

# Vidyasagar University

## Curriculum for B.Sc. Honours in Nutrition [Choice Based Credit System]

### Semester-I

Sl.No.	Name of the Subject	Nature	Code	Teaching Scheme in hour per week			Credit	Marks
				L	T	P		
C1	C1T: Basic Nutrition ( Theory)	Core Course-1		4	0	0	6	75
	C1P: Basic Nutrition ( Practical)	Core Course1 [Practical]		0	0	4		
C2	C2T: Food Science and Food Commodity ( Theory)	Core Course-2		4	0	0	6	75
	C2P: Nutritional Biochemistry ( Practical)	Core Course-2 [Practical]		0	0	4		
GE-1	GE-1	GE					4/5	75
	GE-1	GE					2/1	
AECC	English	AECC					2	50
Total Credits =20								

L= Lecture, T= Tutorial, P=Practical

**AECC- Ability Enhancement Compulsory Course:** English /Modern Indian Language

**Interdisciplinary/Generic Elective (GE) from other Department**

**[Four papers are to be taken and each paper will be of 6 credits]:** Papers are to be taken from any of the following discipline: **Chemistry/Physiology/Botany /Zoology/Computer Sc/Microbiology/Bio-Technology/Mathematics/Statistics**

## **Semester-1**

### **Core Courses**

#### **CC-1 : Basic Nutrition**

**Credits 06**

#### **C1 T1: Basic Nutrition (Theory)**

**Credits 04**

1. Concept and definition of terms Nutrition, Malnutrition and Health: Brief history of nutritional science. Scope of nutrition.
2. Minimum Nutritional Requirements and RDA : Formulation of RDA and Dietary Guidelines: Reference Man and Reference Woman.
3. Body Composition and Changes through the life cycle.
4. Energy in Human Nutrition: Idea of energy and its unit, energy balance, Assessment of energy requirements, Deficiency and Excess, Determination of energy in food, B.M.R & influencing factors, S.D.A.
5. Energy and other nutritional requirement of adult male and female engaged in different types of work (Sedentary, moderate, heavy).
6. Food as source of nutrients, function of food, definition of nutrition, nutrients and energy, adequate, optimum and good nutrition, malnutrition.
7. Nutrition- Fitness, Athletics and sports.
8. Food Guide- Basic food groups, How to use food guide (according to RDA).
9. Interrelationship between nutrition and health- Visible symptoms of goods health.
10. Function of nutrients- Carbohydrate, dietary fibre, protein, fat, vitamins, minerals, anti-oxidants, water.
11. Effect of cooking and heat processing on the nutritive value of foods.
12. Processed supplementary foods
13. Food sanitation in hygiene.

## **C1 P1: Basic Nutrition (Practical)**

**Credits 02**

1. Use and care of kitchen equipment.
2. Weights and measures standards; household measures of raw and cooked foods.
3. 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, milkshakes.
  - c) Cereals and flour mixtures- basic preparation and their nutritive value- Boiled rice and rice pulao, chapatti, parantha, sandwiches, pastas, pancakes, cookies and cakes.
4. Vegetables and fruits: Simple salad, dry vegetables, curries, fruits preparation using fresh and dried stewed fruit, fruit salad.
5. Milk and milk products: Porridges, curds, anner and their commonly made preparations, milk based simple desserts and puddings, custard, kheer, ice-cream.
6. Meat- Cut of meats Meat preparations, Fish, poultry, hard and soft cooked, poached, scrambled, fried omelette, egg-nogs.
7. Soups: Basic, clear and cream soups.
8. Snacks: pakoras, cheese toast, upma, poha, peanut, chikki, ti and laddo

## **Core Course -2**

### **CC-2 : Food Science and food commodity**

**Credits 06**

### **C2 T2: Food Science and food commodity**

**Credits 04**

1. Basic concept on Food, Nutrients, Nutrition.
2. Classification of Food, Classification of Nutrients.
3. Carbohydrates - Definition, Classification, Structure and properties. Monosaccharides - glucose, fructose, galactose. Disaccharides - Maltose, lactose, sucrose. Polysaccharides - Dextrin, starch, glycogen, resistance starch.
4. Lipids - Definition, Classification & Properties. Fatty acids - composition, properties, types.
5. Proteins - Definition, Classification, Structure & properties.

Amino acids - Classification, types, functions.

6. Carbohydrates - Sources, daily requirements, functions. Effects of too high - too low carbohydrates on health. Digestion & Absorption. Blood glucose and effect of different carbohydrates on blood glucose. Glycemic Index. Functional role of Sugars in food, Fermentation of Sugar.

7. Proteins - Sources, daily requirements, functions. Effect of too high - too low proteins on health. Digestion & absorption. Assessment of Protein quality (BV, PER, NPU). Factors affecting protein bio-availability including anti-nutritional factors.

8. Lipids - Sources, daily requirements, functions. Digestion & Absorption. Role & nutritional significances of PUFA, MUFA, SFA, W-3 fatty acid.

9. Dietary Fibre - Classification, sources, composition, properties & nutritional significance.

10. Minerals & Trace Elements, Bio-Chemical and Physiological Role, bio-availability & requirements, sources, deficiency & excess (Calcium, Sodium, Potassium Phosphorus, Iron, Fluoride, Zinc, Selenium, Iodine, Chromium).

11. Vitamins - Bio-Chemical and Physiological Role Physiological role, bio-availability and requirements, sources, deficiency & excess.

12. Water - Functions, daily requirements, Water balance.

13. Sensory characteristics of food

14 Food behaviour, modification of food behaviour

15. Cereals and Millets: Cereal products, breakfast cereals, fast foods. Structure, processing, storage, use in various preparations, variety, selection and cost.

16. Pulses and Legumes: Production (in brief), structures, selection and variety. Storage, processing and use in different preparations. Nutritional aspects and cost.

17. Milk and Milk-products: Composition, classification, selection quality and cost, processing, storage and uses in different preparations. Nutritional aspects, shelf - life and spoilage.

18. Eggs: Production, grade, quality, selection, storage and spoilage, cost, nutritional aspects and use in different preparations.

19. Meat, Fish and Poultry: Types, selection, purchase, storage, uses, cost, spoilage of fish poultry and meat, uses and preparations.

20. Vegetables and Fruits: Types, selection, purchase, storage, availability. Cost of use and nutritional aspects of raw & processed products and use in different preparations.

21. Sugar and Sugar products: Types of natural sweeteners, manufacture, selection, storage and use as preserver, stages in sugar cookery.

22. Fats and Oils: Types and sources (animal and vegetable), processing, uses in different preparations, storage, cost and nutritional aspects.
23. Raising and Leavening agents: Types, Constituents, Uses in cookery and bakery, Storage.
24. Food Adjuncts: Spices, Condiments, Herbs, Extracts, Concentrates, Essences, Food Colours. Origin, classification, Description, uses, Specifications, procurements and Storage.
25. Convenience Foods: Role, types, advantages, uses, cost and contribution to diet.
26. Salt: Types and uses.
27. Beverages: Tea; Coffee. Chocolate and Cocoa Powder-Processing, cost and nutritional aspects, other beverages-Aerated beverages, juices.
28. Preserved Products : Jams, Jellies, Pickles, Squashes, Syrups types, composition and manufacture, selection, cost, storage, uses and nutritional aspects.
29. Food Standards : ISI, Agmark, FPO, MPO, PFA.
30. New food: fast food, junk food, GM food, Free food
31. Food, preservation, food processing, food adulteration and food storage.

## **C2 P2: Nutritional Biochemistry (Practical)**

**Credits 02**

### **1. Carbohydrate**

- a. Reactions of Mono, Di and Polysaccharides and their identification in unknown mixtures.
- b. Estimation of reducing and total sugars in foods.
- c. Estimation of lactose in milk.

### **2. Fats**

- a. Reactions of fats and oils
- b. Determination of Acid value, Saponification of natural fats and oils.

### **3. Proteins**

- a. Reactions of proteins in foods
- b. Reaction of amino acids and their identification in unknown mixtures
- c. Estimation of total nitrogen of foods by Kjeldhal method.

## **Generic Elective**

### **GE-1 [Interdisciplinary for other department]**

#### **GE-1 : BASIC HUMAN NUTRITION**

**Credits 06**

##### **GE-1 T: BASIC HUMAN NUTRITION**

**(Credits: 6)**

1. Concept and definition of terms-Nutrition, Malnutrition and Health. Brief history of nutrition science. Scope of Nutrition.
2. Body Composition and Changes through the life cycle.
3. Minimum Nutritional Requirement and RDA. Reference Man and Reference Woman.
3. Energy in Human Nutrition : Idea of Energy and its unit, Energy Balance, Assessment of Energy Requirements of the body, B.M.R & influencing factors, S.D.A, Calorific value of food, Determination of Energy in food.
4. Food groups.
5. Function of nutrients- Carbohydrate, dietary fibre, protein, fat, vitamins, minerals, anti-oxidants, water.
6. Effect of cooking and heat processing on the nutritive value of foods.

# Vidyasagar University

## Curriculum for B.Sc. Honours in Nutrition [Choice Based Credit System]

### Semester-II

Sl. No.	Name of the Subject	Nature	Code	Teaching Scheme in hour per week			Credit	Marks
				L	T	P		
C3	C3T: Nutritional Biophysics & Biochemistry	Core Course-3		4	0	0	6	75
	C3P: Nutritional Biophysics & Biochemistry (Practical)	Core Course-3 [Practical]		0	0	4		
C4	C4T: Human Physiology	Core Course-4		4	0	0	6	75
	C4P: Human Physiology ( Practical)	Core Course-4 [Practical]		0	0	4		
GE-2	GE-2	GE					4/5	75
	GE-2	GE					2/1	
AEC C-2	Environmental Studies	AECC					4	100
				Total Credits =22				

**L= Lecture, T= Tutorial, P=Practical**

**AECC- Ability Enhancement Compulsory Course:** Environmental Studies.

### Interdisciplinary/Generic Elective (GE) from other Department

**[Four papers are to be taken and each paper will be of 6 credits]:** Papers are to be taken from any of the following discipline: **Chemistry/Physiology/Botany /Zoology**

**/Computer Sc/Microbiology/Bio-Technology/Mathematics/Statistics**

## Core Courses

### CC-3 Nutritional Biophysics and biochemistry

**C3T    Nutritional Biophysics and biochemistry****Credits 04**

1. Biochemistry: Definition, objectives, scope and interrelationship between biochemistry and other biological science.
2. Biophysics- general idea of biophysics in nutrition
3. Basic process and nutritional importances of Diffusion, Osmosis, Absorption, Viscosity, Surface tension, Colloids.
4. Principles of Thermodynamics and its importance in nutrition.
5. Acid, Base, Buffer, pH and Acid-Base balance.
6. Molecular aspects of transport; Passive diffusion, facilitated diffusion, active transport.
7. Enzymes: Definition, types and classification of enzymes, definition and types of coenzymes. specificity of enzymes, Isozymes, enzyme Kinetics including factors affecting enzyme action, velocity of enzyme catalyzed reactions, enzyme inhibition.
8. Intermediary metabolism:
  - a) Carbohydrate Metabolism, Glycolysis, TCA cycle & energy generation, gluconeogenesis, glycogenesis, glycogenolysis, blood sugar regulation.
  - b) Lipids : Oxidation and biosynthesis of fatty acids (saturated & mono-unsaturated) : Synthesis and utilization of ketone bodies, Ketosis, fatty livers.
  - c) Proteins : General reaction of amino acid metabolism, urea cycle.
9. Lipoproteins : Types, composition, role and significance in disease (in brief)
10. Introduction to Nucleic acids: Structure, replication, transcription, genetic code (in brief) elementary knowledge of biosynthesis of proteins.
11. Fluid, Electrolytes and Acid-Base balance brief.

### C3P Nutritional Biophysics and biochemistry(Practicals)

**Credits 02**

1. To study the general properties of urease and salivary amylase.
2. Preparation of buffer of particular pH (Phosphate buffer, Tris buffer)
3. Determination of strength of  $\text{KMnO}_4$  using primary standard (oxalic acid).
4. Electrophoresis
5. Dialysis

## Core -4

### CC-4: HUMAN PHYSIOLOGY

Credits 06

### C4T: HUMAN PHYSIOLOGY

Credits 04

1. Cell structure and function
2. Blood cells: Haemoglobin, Blood groups, Coagulation factors, Anaemia.
3. Skeletal System: bones, joints and bone deformities in brief.
4. Cardiovascular System: Cardiac cycle, Cardiac output, Blood pressure, Hypertension, Radial Pulse
5. Lymphatic System: Lymph glands and its function, Splen- Structure and functions.
6. Respiratory System:- Ventilation, functions, Lungs volume and capacities.
7. Gastrointestinal System: a. Structure of various parts of the GI tract b. Digestion and absorption of Carbohydrate, protein and fat. (Digestion and absorption of Carbohydrate, protein and fat repeated in CC2T 6, 7, 8)
8. Endocrinology: List of endocrine glands, Hormones their secretion and function (in brief)
9. Excretory System: Structure of Nephron, formation of urine.
10. Central Nervous System: Parts, Sliding filament theory, neuromuscular junction, wallerian degeneration, Motor Nervous System- Upper motor Nervous System and lower motor Nervous System. Sensory Nervous System, Sympathetic and Parasympathetic nervous system.
11. Skin: Structure and function of skin
12. Reproductive System: a. Structure and functions of male and female reproductive organs, Menstrual cycle, Puberty, Menopause, fertilization and development of fertilized ovum, placenta and its function.
13. Special senses: Structure and function of eye and ear, common diseases in eye and ear (in brief).

### C4 P: HUMAN PHYSIOLOGY (Practicals)

Credits 02

1. Identification of prepared Slides:  
(a) Lungs, (b) Supra Renal Gland, (c) Thyroid, (d) Pituitary (e) Testis, (f) Ovary, (g) Kidney, (h) Liver, (i) Pancreas, (j) Small Intestine, (k) Large Intestine, (l) Spinal cord, (m) Cerebellum.
2. Preparation of blood film and identification of white blood cells, Differential count.
3. Estimation of Haemoglobin.
4. Determination of Bleeding time and clotting time of blood, Blood grouping.
5. Measurement of Blood pressure and Pulse Rate.
6. Elicitation of Reflexes and jerks.
7. Estimation of haemoglobin, RBC, WBC, TLC, DLC and ESR.

## **Generic Elective**

### **GE-2 [Interdisciplinary for other department]**

#### **GE-2 : FOOD SCIENCE**

**Credits : 06**

#### **GE-2 T : FOOD SCIENCE**

1. Cereals and Millets: Cereal products, breakfast cereals, fast foods. Structure, processing, storage, use in various preparations, variety, selection and cost.
2. Pulses and Legumes: Production (in brief), structures, selection and variety. Storage, processing and use in different preparations. Nutritional aspects and cost.
3. Milk and Milk-products: Composition, classification, selection quality and cost, processing, storage and uses in different preparations. Nutritional aspects, shelf - life and spoilage.
4. Eggs: Production, grade, quality, selection, storage and spoilage, cost, nutritional aspects and use in different preparations.
5. Meat, Fish and Poultry: Types, selection, purchase, storage, uses, cost, spoilage of fish poultry and meat, uses and preparations.
6. Vegetables and Fruits: Types, selection, purchase, storage, availability. Cost of use and nutritional aspects of raw & processed products and use in different preparations.
7. Sugar and Sugar products: Types of natural sweeteners, manufacture, selection, storage and use as preserver, stages in sugar cookery.
8. Fats and Oils: Types and sources (animal and vegetable), processing, uses in different preparations, storage, cost and nutritional aspects.
9. Raising and Leavening agents: Types, Constituents, Uses in cookery and bakery, Storage.
10. Food Adjuncts: Spices, Condiments, Herbs, Extracts, Concentrates, Essences, Food Colours. Origin, classification, Description, uses, Specifications, procurements and Storage.
11. Convenience Foods: Role, types, advantages, uses, cost and contribution to diet.
12. Salt : Types and uses.

13. Beverages : Tea; Coffee. Chocolate and Cocoa Powder-Processing, cost and nutritional aspects, other beverages-Aerated beverages, juices.
14. Preserved Products : Jams, Jellies, Pickles, Squashes, Syrups types, composition and manufacture, selection, cost, storage, uses and nutritional aspects.
15. Food Standards : ISI, Agmark, FPO, MPO, PFA.
16. New food: fast food, junk food, GM food, Free food
17. Food, preservation, food processing, food adulteration and food storage.

# Vidyasagar University

## Curriculum for B.Sc (Honours) in Nutrition [Choice Based Credit System]

### Semester-III

Course	Course Code	Name of the Subjects	Course Type/ Nature	Teaching Scheme in hour per week			Credit	Marks
				L	T	P		
CC-5		C5T:Family meal management and meal planning	Core Course - 5	4	0	0	6	75
		C5P:Practical		0	0	4		
CC-6		C6T:Community Nutrition and Nutritional Epidemiology	Core Course - 6	4	0	0	6	75
		C6P:Practical		0	0	4		
CC-7		C7T:Basic Dietetics	Core Course - 7	4	0	0	6	75
		C7P:Practical		0	0	4		
GE-3	TBD		Generic Elective -3				4/5	75
							2/1	
SEC-1		SEC1T: Immunology, Toxicology and Public Health Or SEC1T: Biostatistics and Bioinformatics	Skill Enhancement Course-1	1	1	0	2	50
Semester Total							26	350

**L**=Lecture, **T**= Tutorial, **P**=Practical, **CC** = Core Course, **GE**= Generic Elective, **SEC** = Skill Enhancement Course, **TBD** = to be decided

**Generic Elective (GE)( Interdisciplinary)** from other Department [**Four papers are to be taken and each paper will be of 6 credits**]:

Papers are to be taken from any of the following discipline:

**Chemistry/Physiology/Botany /Zoology/Computer Sc/Microbiology/Bio-Technology/ Mathematics/Statistics**

**Modalities of selection of Generic Electives (GE):** A student shall have to choose **04** Generic Elective (GE1 to GE4) strictly from **02** subjects / disciplines of choice taking exactly **02** courses from each subjects of disciplines. Such a student shall have to study the curriculum of Generic Elective (GE) of a subject or discipline specified for the relevant semester.

**Semester-III**  
**Core Course (CC)**

**CC-5: Family meal management and meal planning** **Credits 06**

**CC5T: Family meal management and meal planning** **Credits 04**

**Course Contents:**

1. Nutrition during Pregnancy: Physiology of pregnancy, factors (nonnutritional) affecting pregnancy outcome, importance of adequate weight gain during pregnancy, antenatal care and its schedule, Nutritional requirements during pregnancy and modification of existing diet and supplementation, nutritional factors affecting breast feeding. Deficiency of nutrients and impact- energy, iron, folic acid, protein, calcium, iodine. Common problems of pregnancy and their managements- nausea, vomiting, pica, food aversions, pregnancy induced hypertension, obesity, diabetes and Adolescent Pregnancy.
2. Nutrition during Lactation: Physiology of Lactation: Nutritional requirements during lactation, dietary management, food supplements, galactagogues, preparation for lactation. Care and preparation of nipples during breast feeding.
3. Nutrition during infancy: Infant physiology relevant to feeding and care. Breast feeding - colostrums, its composition and importance in feeding. Initiation of breast-feeding and duration of breast-feeding, Advantages of exclusive breast-feeding, Nutritional and other advantages of breast-feeding. Introduction of complementary foods, initiation of management of weaning, breast feeding etc. Bottlefeeding circumstances under which bottle-feeding is to be given. Care and sterilization of bottles. Preparation of formula. Mixed feeding, breast feeding and artificial feeding. Teething and management of problems.
4. Nutrition to toddlers / preschool/school going children or adolescent.
5. Management of preterm and low birth weight children – their special needs.
6. Growth and development from infancy to adulthood: Importance of nutrition for ensuring adequate development, Preventions of growth faltering. Growth assessment by Height, Weight, BMI, Skin fold thickness, Waist Hip Ratio.
7. Geriatric nutrition – Dietary requirement, Geriatric health problems, Nutritional care.
8. Sports Nutrition- nutritional demand on different sports and dietary recommendations.
9. Space Nutrition- Body composition changes in space, special diet in space persons.
10. Meal planning for the family
11. Indian meal pattern- vegetarian and non- vegetarian
12. Food faddism and the faulty food habits
13. Nutritive value of common Indian recipes.

**C5P: Family meal management and meal planning (practical)** **Credits 02**

1. Planning and preparation of balanced diet for a pregnant women
2. Diet during complication of pregnancy
3. Planning and preparation of balanced diet for a lactating women
4. Preparation of weaning food
5. Planning and preparation of balanced diet for a pre-school children
6. Planning and preparation of balanced diet for school going child. Preparation of packed lunch
7. Planning and preparation of balanced diet for adolescents

8. Planning and preparation of balanced diet for adult men and women of different Physical activity and economic status.
9. Planning and preparation of balanced diet for senior citizen.

## **CC-6: COMMUNITY NUTRITION AND NUTRITIONAL EPIDEMIOLOGY**

**Credit 06**

### **C6T: Community Nutrition and Nutritional Epidemiology**

**Credit 04**

#### **Course Contents:**

1. Concept of community, types of community, factors affecting health of Community.
2. Nutritional Anthropometry, Biochemical tests and Biophysical methodology - Merits, Limitations
3. Diet Survey: Need and importance, methods of dietary survey- Merits and Limitations. Family food security.
4. Clinical Signs: Merits, Limitations, Need and importance, identifying signs of PEM, vitamin A deficiency, Vit.-D deficiency and iodine deficiency, Classify clinical sign according to WHO.
5. Nutritional problem in the community
6. National Nutritional Intervention Programme to combat malnutrition
7. Food availability, factors affecting food availability and its consumption.
8. Infection and Immunization: Importance and Schedule of Vaccination of Children, Adult and foreign travelers. Full and partial immunization. Role of community for universal vaccination implementation
9. Principles of Epidemiology: Concept of disease, rate of a disease in a population (attack rate, morbidity rate, mortality rate, incidence and prevalence rate).
10. Dietary Exposure-National, Household, Institution and Individual level (NHFS and NNMB)
11. Biomarkers and nutrient intakes.
12. Epidemiological methods: descriptive studies, analytical studies and experimental studies.
13. Study of the epidemiologic approach – time, place, person distribution. Determinants of disease. Vital statistics and their significance.
14. Demography- Demography cycle and its applications. Socio-demographic and psychosocial variables.
15. Public health hazards from contaminated foods
16. Comparison with norms, standards, Z-scores.
17. Interpretation of the nutritional assessment data and its significance
18. Determining Validity and Reliability
19. Sources of errors for different methods of measurement relating to nutritional exposures.
20. Malnutrition and Infection vicious cycle-UNICEF conceptual model of Malnutrition.

### **C6P: Community Nutrition and Nutritional Epidemiology (Practical)**

**Credit 02**

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 of children and adolescent girls and boys
2. Preparation of visual aids to highlight community nutrition, nutritional awareness, nutritional surveillance.
3. Field visit to-
  - a. Observe the working of nutrition and health oriented programmes (survey based result).
  - b. Hospitals to observe nutritional deficiencies.

## **CC-7: Basic Dietetics**

**Credits 06**

### **C7T: Basic Dietetics**

**Credits 04**

1. Role of dietician: The hospital and community
2. Basic Concepts of diet therapy
3. Principle of diet therapy and therapeutic nutrition for changing needs
4. Routine Hospital Diets: Regular, light, soft, fluid, parenteral and enteral feeding
5. Diets for febrile conditions, infections and surgical conditions.
6. Diet for gastro-intestinal disorders- Constipation, diarrhoea, peptic ulcer
7. Diet for Renal Diseases- Nephritis, Nephrotic syndrome, Renal failure.
8. Diet for obesity and different cardiovascular disorders
9. Diet for diabetes mellitus
10. Nutrition in cancer
11. Nutrition in Immune system dysfunction (AIDS & Allergy)
12. Nutrition support in metabolic disorder
13. Nutrition in burn and surgery
14. Nutrition- Addictive behaviour in anorexia nervosa, bulimia and alcoholism
15. Nutrient Drug interaction
16. Feeding infants and children's- problems in feeding children in hospital
17. Nutrition and diet clinics- Nutrition education in general, Patients check-up and dietary counselling, educating the patient and follow up.

### **C7P: Basic Dietetics (Practical)**

**Credits 02**

1. Planning and preparation of normal diets.
2. Planning and preparation of fluid diets.
3. Planning and preparation of soft/semi solid diets.
4. Planning and preparation of high and low calorie diets.
5. Planning and preparation of diets for diabetes mellitus
6. Planning and preparation of diet for hypertension and atherosclerosis
7. Planning the preparation of diets for nephritis and nephrotic syndrome
8. Planning and preparation of diets for Peptic Ulcers.
9. Low and medium cost diets for PEM, anaemia and vitamin A deficiency

## Skill Enhancement Course (SEC)

### SEC-1: IMMUNOLOGY, TOXICOLOGY AND PUBLIC HEALTH

Credits 02

#### SEC1T: Immunology, Toxicology and Public Health

##### Theory:

##### 1. Immunology:

- Basic concept of immunity, Types of immunity-innate, acquired, active and passive immunity.

##### 2. Humoral immune system:

- Mechanisms of humoral immunity, Immunoglobulin isotypes- IgG, IgM, IgA, IgD, and IgE.

##### 3. Cell mediated immune system:

- Types of effector T cells, mechanisms of cell mediated immunity.

##### 4. Toxic agents:

- Human exposure, mechanism of action and resultant toxicities of the following xenobiotics: Metals: lead, arsenic Pesticides: organophosphates, carbamates, organochlorine.

##### 5. Eco-toxicology:

- Brief introduction to avian and aquatic toxicology, movement and effect of toxic compounds in food chain (DDT, mercury), bioaccumulation, biomagnifications, concept of BOD and COD.

##### Suggested Reading:

1. Immunology, 8th edition, (2012), Male, D., Brostoff, J., Roth, D.B. and Roitt, I., Elsevier-Saunders.
2. An Introduction to Immunology, Immunochemistry and Immunobiology, 5th edition, (1988), Barrett, James T., Mosby Company, St. Louis.
3. Immunology: An Introduction, 4th edition, (1994), Tizard, I.R., Saunders College Publishing, Philadelphia.
4. Cassarett and Doull's "Essentials of Toxicology" 2nd edition (2010), Klaassen and Watkins, McGraw Hill Publisher.
5. Introduction to Toxicology, 3rd edition (2001), John Timbrell, Taylor and Francis Publishers..
6. Principles of Toxicology, 2nd edition (2006), Stine Karen and Thomas M Brown, CRC press.
7. Lu's basic toxicology: Fundamentals target organ and risk assessment, 5th edition (2009), Frank C Lu and Sam Kacow, Informa Health care.

OR

**SEC 1: BIOSTATISTICS AND BIOINFORMATICS**

**Credits 02**

**SEC1T: Biostatistics and Bioinformatics**

**Theory:**

1. Data and Data Types: Primary data and Secondary Data.
2. Measures of Central Tendency: Mean, Median, Mode.
3. Dispersion: Range, Standard Deviation.
4. Hypothesis Testing: Chi-square Test, Student 't' test, Analysis of Variance (ANOVA).
5. Bioinformatics and Health Informatics: Concept and applications.
6. Nucleic acid and Protein Data Bases, Nutrient data bases.
7. Sequence similarity searching by BLAST, Principle, features and types of BLAST, Significance of Multiple Sequence Alignments, Phylogenetic Tree.

**Suggested Readings :**

1. Saxena Sanjay (2003) A First Course in Computers, Vikas Publishing House.
2. Pradeep and Sinha Preeti (2007) Foundations of Computing, 4th ed., BPB Publications.
3. Lesk M.A. (2008) Introduction to Bioinformatics. Oxford Publication, 3rd International Student Edition.
4. Rastogi S.C., Mendiratta N. and Rastogi P. (2007) Bioinformatics: methods and applications, genomics, proteomics and drug discovery, 2nd ed. Prentice Hall India Publication.
5. Primrose and Twyman (2003) Principles of Genome Analysis & Genomics. Blackwell.
6. Debjyoti Das (2012). Biostatistics. Academic Publishers
7. E. Batschelet : Introduction to Mathematics for Life Scientists, Springer Verlag, International Student Edition, Narosa Publishing House, New Delhi (1971, 1975).
8. A. Edmondson and D. Druce : Advanced Biology Statistics, Oxford University Press; 1996.
9. W. Danial : Biostatistics : A foundation for Analysis in Health Sciences, John Wiley and Sons Inc; 2004.

**Generic Elective Syllabus**  
**GE-3 [Interdisciplinary for other department]**

**GE-3: Community Nutrition and Nutritional Programme**

**Credits 06**

**GE3T: Community Nutrition and Nutritional Programme**

**Community Nutrition and Nutritional Programme:**

1. Concept of community, types of community, factors affecting health of Community.
2. Basic concept of Nutritional Programme Formulation.
3. ICDS Programme – Aims, Objectives, Target group, Services provided, Advantages, Limitation, Suggestion for improvement.
4. MDMP – Aims, Objectives, Target group, Service provided, Advantages, Limitation, Suggestion for improvement.
5. ANP, SNP, CNP, BFP – Aims and Objectives, Target group, Service provided, Advantages, Limitation.
6. PHC and Public distribution system to combat malnutrition
7. Identifying signs and symptoms of vitamin A deficiency, Vit.-D deficiency, iodine and iron deficiency, and role of prophylaxis programme to overcome such deficiencies.
8. Nutritional Anthropometry, Biochemical tests and Biophysical methodology - Merits, Limitations
9. Diet Survey: Need and importance, methods of dietary survey- Merits and Limitations. Family food security.
10. Concept of Surveillance Systems: Role of international, national, regional agencies and organizations.
11. Nutritional problem in the community : Epidemiology, etiology and prevention of Marasmus, Kwashiorkor, Scurvy, Ricket, Osteomalacia, Obesity.
12. Importance of dietitian in community

**Nutrition in specific pathophysiological conditions:**

1. Hospital diets- liquid, clear fluid, soft & normal diets.
2. Diet therapy in diabetes mellitus and obesity.
3. Dietary management and nutritional factors involved in cardiovascular disease like atherosclerosis, hyperlipidemia, hypertension.
4. Diet therapy in peptic ulcer, gastritis, diarrhea, colitis, constipation, flatulence and jaundice.
5. Diet during febrile condition, infection, surgical condition, nephritis, and nutritional anemia.
6. Therapeutic uses of dietary fibers with special reference to chronic constipation, diverticular disease, irritable bowel syndrome, obesity and diabetes, possible adverse effects of dietary fibers.
7. Rehydration therapy- Elementary idea about rehydration, Conditions for rehydration. Different types of rehydration therapy with special emphasis on ORS -its types and importance, Age dependent ORS quantity for rehydration therapy.
8. Nutrition and Infection: Infection, a cause of malnutrition and vice-versa. Nutrition and immunity during childhood and in adult.