

# 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
<b>Total Credits =20</b>								

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 good 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
<b>Total Credits =22</b>								

**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**

## Semester-2

### Core Courses

#### Core -3

**CC-3 Nutritional Biophysics and biochemistry Credits 06**

**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 regeneration, 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		<b>C5T:</b> Family meal management and meal planning	Core Course - 5	4	0	0	6	75
		<b>C5P:</b> Practical		0	0	4		
CC-6		<b>C6T:</b> Community Nutrition and Nutritional Epidemiology	Core Course - 6	4	0	0	6	75
		<b>C6P:</b> Practical		0	0	4		
CC-7		<b>C7T:</b> Basic Dietetics	Core Course - 7	4	0	0	6	75
		<b>C7P:</b> Practical		0	0	4		
GE-3	TBD		Generic Elective -3				4/5	75
SEC-1		<b>SEC1T:</b> Immunology, Toxicology and Public Health <b>Or</b> <b>SEC1T:</b> Biostatistics and Bioinformatics	Skill Enhancement Course-1	1	1	0	2	50
<b>Semester Total</b>							<b>26</b>	<b>350</b>

**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 recepies.

**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-Sanders.
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 Whatkins, 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.

# Vidyasagar University

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

### Semester-IV

Course	Course Code	Name of the Subjects	Course Type/ Nature	Teaching Scheme in hour per week			Credit	Marks
				L	T	P		
CC-8		C8T: Diet and Diseases	Core Course - 8	4	0	0	6	75
		C8P:Practical		0	0	4		
CC-9		C9T: Food Microbiology	Core Course - 9	4	0	0	6	75
		C9P:Practical		0	0	4		
CC-10		C10T: Food processing and Preservation	Core Course - 10	4	0	0	6	75
		C10P:Practical		0	0	4		
GE-4	TBD		Generic Elective-4				4/5	75
							2/1	
SEC-2		Basic Molecular Biology Or Nutrition and Fitness Or Entrepreneurship Development Or Women Health & Nutrition	Skill Enhancement Course-2	1	1	0	2	50
<b>Semester Total</b>							<b>26</b>	<b>350</b>

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: 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.

Core Course (CC)

**CC-8: Diet and Diseases**

**Credits 06**

**C8T: Diet and Diseases**

**Credits 04**

**Course Contents:**

1. Inborn error of metabolism – Lactose Intolerance, Galactosamia, Phenylketonuria and its dietary management.
2. Etiology, symptoms, diagnostic tests and dietary management of intestinal diseases: Diarrhea, Steatorrhoea, Diverticular disease, Inflammatory bowel disease, Ulcerative Colitis, Flatulence, Constipation, Irritable Bowel Syndrome, Haemorrhoids.
3. Etiology, symptoms, diagnostic tests and dietary management of Malabsorption syndrome, Celiac sprue, tropical sprue, Intestinal brushborder deficiencies (Acquired disaccharide intolerance), Protein losing enteropathy. RUTF.
4. Disease of the liver, Exocrine Pancreas and Biliary System. Liver function tests, application of diet therapy and nutritional care in liver disease. Dietary care and management in Viral Hepatitis, Cirrhosis of liver, Wilson's diseases. Dietary care and management in diseases of Gall Bladder and Pancreas Cholelithiasis, Cholecystitis, Cholecystectomy, Pancreatitis.
5. Anaemias: Pathogenesis and dietary management - Nutritional Anaemias, Sickle Cell Anaemias, Thalassemia, Anaemia resulting from Acute Haemorrhage.
6. Arthritis and gout: Etiology, symptoms, diagnostic tests and dietary management.

**C8P: Diet and Diseases (Practical)**

**Credits 02**

**Practical:**

1. Planning and preparation of diet for diarrhoea patient.
2. Planning and preparation of diet for Steatorrhoea patient.
3. Planning and preparation of diet for Diverticular disease patient.
4. Planning and preparation of diet for Ulcerative Colitis patient.
5. Planning and preparation of diet for Flatulence patient.
6. Planning and preparation of diet for Constipation patient.
7. Planning and preparation of diet for Irritable Bowel Syndrome patient.
8. Planning and preparation of diet for Haemorrhoids patient.
9. Planning and preparation of diet for Celiac sprue patient.

10. Planning and preparation of diet for Viral Hepatitis patient.
11. Planning and preparation of diet for Cirrhosis of liver patient.
12. Planning and preparation of diet for Cholelithiasis patient.
13. Planning and preparation of diet for Pancreatitis patient.
14. Planning and preparation of diet for Anaemia patient.
15. Planning and preparation of diet for Thalassemia patient.

## **CC-9: Food Microbiology**

**Credits 06**

### **C9T: Food Microbiology**

**Credits 04**

#### **Course Contents:**

1. Introduction to microbiology and its relevance to everyday life. General characteristics of bacteria, fungi, virus, protozoa and algae.
2. Cultivation of microorganisms: Nutritional requirements of microorganisms, types of media used, methods of isolation.
3. Growth of microorganisms: Growth curve, effect of environmental factors in growth of microorganism – pH, water activity, oxygen availability, temperature and others.
4. Primary sources of microorganisms in foods, physical and chemical methods used in destruction of micro organisms in foods - sterilisation and disinfection.
5. Food Spoilage: Contamination of micro organisms in the spoilage of different kinds of foods, such as cereal and cereal products, vegetable and fruits, fish and other sea foods, meat and meat products, eggs and poultry, milk and milk products, canned foods.
6. Assessing the microbiological quality of food: indicator organisms, microbiological standards, principles of GMP & HACCP in food processing. Safety management at household and industrial level.
7. Foodborne infections: Bacterial food infections-Salmonellosis, Shigellosis and Listeriosis. Food poisoning (Staphylococcal and Botulism) - Symptoms, mode of transmission and methods of prevention, Concept of aflatoxin intoxication.
8. Beneficial effect of microorganisms-concept of probiotics and related factors
9. Environmental microbiology: Water and water borne diseases, air and air borne diseases, soil and soil borne diseases, sewage and diseases.
10. Waste product handling: Planning for waste disposal- solid wastes and liquid wastes.
11. Fermented Foods- Dietary different fermented products, importance of fermented foods.

### **C9P: Food Microbiology (Practical)**

**Credits 02**

#### **Practical:**

1. Study of equipments in a microbiology lab.
2. Preparation of different culture media.
3. Staining of bacteria with gram staining.
4. Microbiological examination of milk (Methylene blue reduction test).

5. Preparation of traditional Indian fermented food and its quality checking e.g. testing of physical, chemical and nutritional properties.

## **CC-10: Food processing and Preservation**

**Credits 06**

## **C10T: Food processing and Preservation**

**Credits 04**

### **Course Contents:**

1. Significance, principles of different methods of food processing: thermal processing- Cooking (moist heat, dry heat, combination method of cooking), blanching, pasteurization, sterilization, canning.
2. Principles of microwave cooking and solar cooking.
3. Principle of freezing, changes occurring during freezing. Types of freezing - slow freezing, quick freezing. Food preservation by drying and dehydration, differences between sun drying and dehydration (i.e. mechanical drying), types of driers used in the food industry.
4. Preservation by Irradiation: Units of radiation, kinds of ionizing radiations used in food irradiation. Mechanism of action, concept of cold sterilization.
5. Principle and methods of making pickles, jam and jellies from different vegetables / fruits.
6. Principle and methods of preparation of food from cereals.
7. Principle and methods of preparation of meat, fish, poultry and egg products.

## **C10P: Food processing and Preservation (Practical)**

**Credits 02**

### **Practical:**

#### **A:**

1. **Milk cookery:** Experimental milk cookery. Preparation of selected common recipes.
2. **Egg cookery:** Experimental cookery on eggs-boiled eggs, poached eggs, Omelettes and custards. Preparation of selected common recipes.
3. **Vegetables Cookery:** a. Different methods of cooking vegetables – effect of shredding, dicing, acid and alkali, pressure cooking, steaming with and without lid. e.g. Potato, beetroot, carrot and greens. Recipes with Vegetables
4. **Fruits:** Prevention of browning on fruits. Preparation of selected common recipes.
5. Estimation of Sodium, Potassium, Calcium and Iron in different food staffs.
6. Estimation of vitamin C content of food by biochemical method.

#### **B:**

**Visit to a food processing industry.**

*Skill Enhancement Course (SEC)*

**SEC-2: Basic Molecular Biology**

**Credits 02**

**SEC2T: Basic Molecular Biology**

**Course Contents:**

1. Nucleic acid: Bases, nucleosides and nucleotides.
2. DNA structure: DNA double helix (Watson and Crick Model). Types of DNA and RNA, DNA and RNA as genetic material.
3. DNA replication: Semi-conservative replication, Basic mechanism of replication (Prokaryotes / Eukaryotes).
4. Transcriptional unit and basic concept of transcription (Prokaryotes / Eukaryotes).
5. Genetic code and basic mechanism of translation (Prokaryotes / Eukaryotes ).
6. Basic concept of genomics, proteomics and metabolomics.

**Suggested readings**

1. Bolandar, M. (2001). Molecular Endocrinology. Elsevier Science.
2. Alberts, B. et al. (2008). Molecular Biology of the Cell. 5th Ed. Garland Publishing House.
3. Yoshinori Mine (Editor), Kazuo Miyashita (Editor), Fereidoon Shahidi (Editor): Nutrigenomics and Proteomics in Health and Disease: Food Factors and Gene Interactions.
4. Van Ommen, B. (2004). Nutrigenomics: Exploiting systems biology in the nutrition and health arenas. *Nutrition*.20:4-8.
5. Simopoulos, A.P. and Ordovas, J.M. (Editors)(2004). Nutrigenetics and Nutrigenomics.
6. Roche, H.M. (2004). Dietary lipids and gene expression. *Biochem Soc Trans*. 32(Pt 6):999-1002.
7. Mount, D. W. Bioinformatics. Sequence and Genome Analysis, CSHL Press.
8. Jones.N. C., Pevzner, P. A. (2004). An Introduction to Bioinformatics Algorithms, MPI Press.
9. Kaput J, Rodriguez RL. (2004)Nutritional genomics: The next frontier in the Postgenomic era. *Physiol Genomics*.16:166-177.
10. Kaput J. and Rodriguez. R. L. (2006). Nutritional Genomics. John Wiley & Sons, Inc.
11. De Busk RM, Fogarty CP, Ordovas JM, Kornman KS. (2005). Nutritional genomics in practice: Where do we begin? *J Am Diet Assoc*. 105:589-598.

**Or**

**SEC2T: Nutrition and Fitness**

**Credits 02**

**SEC2T: Nutrition and Fitness**

## **Course Contents**

1. Understanding Fitness: Definition of fitness, health and related terms. Assessment of fitness, Approaches for keeping fit.
2. Importance and benefits of physical activity: Physical Activity – frequency, intensity, time and type with examples Physical Activity, physical activity guidelines and physical activity pyramid.
3. Importance of nutrition Role of nutrition in fitness, Nutritional guidelines for health and fitness, Nutritional supplements.
4. Importance of diet and exercise for weight management.

## **Suggested Readings:**

1. Campbell BI. (2014). Sports Nutrition: Enhancing Athletic Performance, CRC Press, Taylor & Francis,
2. Haff GG. (2008). Essentials of Sports Nutrition Study Guide, Humana Press.
3. Dunford M and Doyle JA. (2008). Nutrition for Sport and Exercise, Thomson Wadsworth.
4. Srilakshmi B. (2018). Dietetics, New Delhi: New Age International.

**Or**

**SEC-2: Entrepreneurship Development**

**Credits 02**

**SEC2T: Entrepreneurships Development**

### **Unit-I: Introduction**

Meaning, Needs and Importance of Entrepreneurship, Promotion of entrepreneurship, Factors influencing entrepreneurship, Features of a successful Entrepreneurship.

### **Unit-II: Establishing an enterprise**

Forms of Business Organization, Project Identification, Selection of the product, Project formulation, Assessment of project feasibility.

### **Unit- III: Financing the enterprise**

Importance of finance / loans and repayments, Characteristics of Business finance, Fixed capital management: Sources of fixed capital, working capital its sources and how to move for loans, Inventory direct and indirect raw materials and its management.

### **Unit- IV: Marketing management**



Meaning and Importance, Marketing-mix, product management – Product line, Product mix, stages of product like cycle, marketing Research and Importance of survey, Physical Distribution and Stock Management.

### **Unit – V: Entrepreneurship and International business**

Meaning of international business, Selection of a product, Selection of a market for international business, Export financing, Institutional support for exports.

#### **Suggested Reading:**

1. Holt DH. Entrepreneurship: New Venture Creation.
2. Kaplan JM Patterns of Entrepreneurship.
3. Gupta CB, Khanka SS. Entrepreneurship and Small Business Management, Sultan Chand & Sons.

**Or**

#### **SEC-2: Women Health & Nutrition**

**Credits 02**

#### **SEC2T: Women Health & Nutrition**

1. Factors (non-nutritional) 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, Deficiency of nutrients, specially energy, iron folic acid, protein, calcium, iodine. Common problems of pregnancy and their managements, specially - nausea, vomiting, pica, food aversions, pregnancy induced hypertension, obesity, diabetes. Adolescent pregnancy.
2. Nutritional requirements during lactation, dietary management, food supplements, galactogogues, preparation for lactation. Care and preparation of nipples during breast feeding.

#### **Suggested Readings:**

1. Ghosh, S: The Feeding and Care of Infants and Young Children, VHAI. 6th Ed. Delhi.
2. WHO: A growth chart for International use In Maternal and Children Health Care, Geneva.
3. Mann and Truswell: Essentials of Human Nutrition, Oxford University press.
4. Indian Council of Medical Research: Nutrient Requirements and Recommended- Dietary Allowance for Indians, New Delhi.

Generic Elective Syllabus  
*GE-4 [Interdisciplinary for other department]*

**GE-4: Family Meal Management**

**Credits 06**

**GE4T: Family Meal Management**

**Credits 04**

**Course Contents:**

1. Introduction to meal management - balanced diet, food groups & the planning of balance diet.
2. Food guides for selecting adequate diet .
3. Diet therapy
4. Diet & stress in current scenario.
5. Meal planning for the family.
6. Indian meal patterns - vegetarian & non-vegetarian.
7. Food faddism & the faulty food habits.
8. Nutritive value of common Indian recepies.
9. Nutrition in pregnancy - Physiological stages of pregnancy, nutritional requirements. Food selection, complication of pregnancy.
10. Nutrition during lactation - Physiology of lactation, nutritional requirements.
11. Nutrition during infancy - growth & development, nutritional requirements, breast feeding, infant formula, introduction of supplementary foods.
12. Nutrition during early childhood (Toddler/Preschool)- Growth & nutrient need, nutrition related problems, feeding patterns.
13. Nutrition of school children- Nutritional requirement, importance of snacks, school lunch.
14. Nutrition during adolescence - Growth & nutrient needs, food choices, eating habits, factor influencing needs.
15. Nutrition during adulthood - Nutritional requirements, feeding pattern.
16. Geriatric nutrition: Factors affecting food intake and nutrient use, nutrient needs, nutrition related problems.

**GE4P: Family Meal Management (Lab)**

**Credits 02**

**Practical:**

Planning, preparation and nutritional evaluation of diets in relation to activity levels and physiological state.

**A:**

1. Planning and preparation of a balanced diet for a pregnant woman.
2. Diet during complication of pregnancy.
3. Planning and preparation of a balanced diet for a lactating woman.
4. Preparation of weaning foods.

5. Planning and preparation of a balanced diet for pre-school child.
6. Balanced diet for school going child. Preparation of packed lunch.
7. Planning and preparation of a balanced diet for adolescence.
8. Planning of meals for adult belonging to different income group.
9. Planning meal for senior citizen.

**B: Project work with proper diet plan based on survey.**

**Or**

**GE-4: Dietetics and Counseling**

**Credits 06**

**GE4T: Dietetics and Counseling**

**Credits 04**

**Course Contents:**

1. Practical consideration in giving dietary advice and counselling -
  - a) Factors affecting and individual food choice.
  - b) Communication of dietary advice
  - c) Consideration of behaviour modification
  - d) Motivation.
2. Counselling and educating patient
  - a) Introduction to nutrition counselling
  - b) Determining the role of nutrition counsellor
  - c) Responsibilities of the nutrition counsellor
  - d) Practitioner v/s client managed care
  - e) Conceptualizing entrepreneur skills and behaviour
  - f) Communication and negotiation skills.
3. Teaching aids used by dietitians- charts, leaflets, posters etc., preparation of teaching material for patients suffering from Digestive disorders, Hypertension, Diabetes, Atherosclerosis & Hepatitis and cirrhosis.
4. Computer application
  - a) Use of computers by dietitian
  - b) Dietary computations
  - c) Dietetic management
  - d) Education/ training
  - e) Information storage
  - f) Administrations
  - g) Research
5. Computer application
  - a) Execution of software packages

- b) Straight line, frequency table, bar diagram, pie chart, Preparation of dietary charts for patients
- c) Statistical computation- mean, median, standard deviation, conclusion and regression test.

**GE4P: Practical**

**Credit 02**

1. Project planning for any one disease.
2. Computer application for different diseases.
3. Submitting computed data.
4. Preparations of teaching aids in the field of nutrition.
5. Preparation of case history of a patient and feeding of information in the hard disc.

# Vidyasagar University

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

### Semester-V

Course	Course Code	Name of the Subjects	Course Type/ Nature	Teaching Scheme in hour per week			Credit	Marks
				L	T	P		
CC- 11		C11T: Public Health and Hygiene	Core Course -11	4	0	0	6	75
		- Lab		0	0	4		
CC- 12		C12T: Research Methodology	Core Course -12	4	0	0	6	75
		- Lab		0	0	4		
DSE-1		TBD	Discipline Specific Elective - 1	5/4	1/0	0/4	6	75
DSE-2		TBD	Discipline Specific Elective -2	5/4	1/0	0/4	6	75
<b>Semester Total</b>							<b>24</b>	<b>300</b>

**L=** Lecture, **T=** Tutorial, **P =** Practical, **CC -** Core Course, **TBD -** To be decided, **DSE:** Discipline Specific Elective.

## **Semester-V**

### **List of Core Course (CC)**

**CC-11: Public Health and Hygiene**

**CC-12: Research Methodology**

### **Discipline Specific Electives (DSE)**

**DSE-1: Chemical Safety of Foods**

**Or**

**DSE-1: Microbiological safety of foods**

**Or**

**DSE-1: Food Sanitation and Hygiene**

**DSE-2: Quality Assurance in Food Sectors**

**Or**

**DSE-2: Quality Control and Food Standards**

**Or**

**DSE-2: Food Quality and Sensory Evaluation**

## Semester-V

### Core Courses (CC)

**CC- 11: Public Health and Hygiene**

**Credits 06**

**CC11T: Public Health and Hygiene**

**Credits 04**

#### **Course Contents:**

1. **Food adulteration:** common, adulterants, and health hazards. Food standards and food laws. National and International; PFA, FSSAI, HACCP, ISO Certification; Consumer guidance society, Consumer rights, Consumer court, Central facilities for assessing food adulteration, Role of food inspectors.
2. **Community Water and Waste Management:** Importance of water to the community, etiology and effects of toxic agents, water borne infectious agents, sources of water, safe drinking water/portability and tests for portability, community, waste and waste disposal, sewage disposal and treatment, solid waste and disposal, liquid waste disposal.
3. **Food Borne Disorders:** Food borne infections- Typhoid, Para typhoid, cholera, infective hepatitis, amoebiasis - Food borne intoxications- Disorders caused by; Natural toxins, chemical toxins and Microbiological toxins in food- Lathyrism, staphylococcal intoxication, Botulism, clostridium perfringens, Mycotoxins.
4. **Food handling and Public Health:** Preventing food borne illness and the spread of communicable disease; Sanitation of food serving institution; environmental sanitation, hygienic in food handling and personal hygiene of food handler.
5. **Air & health-** Indices of thermal comfort , Pollution a) Sources b) Pollutants c) Monitoring d) Effects e) Prevention & control.
6. **Mental health-** Health & diseases, Concept of a) Normality b) Mental health, Magnitude of the problem, Prevention of mental diseases, Alcohol related & drug related problems, mental health services in India.
7. **Health care delivery system:** Patterns of health care delivery, History of development of health care delivery system in India, Reports of different committees, Three-tier health care delivery system, Primary health center, Subcentre, CHV, Urban health infrastructure.
8. **Demography & Population Control:** Introduction, Definition, Demographic cycle, Population Pyramid, Fertility, Factors affecting fertility, Indicators of fertility, Population

explosion as a public health problem, Approaches for population control, Family planning methods.

**C11P: Public Health and Hygiene ( Lab)**

**Credits 02**

**List of Practical**

Assignment programme on public health, nutrition and disease – covering any one of the following fields

1. Protein under nutrition and its recovery.
2. Vitamin or Mineral under nutrition and its recovery.
3. Dietary management of non-communicable disease.
4. Dietary management of growing child.
5. Impact of nutrition education on awareness development in the field of personal health.

**CC-12: Research Methodology**

**Credits 06**

**C12T: Research Methodology**

**Credits 04**

**Course Contents:**

1. Introduction to Research Methodology: Meaning of Research, Objectives of Research, Motivations in Research, Criteria of Good Research, Types of Research– Fundamental research, Applied Research, Action research, Qualitative Research, Quantitative Research, Historical research.
2. Defining the Research Problem : Scientific Problem, Formation of scientific Problem, criteria of good research problem
3. The Review of Literature: Meaning of Review of Literature, Need and importances of Review of Literature, Objectives of Review of Literature
4. The Research Hypotheses: Definitions of Hypothesis, Functions of Hypothesis, types of Hypothesis, Characteristics of a Good Hypothesis
5. Sampling – Criteria, Design, Characteristics of good sampling, types of sampling method.
6. Methods of Data Collection: Primary and secondary data, Criteria of good data, Observation Method, Interview method, questionnaire and Schedules, Case Study Method.
7. Experimental design – single and multi group experimental design, Quasi experimental Design
9. Ethical issues in research: Code of Ethics in Research – Ethics and Research Process – Importance of Ethics in Research



## **C12P: Research Methodology (Lab)**

**Credits 02**

### **Practical**

A Project work on public health / nutritional biochemistry / nutritional survey to be submitted.

Formulation of the Project:

1. Meaning of scientific research and its methods. Formulation of project design.
2. Types of project design- exploratory, descriptive, experimental, cross sectional or longitudinal.
3. Methods: survey, case study, anthropological or experimental
4. Tools and techniques: observation, interviewing, questionnaire schedules or rating scales
5. Tabulation and interpretation: Tabular and graphic representation of data and its interpretation, bar diagram, pie diagram. Statistical procedures - variables, mean, standard deviation, test of hypothesis (t-test), chi-square test, degrees of freedom, null hypothesis, z-score.

### *Discipline Specific Electives (DSE)*

**DSE-1: Chemical Safety of Foods**

**Credits 06**

**DSE1T: Chemical Safety of Foods**

**Credits 06**

### **Course Contents:**

Pesticides and veterinary drugs: Detection and quantification of carbamates, organochlorine and organosulphur, organohalogens, nitrites, herbicides, hormones, antibiotics, steroids, environmental chemicals - heavy metals, toxic residues, radioactive isotopes.

Processing contaminants: Detection, quantification and health hazards of direct contaminants – acrylamide, PAHs, oxyhalides, and haloacetic acids, preservatives, flavor enhancers, color additives. Indirect contaminants- boiler water additives, peeling aids, defoaming agents, building and equipment contaminates: lubricants, paint and coatings, contaminants during packaging, storage and transport: cleaners, sanitizers and cross contaminants.

Food additives: Detection, quantification and health hazards of hydrogenated or partially hydrogenated oils, high-fructose corn syrup, artificial colorants, artificial sweeteners such as aspartame, sucralose and saccharin, BHA or BHT, monosodium glutamate, hydrolyzed vegetable protein or autolyzed yeast extract, potassium bromate, propyl gallate, sulfites, sodium nitrate, sodium benzoate.

Food colorants and sweeteners: Detection, quantification and health hazards of brilliant

blue, Indigo, carmine, citrus red , fast green, erythrosine, allura red ,tartrazine, sunset yellow,lake pigments and non-certified colorants, food sweeteners- neotame, sorbitol and non certified sweeteners.

Emulsifiers, stabilizers, thickening and gelling agents: tara gum, soyabean hemicelucose, sucroglycerides, stearyl tartarate, talc, gluconic acid, candelilla wax, carbamide, argon, salt of aspartame and other non certified agents- detection, quantification and health hazards.

### **Suggested Readings:**

1. Branen, A.L., Davidson, P.M. & Salminen, S. (2007) Food Additives, 2<sup>nd</sup> Ed., Marcel Dekker.
2. George, A.B. (2006) Encyclopedia of Food and Color Additives, Vol. III, CRC Press, LLC. Boca Raton, FL
3. George, A.B. (2008) Fenaroli's Handbook of Flavor Ingredients, 5<sup>th</sup> Ed, CRC Press, LLC. Boca Raton, FL
4. Madhavi, D.L., Deshpande, S.S., & Salunkhe, D.K. (2006) Food Antioxidants: Technological, Toxicological and Health Perspective, MarcelDekker
5. Morton, I.D., & MacLeod, A.J. (2008) Food Flavors, Part A, B & C. Elsevier.
6. Nakai, S., & Modler, H.W. (2007) Food Proteins. Processing Applications. Wiley VCH.

**Or**

**DSE-1: Microbiological Safety of Foods**

**Credits 06**

**DSE1T: Microbiological Safety of Foods**

**Credits 06**

### **Course Contents:**

Importance and significance of microorganisms in food safety, intrinsic and extrinsic factors affecting the growth of micro organisms in food. Protection and preservation of foods: Hurdle technology, chemical, modified atmosphere, irradiation, thermal and non thermal techniques.

Food borne diseases: characteristics and incidence - global and Indian scenario, food poisoning and food intoxications of microbial origin, bacterial food borne diseases; viral food borne diseases; protozoa animal parasite food borne diseases; mycotoxicoses; mushroom poisoning; investigation and management of food borne diseases.

Food spoilage: characteristic features, dynamics and significance of spoilage of different groups of foods - cereal and cereal products, vegetables and fruits, meat poultry and sea foods, milk and milk products, packed and canned foods.

Determination of microorganisms and their products in food: sampling, sample collection, transport and storage, sample preparation for analysis. microscopic and culture dependent

methods- direct microscopic observation, culture enumeration and isolation methods ; culture independent techniques – PCR Based, DGGE, metagenomics, etc.; chemical, physical, immunological methods for microbial metabolites- microbial metabolites.

### **Suggested Readings:**

1. Pelczar, M.I., and Reid, R.D. (2009) Microbiology, 5<sup>th</sup> Ed., McGraw Hill Inc., New York.
2. James, M.J. (2007) Modern Food Microbiology, 2<sup>nd</sup> Ed., CBS Publisher, New Delhi
3. Adams, M.R., and Moss, M.G., (2005) Food Microbiology, 1<sup>st</sup> Ed., New Age International (P) Ltd., NewDelhi.
4. Frazier, W.C. (2008) Food Microbiology, 4<sup>th</sup> Ed., McGraw Hill Inc., NewYork.
5. Doyle, P., Bonehat, L.R. and Mantville, T.J. (2007) Food Microbiology, Fundamentals and Frontiers, ASM Press, WashingtonDC.

**Or**

**DSE-1: Food Sanitation and Hygiene**

**Credits 06**

**DSE1T: Food Sanitation and Hygiene**

**Credits 04**

### **Course Contents:**

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 transmissions. Water, air, sewage and soil as reservoirs of infection and ways of spread. Other agents of contamination - Humans, domestic animals, vermins, birds.
4. Importance of personal hygiene of food handler - habits -clothes, illness. Education of food handler in handling and serving food.
5. Safety in food procurement, storage, handling and preparation – control of spoilage – safety of left over foods.
6. Cleaning methods – sterilization, and disinfection –products and methods –use of detergents, heat, chemicals, and tests for sanitizer strength.
7. Control of infestation: rodent control- rats, mice; vector control- use of pesticides

8. Food sanitation, control and inspection-planning and implementation of training programme for health personnel.

**DSE1P: Food Sanitation and Hygiene (Lab)**

**Credits 02**

**Practical:**

1. Study of personal and environmental hygiene habits of street food handlers. Intervention and result analysis. Project submission and presentation.
2. Preservation of fruits and vegetables for later use-peas, carrots, cauliflower, chutney, soup, pickle, jam, jelly, marmalade, squash.

**Suggested Readings:**

1. Textbook of Food and Beverage Management by Sudhir Andrews, Tata Mc Graw Hill, New Delhi.
2. Food Hygiene and Sanitation by S. Roday
3. Essentials of food safety and sanitation by David Ms Swane, Nancy Rue and Richard Linton
4. Essentials of Food Sanitation by Marriott, Norman
5. Food Safety, Sanitation and Personal Hygiene by BC Cook Articulation Committee and the BC Cook Articulation Committee.

**DSE-2: Quality Assurance in Food Sectors**

**Credits 06**

**DSE2T: Quality Assurance in Food Sectors**

**Credits 06**

**Course Contents:**

Food laboratories : need for food analysis, accreditation of food laboratory, referral laboratories, functions of food analysts, hierarchy of food safety authorities, analysis of food samples and reports, other regulatory provisions pertaining to analysis of food

Validation of analytical methods: Good Laboratory Practices (GLP)- history of GLP, areas of application, facilities, test systems, test and reference items, Standard Operating Procedure (SOP), study performance and reporting.

Analytical method used for quality determination: chemical and physical, microbiological, biochemical and sensory analysis.

Analytical methods of determination of basic food components: protein, saccharides, lipids, vitamins, water, minerals and trace elements, sensory active compounds, anti-nutritive and natural toxic compounds, food additives and food contaminants.

Advanced laboratory techniques: principle, working and application of GC, HPLC, HPTLC, LC/MS, inductively coupled Plasma Mass Spectroscopy and PCR, real time PCR, ELISA, Triple Quadra pole system.

### **Suggested Readings:**

1. The training manual for Food Safety Regulators. Vol. II- Food Safety regulations and food safety management. (2011) Food safety and Standards Authority of India. New Delhi.

**Or**

**DSE-2: Quality Control and Food Standards**

**Credits 06**

**DSE2T: Quality Control and Food Standards**

**Credits 06**

### **Course Contents:**

Principal aspects of sampling of food: Importance of sample collection, sampling tools and containers, sample collection techniques, sampling for microbiological analysis of food, routine versus investigational sampling, quantity of sample to be collected, packaging and sealing of sample, dispatch of sample, documentation and commodity specific sampling procedure.

Codex Alimentarius Commission (CODEX): Introduction, standards, codex of practice, guidelines and recommendations, applying codex standards, Codex India, core functions of National Codex Contact Point, National Codex Committee of India

International Organization of Standardization (ISO): Overview, structure, interpretation and case studies of food safety and Quality management including ISO-22000, ISO-9001:2000, ISO22000:2005, ISO 17025/CODES/GLP, Retailers standards: BRC food and BRC IOP standards, IFS, SQF: 1000, SQF: 2000.

Hazard Analysis Critical Control Point (HACCP): History, structure, pre- requites and principles, HACCP applications, HACCP based SOPs.

Good Manufacturing Practices (GMP), Good Hygienic Practices (GHP), Good Agricultural Practice(GAP), Good Veterinary Practice (GVP),Storage and distribution of food, sanitation and safety in food services.

### **Suggested Readings:**

1. The Training Manual for Food Safety Regulators. Vol. II- Food Safety regulations and food safety management. (2011) Food safety and Standards Authority of India. New Delhi

2. Mortimore, S., and Wallace, C., (2005) HACCP: A practical approach, 2<sup>nd</sup> Ed, Aspen Publication
3. Surak, J.G., and Wilson, S. (2007) American Society for Quality, 2<sup>nd</sup> Ed., Quality Press

**Or**

**DSE-2: Food Quality and Sensory Evaluation** **Credits 06**

**DSE2T: Food Quality and Sensory Evaluation** **Credits 04**

**Course Contents:**

**UNIT- 1: Introduction to quality attributes of food**

- Appearance, flavour, textural factors and additional quality factors.

**UNIT- 2: Gustation**

- Introduction and importance of gustation.
- Structure and physiology of taste organs- tongue, papillae, taste buds, salivary glands.
- Mechanism of taste perception.
- Chemical dimensions of basic tastes- sweet, salt, sour, bitter and umami.
- Factors affecting taste quality, reaction time, taste modification, absolute and recognition threshold.
- Taste measurement- Electronic Tongue.
- Taste abnormalities.

**UNIT- 3: Olfaction**

- Introduction, definition and importance of odour and flavor.
- Anatomy of nose, physiology of odour perception.
- Mechanism of odour perception.
- Theories of odour classification, chemical specificity of odour.
- Odour measurement techniques – historical perspective and emphasis on recent techniques-e-nose,etc .Merits and Demerits of each methods.
- Olfactory abnormalities.

**UNIT- 4: Colour**

- Introduction and importance of colour.
- Dimensions of colour and attributes of colour;appearance factors, gloss etc.
- Perception of colour.
- Colour Measurement: Munsell colour system, CIE colour system, Hunter colour system, spectrophotometry and colorimetry etc.
- Colour abnormalities.

**UNIT- 5: Texture**

- Introduction, definition and importance of texture.
- Phases of oral processing.

- Texture perception, receptors involved in texture perception.
- Rheology of foods.
- Texture classification.
- Texture measurement – basic rheological models, forces involved in texture measurement and recent advances in texture evaluation.
- Application of texture measurement in cereals, fruits and vegetables, dairy, meat and meat products.

## **DSE2P: Food Quality and Sensory Evaluation (Lab)**

**Credits 02**

### **Practical:**

### **Content**

1. Training of sensory panel.
2. To perform recognition and sensitivity tests for four basic tastes.
3. To perform analytical and affective tests of sensory evaluation.
4. Recognition tests for various food flavors.
5. Sensory evaluation of milk and milk products.
6. Flavor defects in milk
7. Extraction of pigments from various fruits and vegetables and study the effect of temperature and pH.
8. Texture evaluation of various food samples- crispies / cookies/ biscuits/ snack foods.
9. Textural measurement of various food products using Texture Analyzer.
10. Measurement of colour by using Tintometer/ Hunter Colour Lab etc.
11. Qualitative tests for hydrogenated fats, butter, ghee
12. Platform tests for milk.
13. Quality evaluation of various food stuffs- cereals, pulses, honey, jaggery, sugar, tea, coffee, etc

### **Suggested Readings:**

1. Rao E. S. (2013). Food Quality Evaluation. Variety Books.
2. Pomeranz Y and Meloan CE (2002). Food Analysis – Theory and Practice, CBS Publishers and Distributors, New Delhi.
3. deMan J. (2007). Principles of Food Chemistry, 3<sup>rd</sup> ed., Springer.
4. Meilgard (1999). Sensory Evaluation Techniques, 3<sup>rd</sup> ed. CRC Press LLC, 1999.
5. Amerine, Pangborn & Roessler (1965). Principles of Sensory Evaluation of food, Academic Press, London.

# Vidyasagar University

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

### Semester-VI

Course	Course Code	Name of the Subjects	Course Type/ Nature	Teaching Scheme in hour per week			Credit	Marks
				L	T	P		
CC- 13		C13T: Dietetics and Counselling	Core Course-13	4	0	0	6	75
		- Lab		0	0	4		
CC- 14		C14T: Entrepreneurship development, Enterprise management and Entrepreneurship for small catering units	Core Course-14	4	0	0	6	75
		- Lab		0	0	4		
DSE-3		TBD	Discipline Specific Elective - 3	4	0	0	6	75
				0	0	4		
DSE-4		TBD	Discipline Specific Elective - 4	4	0	0	6	75
				0	0	4		
<b>Semester Total</b>							<b>24</b>	<b>300</b>

**L**= Lecture, **T**= Tutorial, **P** = Practical, **CC** - Core Course, **TBD** - To be decided, **DSE**: Discipline Specific Elective.



## **Semester-VI**

### **List of Core Course (CC)**

**CC-13: Dietetics and Counselling**

**CC-14: Entrepreneurship development, Enterprise management  
and Entrepreneurship for small catering units**

### **Discipline Specific Electives (DSE)**

**DSE-3: Geriatric Nutrition**

**Or**

**DSE-3: Nutrition Communication for Health Promotion**

**Or**

**DSE-3: Personnel Management and Food Service Management**

**DSE-4: Methods for Epidemiological Data Analysis**

**Or**

**DSE-4: Food packaging**

**Or**

**DSE-4: Bakery Technology and Mushroom Culture**

**Or**

**DSE-4: Sea food and Dairy Technology**

## Semester-VI

### Core Course (CC)

**CC-13: Dietetics and Counselling**

**Credits 06**

**CT13: Dietetics and Counselling**

**Credits 04**

#### **Course Contents:**

#### **Unit-I: Introduction to Psychology and counselling**

Introduction to psychology – Definition , Nature and Scope. Attention and perception – Types of attention and factors influencing attention , principles of perceptual organization and abnormalities in perception. Learning and memory- Types of learning, Types of memory, Forgetting and its causes. Motivation and emotion- Types of motives, types of emotions, emotional expression. Personality- nature and definition , factors influencing personality, Psycho analytic theory of personality. Nature and goals of counselling. Principles of counselling. Characteristics of a good counsellor. Ethical principles of counselling. Special areas of counselling: Educational, family, health, community and counselling of alcoholic, and drug addicts.

#### **Unit-II: Counselling Skills**

Approaches to counselling – i. Psycho analytic approach, ii. Behaviouristic, iii. Humanistic approach.

Pre – Helping phase: i. Rapport building skills, ii. Attending and listening skills,

**Stage I skills:** Empathy, respect, Genuineness and concreteness,

**Stage II skills:** Advanced empathy, self disclosure, Immediacy and Confrontation.

**Stage III skills:** Goal setting, Action plan Programme and Brainstorming.

#### **Unit-III: Basics of Diet Counseling**

Diet Counselling - meaning, significance, process, types. Goals of counselling, individuals, group and family counselling. Basic sequence in counselling. Materials needed for counselling – models, charts, posters, AV aids, Hand outs etc. Communication process in counselling and linguistics in clinical dietary practices, problems in communication. Role of Counsellor & Counsee. Techniques of obtaining relevant information- 24 Hour Dietary recall, List of food likes and dislikes, Lifestyle. Dietician as a part of medical team and research team. Impact of counselling on health and disease of individuals – discussion of hospital case studies.

#### **Processes involved in dietary counseling**

Managing resources of the communicator/counselor. Designing of counseling plans – goals & objectives, evaluation instruments. Implementation: facilitating self-management of disease condition. Evaluation: evaluating adherence to dietary changes. Counseling approaches after evaluation.

#### **Unit-IV: Practical consideration in giving dietary advice and counselling**

a) Factors affecting and individual food choice. b) Communication of dietary advice c) Consideration of behaviour modification d) Motivation.

#### **Unit-V: Counselling and educating patient**

a) Introduction to nutrition counselling, b) Determining the role of nutrition counsellor, c) Responsibilities of the nutrition counselor , d) Practitioner v/s client managed care, e) Conceptualizing entrepreneur skills and behavior , f) Communication and negotiation skills.

#### **Unit-VI: Teaching aids used by dietitians**

Charts, leaflets, posters etc., preparation of teaching material for patients suffering from Digestive disorders, Hypertension, Diabetes, Atherosclerosis & Hepatitis and cirrhosis.

#### **Unit-VII: Diet Counselling at Hospital and Community level**

Role of counselling in hospital. Role of counselling in community. Organizing health camps and patient feedback – at hospital level. Organizing health camps and patient feedback – at community level.

**Dietary counseling through the life span** - Diet counselling plans for obese people, Diabetics, CVD, dyslipidemia, cancer risk prevention, renal diseases, liver disorders mother and child care, Prenatal and pregnant women, Lactating women Childhood nutrition problems like, SAM, weight management, vitamin and mineral deficiencies, School children, adolescents, young adults, fitness, weight management, eating disorders. Geriatric counselling. Patient follow up / home visits,

#### **Unit-VIII: Computer application**

a) Execution of software packages.  
b) Straight line, frequency table, bar diagram, pie chart, Preparation of dietary charts for patients.  
c) Statistical computation- mean, median, standard deviation, conclusion and regression test.

#### **Unit-IX: Computer application in dietetic management**

a) Use of computers by dietician, b) Dietary computations, c) Dietetic management ,d) Education/ training , e) Information storage, f) Administrations , g) Research

#### **Unit -X: Nutritional/medicinal role of traditional foods:**

Traditional food beliefs, role of Ayurveda, Naturopathy, Yoga and other traditional medicines in disease management.

**C13P: Dietetics and Counselling (Practical)**

**Credits 02**

**Practical**

1. Computer application for collection of data of different diseases. Submitting computed data.
2. Preparations of teaching aids in the field of nutrition.
3. Preparation of case history of a patient and feeding of information in the hard disc.
4. Understanding the use of conventional and non-conventional methods of counseling
  - i. Face to face counseling.
  - ii. Use of software for counseling e.g Dietcal.
  - iii. Use of any one Diet App for counseling and assessing food intake.
5. Planning Nutrition counseling sessions and identifying ways to adhere to dietary changes for the following conditions:

Lactation counseling, SAM. Eating disorders. Overweight / Obesity in School children, adolescent and adults. Metabolic syndrome. Diabetes- Gestational Diabetes. Renal disease, Liver disorders.
6. Organizing health camps and patient feedback – both at hospital level and community level.
7. Project planning for any one disease.

**CC- 14: Entrepreneurship development, Enterprise management and Entrepreneurship for small catering units**

**Credits 06**

**C14T: Entrepreneurship development, Enterprise management and Entrepreneurship for small catering units**

**Credits 04**

**Course Contents:**

**Unit-I: Entrepreneurship development**

Entrepreneurship - concept, definition, need and significance of entrepreneurship development in India, entrepreneurship growth process, barriers, entrepreneurship education model.

Entrepreneur- their characteristics, types, gender issues, role demands and challenges.  
Entrepreneurial motivation. Challenges faced by Women Entrepreneurs

## **Unit- II: Enterprise Planning and Launching**

Types of enterprises classification based on capital, product, location, ownership pattern and process. Sensing business opportunities and assessing market potential; market research. Appraising of project and feasibility

## **Unit-III: Enterprise Management and Networking**

- a. Organization and Management - Principles of management. Functions of management/ manager.
- b. Managing Production: Organizing Production; input- output cycle. Ensuring Quality
- c. Managing marketing: Understanding markets and marketing. Functions of marketing. 4Ps of marketing (same as marketing mix).
- d. Financial Management: Meaning of Finance. Types and sources of Finance. Estimation of project cost. Profit Assessment. Networking of Enterprises. Importance of Financial Management. Budgets and Budgeting process. Cost concepts

## **Unit - IV: Personnel management**

Functions of a personnel manager, Factors to consider while planning the kind and number of personnel: Menu, type of operations, Type of service, Job description and job specification

## **Unit-V: Food service units, Menu planning, Food production process, Space and equipment**

1. **Food service units**: Origin of Food Service units. Kinds of food service units.
2. **Menu Planning**: Importance of menu. Factors affecting menu planning, Types of menu.
3. **Food Production Process**: Food purchase and receiving, Storage. Quantity food production: Standardization of recipes, Recipe adjustments and portion control, Quantity food production techniques. Food service. Food hygiene and sanitation.
4. **Space and Equipment**: Types of kitchen areas, Flow of work and work area relationship. Equipment a) Factors affecting selection of equipment, b) Equipment needs for different situations

## **Unit VI: Planning of a small food service unit**

- a. **Preliminary Planning**: Survey of types of units, identifying clientele, menu, operations and delivery.
- b. **Planning the set up**: a) Identifying resources, b) Developing Project plan, c) Determining investments

## **Unit-VII: Development of a business plan**

**CC14P: Entrepreneurship development, Enterprise management  
and Entrepreneurship for small catering units (Practical)**

**Credits 02**

**Practical**

1. SWOT analysis with respect to entrepreneurial competencies through case profiling of successful entrepreneurs and enterprises.
2. Achievement Motivation lab-development of entrepreneurial competencies.
3. Survey of an institution facilitating entrepreneurship development in India.
4. Preparation of business plan.
5. Market survey for food items both raw and processed. Survey of food service units.
6. Standardization of a recipe.
7. Preparing Quick Foods for scaling up for quantity production.
8. Planning menus for the following:
  - a. Packed meals for office employees.
  - b. Nutritious Tiffin for school children.
  - c. School/college canteens.
9. Demonstration of a specialized cuisine.
10. Develop a checklist for good hygiene practices.

**Discipline Specific Electives (DSE)**

**DSE-3: Geriatric Nutrition**

**Credits 06**

**DSE3T: Geriatric Nutrition**

**Credits 04**

**Course Contents:**

**Unit-I: Introduction to ageing**

Definition of ageing, senescence, old age or aged people, gerontology, geriatrics, and Geriatric nutrition. Classification of old population.

Introduction to geriatric care- concept of gerontology. Ageing - Biology of ageing. Theories of ageing – disengagement theory, activity theory, selective theory and continuity. Microscopic theories, changes in ageing scenario. Interaction between biological and psychological in ageing. Interaction between physiological and social processes in ageing. Drug, food, and nutrient reaction. Dietetics of Geriatric care-Nutritional requirement. Food requirement, dietary modification.

Implication of ageing population for rehabilitation: Demography, mortality and morbidity.

## **Unit-II: Issues and challenges of ageing**

Issues and challenges of ageing – economic dependence/ poverty, elderly in rural/ urban area. Abuse, neglect, abandonment, physical, health and sensory problems. Crime against elderly, retirement and related issues. Ageing sensory system and issues with falling. Common complaints during ageing. Geriatric guidance and counselling. Depression in old age. Exercise-yoga, meditation .

Behavior therapy: rational- emotive behavior therapy (REBT), horticultural therapy. Music therapy, Art therapy, Bibliotherapy

## **Unit-III: Clinical Geriatric**

Physiological and biochemical changes during old age. Nutritional requirements and general dietary guidelines for elderly. Major nutritional and health problems during old age - osteoporosis ,obesity, neurological dysfunction. Anaemia. Malnutrition and constipation. Infection and Immunity. Degenerative disorders in elderly- Dementia, Alzheimer, Parkinson's disease. Disorders of upper GIT. Disorders of lower GIT. Disorders of Liver. Disorders of Biliary system and pancreas. Infection of Respiratory system. Coronary heart disease. Assessment of nutritional status of older adults.

## **Unit – IV: Social Geriatric**

Types of family – Joint family System, Role of Elders and Younger generation. Isolation, Loneliness and Dependency – Dependency Ratio – Generational equality. Financial aspects – Sources of income, Old age pension. Role of Govt. and NGOs in Socio – economic status of the elderly. Geriatric service for the elderly in western countries and India. Structure of geriatric service, family as basic unit- models of geriatric service. Day hospital, day care centre, long stay care institution. Home for the aged, function of the day hospital staff and patients of day hospital. Ethical issues in geriatric medicine- age limits on health care. Life sustaining measures.

### **DSE-3: Geriatric Nutrition (practical)**

**Credits 02**

1. Visit to old- age homes- assessment of nutritional status of old people, diet counselling.
2. Preparation of dishes suitable for older person- soft, semisolid, easily digestible, nutritious and calorie dense balanced diet.

**Or**

### **DSE-3: Nutrition communication for Health promotion**

**Credits 06**

### **DSE3T: Nutrition communication for Health promotion**

**Credits 04**

## **Course Contents:**

### **Unit-I: Dietary guidelines for nutrition and health related concerns**

National and international guidelines and their role in nutrition promotion. Critical appraisal of the current guidelines.

### **Unit-II: Nutrition and behaviour inter-relationship**

Food and health behaviour, models/ theories of health behaviour, food choices, strategies for intervention at the ecological and individual level.

### **Unit-III: Social and Behaviour Change Communication for nutrition and health promotion**

- a. Concept and objectives of communication for behaviour change
- b. Planning of communication strategies for social and behaviour change programme,
- c. Communication needs analysis, stakeholders in nutrition promotion, developing nutrition education plan, identifying communication strategies/ approaches for nutrition and health promotion (e.g. social marketing), designing nutrition and health messages, selecting communication channels, developing and field testing of communication materials, designing training strategies for trainers and their capacity building.
- d. Implementing social and behaviour change communication intervention: an overview
- e. Evaluation of social and behaviour change communication programmes

### **Unit-IV: Nutrition Advocacy**

- a. Meaning, types, tools and techniques and advocacy planning.
- b. Role of advocacy in nutrition policy formulation, preparation of policy briefs.

### **Unit V Ethics in nutrition and health communication**

- a. Significance of ethics in nutrition and health communication.
- b. Ethical Principles and concerns

### **DSE3P: Nutrition communication for Health promotion (Practical)**

**Credits 02**

1. Planning of communication strategies for public health nutrition problems among vulnerable groups in the community -field testing of messages, materials and methods.
2. Review of communication strategies being used in any one public health nutrition programme in the community.

**Or**

### **DSE-3: Personnel management and Food service management**

**Credits 06**

### **DSE3T: Personnel management and Food service management**

**Credits 04**

### **Course Contents:**

#### Personnel Management



**Unit-I:** Organization and management: a) Definition and types of organization. b) Definition-functions and tools of management. c) Technique of effective management and its application to food preparation and science.

**Unit-II:** Food material management: a) Meaning, definition, and importance. b) Food selection, purchasing, receiving and storeroom management. c) Control in relation to the above operations (material planning, budgeting, material identification, modification and standardization, inventory control, store keeping, definition, objectives, functions, factors underlying successful storekeeping, duties and responsibilities of a storekeeper, purchasing, organization, principle, procedure, systems and quality control).

**Unit-III:** Personnel Management: Recruitment, selection and training of personalities, work standards, productivity, supervision, and performance appraisal and motivation incentives for effective performances.

**Unit-IV:** Labour policies and legislation: (Personnel policies related to salaries, other emoluments, allowances, leave, uniform and other prize benefit, laws and organization)- Laws affecting food service institution to study the following: (hospital, flight kitchen, hotel, Restaurant, canteen, Industrial) - a. Organization, b. Physical plan and layout. c. Food and silver equipment, d. Sanitation and hygiene.

### Food Service Management

**Unit-V: Foundations:** The Foodservice Industry, The Systems Approach, The Fundamentals, Food Safety, Cleaning, Sanitation, and Environmental Safety, The Menu.

**Unit-VI: Operational Functions:** Purchasing, Receiving, Storage, and Inventory, Production, Beverage Provision, Food and Beverage Service, Events Conferencing & Banqueting, Appraising Performance, Strategic Decisions.

**Unit-VII: Facilities:** Facilities Planning and Design, Equipment and Furnishings, Environmental Management.

**Unit-VIII: Management Functions:** Organizational Design, Leadership, Human Resource Management, Performance Improvement, Financial Management, Marketing.

**DSE3P: Personnel management and Food service management (Practical) Credits 02**

Visit and appraisal of any two medical organizations.

1. Work simplification: food preparation, Calculating work unit, time norms etc.
2. Costing, accounting, budgeting, purchase.
3. Storekeeping: Listing and management of food items in the store.
4. Personnel recruitment: Preparations of a project and report making.

5. Maintenance of the clothing for persons and staff involved in kitchen area.
6. Prepare an inventory for evaluating staffs personal hygiene.

### **Food service Management:**

1. Layout of Food Service Outlets & Organisations
2. Food Service Operations
3. Conferencing & Banqueting
4. Equipment and Furnishings, Environmental Management in Food Service Operations
5. Visit to a professional Food Service Outlet

Note: An Event may be planned to supplement learning of students and practical may be conducted in view of theory syllabus to provide practical inputs to learners.

### **DSE- 4: Methods for Epidemiological Data Analysis**

**Credits 06**

#### **DSE4T: Methods for Epidemiological Data Analysis**

**Credits 04**

### **Course Contents:**

#### **Unit I: Understanding Epidemiological Data**

Components of epidemiology: disease frequency, distribution of disease and determinants of disease. Epidemiological approach and measurements- vital statistics (rates, ratios and proportions), measurements of health indicators (morbidity, mortality and fertility rates).

#### **Unit II: Epidemiologic Methods and Survey**

Data collection: observational (descriptive and analytical) and experimental studies. Epidemiology study designs - case control and cohort studies (prospective and retrospective), techniques of sampling and matching, sources of bias.

#### **Unit III: Data Organization and Presentation**

Basic principles of 'R' software for tabulation and graphical representations (bar diagrams, histograms, pie charts, box plot, etc.), measures of central tendency (mean, mode, median and partition values), dispersion (range, standard deviation, coefficient of variance and covariance) and skewness.

#### **Unit IV: Statistical Modeling and Analysis using 'R' on NCRP data and survey conducted by the students**

Correlation analysis (scatter diagrams and Karl Pearsons coefficient of determination, standard and probable errors) and regression analysis. Inferential statistics: sampling distributions and standard error null and alternate hypothesis, basic concept and illustrations of type I and type II

errors, concept of confidence interval estimation, large sample tests for single mean and difference of means, single proportion and difference of proportions, students t-distribution (test for single mean, difference of means and paired t-test), chi-square distribution, F-distribution, one-way and two-way ANOVA, non parametric analysis (sign and rank tests), p-value.

**DSE4P: Methods for epidemiological data analysis (Practical )**

**Credits 02**

**List of Practical**

1. Analysis of data from National Cancer Registry Program (NCRP). Understanding incidence, mortality (rates, ratios and proportions).
2. Designing a questionnaire for survey of prevalence diabetes/ hypertension/ allergy/ respiratory disorders/etc. Determining the target and control populations
3. Surveying the population for the diseases mentioned above.
4. Introduction to 'R' software. Analysis of data from NCRP data and survey conducted by the students.
5. Correlation studies. Regression studies. Probabilistic distribution studies. Comparison of groups and ascertaining statistical significance of differences.

**Or**

**DSE-4: Food packaging**

**Credits 06**

**DSE4T: Food packaging**

**Credits 04**

**Course Contents:**

**Unit 1:** Introduction to Food Packaging -Packaging Functions and Requirements,, Printing of packages .Barcodes & other marking, Labeling Laws

**Unit 2:** Food Packaging Materials -Paper and paper-based materials, corrugated fiber board (CFB). Plastics, formation- Injection molding, Blow molding, Types of plastics, Lamination, Biodegradable plastics, Edible packaging and Bio-composites. Environmental Concerns recycling and disposal of plastic waste Metal packaging- Metals: Tinplate, tinning process, components of tinplate, tin free can (TFC) types of can, metallic films, lacquers Glass: Composition, Properties, Methods of bottle making, Types of closures.

**Unit 3:** Package Designing for Foods - Package design for fresh horticultural produce and animal foods, dry and moisture sensitive foods, frozen foods, fats and oils, thermally processed foods and beverages.

**Unit 4:** Testing and Regulatory Aspects of Food Packaging- Testing Procedures for Packaging Materials- thickness, tensile strength, puncture resistance, bursting strength, seal strength, water

vapor permeability, CO<sub>2</sub> permeability, oxygen permeability, grease resistance, Testing Procedures for Packaged Foods - Compatibility and shelf life studies, evaluation of transport worthiness of filled packages. Food Packaging Laws and Regulations.

**Unit 5:** Packaging Machinery and Systems - Bottling machines, Cartoning systems, Seal and Shrink packaging machine; Form, Fill and Sealing machine (FFS). Vacuum, Controlled and Modified atmosphere packaging systems; Aseptic packaging systems; Retort packaging, Active and Intelligent packaging systems

**DSE4P: Food Packaging (Practical)**

**Credits 02**

**List of Practical:**

1. Testing of physical/mechanical properties of food packaging material.
2. Testing of thermal shock resistance of glass.
3. Gas/Vacuum packaging of foods and shelf life studies.
5. Edible packaging of Food Samples.
6. Packaged food cut-out analysis.

**Demonstration:**

1. Study of Sorption Isotherm for Food Package Design (**Demonstration**).
2. Determination of Water Vapor Transmission rate of Packaging Material (**Demonstration**).
3. Study the operation of FFS machine (**Demonstration**).

**Or**

**DSE-3: Bakery Technology and Mushroom Culture**

**Credits 06**

**DSE3T: Bakery Technology and Mushroom Culture**

**Credits 04**

**Course Contents:**

**Unit- I:** Bakery industry: Current status, growth rate, and economic importance of Bakery Industry in India. Product types, nutritional quality and safety of products, pertinent standards & regulations.

**Unit- II:** Bread, Buns and Pizza base - Ingredients & processes for breads, buns, pizza base, Equipments used, product quality characteristics, faults and corrective measures

**Unit- III:** Cakes - Ingredients & processes for cakes, Equipments used, product quality characteristics, faults and corrective measures. Different types of icings.

**Unit- IV:** Biscuits, Cookies & Crackers - Ingredients & processes, Equipments used, product quality characteristics, faults and corrective measures.

**Unit- V:** Modified Bakery Products - Modification of bakery products for people with special nutritional requirements e.g. high fibre, low sugar, low fat, and gluten free bakery products.

**Unit- VI:** Breakfast Cereals, Macaroni Products and Malt - Production and quality of breakfast cereals, macaroni products and malt.

**Unit- VI:**

**Mushroom Culture:** 1. Definition and characteristics of mushroom. 2. Morphology and life cycle of Mushroom. 3. Identification and classification of mushroom 4 Nutritional and medicinal value of edible mushrooms; poisonous mushrooms. 5. Types of edible mushrooms available in India- Volvariella volvacea, Pleurotus citrinopileatus, Agaricus bisporus. 6. Process of mushroom cultivation. 7. Storage and nutrition: short term storage (Refrigeration- upto 24 hours), long term storage (canning, pickles, papads), drying, storage in salt solutions.

**DSEP: Bakery Technology and Mushroom Culture (Practical)**

**Credits 02**

**List of Practical:**

1. Preparation of pizza base and assessment of its quality
2. Preparation of bread and assessment of its quality
3. Preparation of buns and assessment of quality
4. Preparation of butter cake and assessment of its quality.
5. Preparation of sponge cake with icing and assessment of its quality.
6. Preparation of cookies and assessment of quality.
7. Preparation of biscuits and assessment of quality.
8. Visit to Mushroom Culture Centres/ Farms for:

Process involved in mushroom cultivation Types and varieties of mushroom. Visual Identification of edible and poisonous mushroom Marketing.

9. Different Food preparation from mushroom.

Or

**DSE-4: Sea food and Dairy Technology**

**Credits 06**

**DSE4T: Sea food and Dairy Technology**

**Credits 04**

**Course Contents:**

Technology of Sea food:

**Unit-I:** Introduction. Status of fishery industry in India.

**Unit-II:** Chilling and Freezing of fish. Relationship between chilling and storage life, MAP, general aspects of freezing, freezing systems (air blast freezing, plate or contact freezing spray or immersion freezing, freezing on board, onshore processing, changes in quality in chilled and frozen storage, thawing.

**Unit-III:** Fish Curing and Smoking - Drying and salting of fish, water activity and shelf-life, salting process, salting methods (brining, pickling, kench curing, gaspe curing), types of salts, dried and salted fish products- pindang, fishwood, dried shrimp. Preservation by smoking, smoke production, smoke components, quality, safety and nutritive value of smoked fish, processing and equipment, pre-smoking processes, smoking process control. Traditional chimney kiln, modern mechanical fish smoking kiln, examples of smoked and dried products.

**Unit-IV: Canning of fish:** Principles of canning, classification based on pH groupings, effect of heat processing on fish, storage of canned fish, pre-process operations, post process operations, cannery operations for specific canned products.(Tuna,Mackerel,Sardine).

**Unit-V: Fishery by-products - Surimi-** Introduction, fish muscle proteins, the surimi process, traditional and modern surimi production lines, quality of surimi products, comparison of surimi and fish mince products. Fish protein concentrates (FPC), fish protein extracts (FPE), fish protein hydrolysis (FPH)

**Unit-VI: Fermented fish-** Flowchart of Indigenous products- Fish sauce and Paste

**Unit-VII: Concept of other Sea foods -** Crabs, lobsters, prawns, shrimps, shell- fish.

Technology of milk and milk products

**Unit-VIII: Physical properties of milk :** Color, taste, pH and buffering capacity, refractive index, viscosity, surface tension, freezing, boiling point, specific heat, OR, electrical conductivity.

**Unit-IX: Lactose -** Lactose (alpha and beta forms and their differences) Significances of lactose in dairy industry.

**Unit-X: Milk fat:** Composition and structure, factors affecting melting point, boiling point, solubility and Refractive Index, fat constants (saponification value, iodine value, RM value, Polenske value, peroxide value). Chemical reactions of fat (hydrolysis, auto-oxidation), condition favouring autooxidation, prevention, measurement of auto-oxidation.

**Unit-XI: Protein and Enzymes** - General structure, amphoteric nature, difference between casein and serum protein, different types of casein (acid and rennet), uses of casein, fractionation of protein. Enzymes- catalase, alkaline phosphatase, lipases and proteases.

**Unit-XII: Market milk industry and milk products:** Systems of collection of milk Reception, Platform testing- Various stages of processing, Filtration, Clarification • Homogenization • Pasteurization • Description and working of clarifier, cream separator, homogenizer and plate heat exchanger. Flow diagram of following milk products - Butter, ghee, flavored milk, yoghurt, dahi, shrikhand, ice-cream, condensed milk, milk powder, channa, paneer, cheese (cheddar).

**DSE4P: Sea food and Dairy Technology (Practical)**

**Credits 02**

**List of Practical:**

1. Perform platform tests in milk.(Acidity, COB, MBRT, specific gravity, SNF)
2. Estimate milk protein by Folin method.
3. Estimate milk fat by Gerber method.
4. Preparation of flavoured milk. Pasteurization of milk.
5. Prepare casein and calculate its yield.
6. Quality evaluation of fish/prawn.
7. Subjective evaluation of Fresh Fish.
8. Cut out examination of canned fish.(Sardine, Mackerel, Tuna)
9. Fish product formulation/canning.

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