CBCS SYLLABUS

FOR

THREE YEARS UNDER-GRADUATE COURSE

IN

NUTRITION (HONOURS)

(*w.e.f. 2017*)

BANKURA UNIVERSITY

BANKURA

WEST BENGAL

PIN 722155

STRUCTURE IN NUTRITION (HONOURS)

SEMESTER –I

Course Code	Course Title	Credit	Marks			No. of Hours		
			I.A.	ESE	Total	Lec.	Tu.	Pr.
SH/NUT/ 101/C-1	C1.T1 Human Physiology I C1.P1 Human Physiology I (Practical)	6 (4+2)	10	40 (25+15)	50	4	-	4
SH/NUT/ 102/C-2	C2.T2 Food Science and Basic Nutrition I C2.P2 Food Science and Basic Nutrition I (Practical)	6 (4+2)	10	40 (25+15)	50	4	-	4
SH/NUT/ 103/GE-1	**Any one of the following** GE1A Fundamentals of Nutrition and Food Science **OR** GE1B Food Allergies and Intolerance	6	10	40	50	5 5	1 1	- -
ACSHP/104/ AECC-1	Environmental Studies	4	10	40	50	4	-	-
Total in Semester – I		**22**	**40**	**160**	**200**			

SEMESTER –II

Course Code	Course Title	Credit	Marks			No. of Hours		
			I.A.	ESE	Total	Lec.	Tu.	Pr.
SH/NUT/ 201/C-3	C3.T3 Human Physiology II C3.P3 Human Physiology II (Practical)	6 (4+2)	10	40 (25+15)	50	4	-	4
SH/NUT/ 202/C-4	C4.T4 Food Science and Basic Nutrition II C4.P4 Food Science and Basic Nutrition II (Practical)	6 (4+2)	10	40 (25+15)	50	4	-	4
SH/NUT/ 203/GE-2	**Any one of the following** GE2.T2A Food Groups and Cooking Methods GE2.P2A Food Groups and Cooking Methods (Practical) **OR** GE2B Food Toxicity Diseases	6 (4+2) OR 6	10	40 (25+15)	50	4 5	- 1	4 -
ACSHP/204/ AECC-2	English/Hind/MIL	2	10	40	50	2		
Total in Semester – II		**20**	**40**	**160**	**200**			

SEMESTER –III

Course Code	Course Title	Credit	Marks			No. of Hours		
			I.A.	ESE	Total	Lec.	Tu.	Pr.
SH/NUT/ 301/C-5	C5T5 Nutritional Biochemistry	6	10	40	50	5	1	-
SH/NUT/ 302/ C-6	C6T6 Food Commodities	6	10	40	50	5	1	-
SH/NUT/ 303/C-7	C7T7 Human Nutrition C7P7 Human Nutrition (Practical)	6 (4+2)	10	40 (25+15)	50	4		4
SH/NUT/ 304/GE-3	**Any one of the following** GE3A.T3A Nutrition through Lifespan GE3A.P3A Nutrition through Lifespan (Practical) **OR** GE3B.T3B Community Nutrition GE3B.P3B Community Nutrition (Practical)	6 (4+2)	10	40 (25+15)	50	4 4	- -	4 4
SH/NUT/ 305/SEC-1	SEC1. Food Adulteration	2	10	40	50	-	-	4
Total in Semester – III		**26**	**50**	**200**	**250**			

SEMESTER –IV

Course Code	Course Title	Credit	Marks			No. of Hours		
			I.A.	ESE	Total	Lec.	Tu.	Pr.
SH/NUT/ 401/C-8	C8T8 Nutritional Biochemistry II	6	10	40	50	5	1	-
SH/NUT/ 402/C-9	C9T9 Diet Therapy I C9P9 Diet Therapy I (Practical)	6 (4+2)	10	40 (25+15)	50	4	-	4
SH/NUT/ 403/C-10	C10.T10 Diet Therapy II C10.P10 Diet Therapy II (Practical)	6 (4+2)	10	40 (25+15)	50	4	-	4
SH/NUT/ 404/GE-4	**Any one of the following** GE4A.T4A Food Safety and Standards GE4A.P4A Food Safety and Standards (Practical) **OR** GE4B.T4B Therapeutic nutrition GE4B.P4B Therapeutic nutrition (Practical)	6 (4+2)	10	40 (25+15)	50	4 4	- -	4 4
SH/NUT/ 405/SEC-2	SEC.2 Practical Approaches in Food and Nutrition (Practical)	2	10	40	50	-	-	4
Total in Semester - IV		**26**	**50**	**200**	**250**			

SEMESTER – V

Course Code	Course Title	Credit	Marks			No. of Hours		
			I.A.	ESE	Total	Lec.	Tu.	Pr.
SH/NUT/ 501/C-11	C11.T11 Community Nutrition C11.P11 Community Nutrition (Practical)	6 (4+2)	10	40 (25+15)	50	4	-	4
SH/NUT/ 502/C-12	C12.T12 Community Hygiene and Sanitation	6	10	40	50	5	1	-
SH/NUT/ 503/DSE-1	**Any one of the following:** DSE1 Food safety and sustainable nutrition **OR** DSE2 Food Service Management	6 (4+2) OR 6	10	40 (25+15)	50	4 5	- 1	4 -
SH/NUT/ 504/DSE-2	**Any one of the following:** DSE3 Maternal and Child Nutrition **OR** DSE4.T4 Basic Principles of Biophysics	6 (4+2) OR 6	10	40 (25+15)	50	4 5	- 1	4 -
Total in Semester – V		**24**	**40**	**160**	**200**			

SEMESTER – VI

Course Code	Course Title	Credit	Marks			No. of Hours		
			I.A.	ESE	Total	Lec.	Tu.	Pr.
SH/NUT/ 601/C-13	C13.T13 Food Microbiology C13.P13 Food Microbiology (Practical)	6 (4+2)	10	40 (25+15)	50	4	-	4
SH/NUT/ 602/C-14	C14.T14 Epidemiology	6	10	40	50	5	1	-
SH/NUT/ 603/DSE-3	**Any one of the following :** DSE5 Public Health Nutrition **OR** DSE6 Inborn Errors of Metabolism and Food Allergies	6 (4+2) OR 6	10	40 (25+15)	50	4 5	- 1	4 -
SH/NUT/ 604/DSE-4	**Any one of the following :** DSE7 Nutrigenomics **OR** DSE8 Concepts in Nutrition Education	6 (4+2) OR 6	10	40 (25+15)	50	4 5	- 1	4
Total in Semester – VI		**24**	**40**	**160**	**200**			

SH=Science Honours, NUT = Nutrition, ACSHP= Arts Commerce Science Honours Pass C= Core Course, AECC= Ability Enhancement Compulsory Course, SEC= Skill Enhancement Course, GE= Generic Elective, DSE= Discipline Specific Elective IA= Internal Assessment, ESE= End-Semester Examination, Lec.=Lecture, Tu.= Tutorial, and Prc.=Practical

DETAILED SYLLABUS FOR NUTRITION HONOURS UNDER CHOICE BASED CREDIT SYSTEM, BANKURA UNIVERSITY

SEMESTER	CORE PAPERS	FULL MARKS
SEMESTER - I	C1 Human Physiology I (Theory & Practical)	50Marks
	C2 Food Science and Basic Nutrition I (Theory & Practical)	50Marks
SEMESTER - II	C3 Human Physiology II (Theory & Practical)	50Marks
	C4 Food Science and Basic Nutrition II (Theory & Practical)	50Marks
SEMESTER - III	C5 Nutritional Biochemistry	50Marks
	C6 Food Commodities	50Marks
	C7 Human Nutrition (Theory & Practical)	50Marks
	SEC1. Food Adulteration	50Marks
SEMESTER – IV	C8 Nutritional Biochemistry II	50Marks
	C9 Diet Therapy I (Theory & Practical)	50Marks
	C10 Diet Therapy I (Theory & Practical)	50Marks
	SEC-2 Practical Approaches in Food and Nutrition (Practical)	50Marks
SEMESTER – V	C11 Community Nutrition (Theory & Practical)	50Marks
	C12 Community Hygiene and Sanitation	50Marks
SEMESTER – VI	C13 Food Microbiology (Theory & Practical)	50Marks
	C14 Epidemiology	50Marks

- **DISCIPLINE SPECIFIC ELECTIVES (Any Two to be chosen in each Semester V and Semester VI)**

SEMESTER	DISCIPLINE SPECIFIC ELECTIVES	FULL MARKS
SEMESTER – V	**Any one of the following:** DSE1 Food safety and sustainable nutrition (Theory & Practical)	50Marks
	DSE2 Food Service Management	50Marks
	Any one of the following: DSE3 Maternal and Child Nutrition (Theory & Practical)	50Marks
	DSE4 Basic Principles of Biophysics	50Marks
SEMESTER – VI	**Any one of the following:** DSE5 Public Health Nutrition (Theory & Practical)	50Marks
	DSE6.T6 Inborn Errors of Metabolism and Food Allergies	50Marks
	Any one of the following: DSE7 Nutrigenomics (Theory & Practical)	50Marks
	DSE8Concepts in Nutrition Education	50Marks

SEMESTER - I

C1.T1 Human Physiology I

1. Structure and Functions of eukaryotic cell: Structure and functions of cell organelles: cell membrane, nucleus, endoplasmic reticulum, mitochondria, ribosomes. Cellular transport.
2. Blood and Cardiovascular System: Clotting time and Bleeding time, Blood groups, Blood coagulation mechanisms, Blood pressure and its regulation. Structure and function of heart, Heart rate, Cardiac cycle, Cardiac output, Systemic, portal and cerebral circulation
3. Alimentary System: Structure and functions of various organs of the GI Tract, Digestion and absorption of food
4. Respiratory System: Structure of lungs and gaseous exchange (Oxygen and carbon dioxide transport), Acclimatization
5. Excretory System: Structure and Function of Kidney. Formation of Urine. Role of kidney in homeostasis

C1.P1 Human Physiology I (Practical)

1. Preparation of blood film and blood analysis: T.C., D.C.
2. Determination of bleeding time and clotting time of blood
3. Estimation of blood pressure by Sphygmomanometer
4. Detection of Blood group

SEMESTER - I

C2.T2 Food Science and Basic Nutrition I

1. Basic terms used in study of Food and Nutrition
2. Carbohydrates: Definition, Classification, General Physical and Chemical properties, dietary sources, functions, digestion and absorption, role in human health and disease, requirements
3. Lipids: Definition, Classification, General Physical and Chemical properties, dietary sources, functions, digestion and absorption, role in human health and disease, Requirements
4. Amino acids and Proteins: Definition, Classification, General Physical and Chemical properties, dietary sources, functions, digestion and absorption, role in human health and disease, requirements
5. Dietary fibre: Sources, classification and nutritional significance.

C2.P2 Food Science and Basic Nutrition I (Practical)

1. Colorimetric estimation of carbohydrate (Anthrone method), Protein (Lowry method)
2. Qualitative detection of carbohydrates: Molisch's test, Benedict's test, Barfoed's test, Seliwanoff 's test, Iodine test, Fehling's test

SEMESTER - I

GE1A Fundamentals of Nutrition and Food Science

1. Basic terms used in food and nutrition
2. Functions, dietary sources, clinical manifestations of deficiency/ excess of the following nutrients:
    - Carbohydrates, lipids and proteins
    - Fat soluble vitamins – A, D, E and K
    - Water soluble vitamins – thiamine, riboflavin, pyridoxine, folate, vitamin B12 and vitamin C
    - Minerals – calcium, iron and iodine
3. Food groups and Food pyramid. Concept of balanced diet. Reference man and woman
4. Concept of dietary reference intakes
5. Dietary guidelines for Indians

GE1B Food Allergies and Intolerance

1. Food allergy – allergen, mechanism of development of food allergic reactions, classification, diagnosis, symptoms, treatment, elimination diet
2. Food Intolerance – common diseases like celiac disease, lactose intolerance, favism
3. Inborn errors of metabolism - phenylketonuria, alcaptonuria, maple syrup urine disease

SEMESTER - II

C3.T3 Human Physiology II

1. Endocrine System: Structure, functions, deficiency and excess of pituitary, thyroid, adrenal, pancreas
2. Reproductive System: Structure and Functions of gonads, gametogenesis, menstrual cycle, brief idea of implantation, pregnancy, parturition, lactation and menopause
3. Musculoskeletal System: structure and function of skeletal, smooth and cardiac muscles, properties and contraction of skeletal muscles
4. Nervous System: Neuron and neuromuscular junction, sympathetic and parasympathetic nervous system. Brief anatomy and functions of cerebrum, cerebellum, hypothalamus. cerebrospinal fluid.

C3.P3 Human Physiology II (Practical)

1. Identification with reasons of histological slides: lung, liver, kidney, small intestine, stomach, thyroid, adrenal, pancreas, testis, ovary and muscle of mammals, blood corpuscles of human
2. Haemoglobin estimation (Cyanomethaemoglobin Method)

SEMESTER - II

C4.T4 Food Science and Basic Nutrition II

1. Vitamins: Dietary sources, requirements, functions and deficiencies and excesses of water and fat soluble vitamins
2. Minerals: Dietary sources, requirements, functions and deficiencies and excesses of Calcium, Phosphorus, Sodium, Potassium, Iron, Iodine, Selenium, Zinc, Fluoride, Magnesium, Chromium, Copper. Absorption of Calcium and Iron.
3. Water: Requirement, functions, deficiencies and excesses. Water balance.

C4.P4 Food Science and Basic Nutrition II (Practical)

1. Estimation of calcium using EDTA by titration
2. Estimation of ascorbic acid by using 2, 6 dichlorophenol indophenol method

SEMESTER - II

GE2A.T2A Food Groups and Cooking Methods

1. Nutritional contribution and changes during cooking of the following food groups:
    - Cereals
    - Pulses
    - Fruits and Vegetables
    - Milk and Milk products
    - Eggs
    - Meat, Poultry and Fish
    - Fats and Oils
2. Food Adjuncts
    - Spices and Herbs
    - Food Additives
3. Different methods of cooking : Dry heat, Moist heat, Shallow fat frying, Deep fat frying, Braising
4. Effects of cooking on nutritive value of foods

GE2A.P2A Food Groups and Cooking Methods (Practical)

1. Weight measurement
2. Different Methods of Cooking – understanding the principles involved and nutritional quality and portion size
3. Preparation of dishes involving each food group

GE2B Food Toxicity Diseases

1. Naturally occurring toxicants in foods
2. Causes, sign and symptoms, prevention and treatment – lathyrism, aflatoxicosis, botulism, epidemic dropsy, dental and skeletal fluorosis, arsenic intoxication through foodstuffs and drinking water

SEMESTER - III

C5.T5 Nutritional Biochemistry I

1. Enzymes: Classification, properties, factors affecting enzyme activity, kinetics, inhibitions, isozymes
2. Carbohydrate Metabolism: Glycolysis, TCA Cycle, Biological Oxidation, Gluconeogenesis, Glycogenesis, Glycogenolysis
3. Lipids Metabolism: Synthesis of fatty acids, Beta Oxidation of fatty acids, Ketone bodies, Lipoproteins
4. Proteins Metabolism: Deamination, transamination, Urea Cycle

SEMESTER - III

C6.T6 Food Commodities

1. Food guide pyramid, Basic food groups, Food exchange list
2. Cereals: Nutritional aspects of wheat, rice and oats. Storage and processing.
3. Pulses & Legumes: Nutritional contribution, Processing and storage
4. Milk & Milk products: Nutritive value, composition, processing, storage. Milk products: butter, curd, cheese, paneer
5. Eggs: Nutritional aspects and uses
6. Meat, Fish and Poultry: Nutritional contribution, Processing and storage, spoilage
7. Vegetables & Fruits: Nutritional contribution, Processing and storage, spoilage
8. Sugar
9. Salts: Types, nutritional aspects, uses.
10. Fats and Oils: types, sources, use and nutritional aspects
11. Beverages: tea, coffee, alcoholic beverages, aerated beverages
12. Spices: Chillies, turmeric, garlic, ginger, fenugreek

SEMESTER - III

C7.T7 Human Nutrition

1. Fundamentals of nutrition: concept and definition of terms, Reference Man and Woman, ACU, RDA – definition and formulation, general dietary recommendations
2. Growth & Development
3. Body Composition: Changes through lifecycle
4. Energy in human nutrition: units, bomb calorimeter, physiological fuel value, energy balance, SDA, BMR, REE
5. Nutrition during different stages of life:
    - Nutrition during pregnancy, Nutrition related complications of pregnancy,
    - Nutrition during lactation
    - Nutritional needs of infancy – breastfeeding, formula feeding and weaning
    - Nutritional needs of preschool and school children, school lunch
    - Nutrition during adolescence, nutritional problems of adolescence
    - Nutrition during adulthood
    - Geriatric nutrition

C7.P7 Human Nutrition (Practical)

1. Planning and preparation of normal diet for infants
2. Planning and preparation of normal diet for preschool child
3. Planning and preparation of normal diet for school child
4. Planning and preparation of normal diet for college student
5. Planning and preparation of normal diet for adult

6. Planning and preparation of normal diet for elderly
7. Planning and preparation of normal diet for pregnant woman and lactating mother

SEMESTER - III

GE3A.T3A Nutrition through Lifespan

1. Physiological changes, RDA, nutritional guidelines, nutritional concerns and healthy food choices for:
    - Adult man and woman
    - Pregnant woman
    - Lactating mother
    - Elderly
2. Growth and development, RDA, nutritional guidelines, nutritional concerns and healthy food choices for:
    - Infants
    - Preschool children
3. RDA, nutritional guidelines, nutritional concerns and healthy food choices for:
    - School children
    - Adolescents
4. Undernutrition – Protein energy malnutrition, nutritional anaemias, Vitamin A deficiency, Iodine deficiency disorders

GE3A.P3A Nutrition through Lifespan

1. Introduction to meal planning
2. Planning and preparation of diets and dishes for Young adult, Pregnant and Lactating woman, Preschool child, School child and adolescents, Elderly

GE3B.T3B Community Nutrition

1. Definition, Factors affecting community health
2. Infant Mortality rate, Under 5 mortality rate, Maternal mortality rate – definition, causes, preventive measures
3. Nutritional status assessment: nutritional anthropometry – height, weight, BMI, MUAC, head and chest circumference, Diet survey by recall method, Clinical assessment
4. National programmes to combat malnutrition: ICDS, Mid day meal, Special nutrition programme

5. National and International agencies to combat malnutrition: NIN, ICMR, ICAR, CFTRI, WHO, FAO, UNICEF, CARE

GE3B.P3B Community Nutrition (Practical)

1. Growth chart: plotting and interpretation
2. Project report on diet survey by 24 hour recall method
3. Nutritional anthropometry and clinical assessment of primary school children

SEMESTER - III

SEC1. Food Adulteration

1. Food Adulteration: Typesof food adulteration, common adulterants in food and their effects on health. Common methods to detect adulterants in foods
2. Detection of common adulterants in following foodstuffs :
    - Detection of vanaspati in ghee/butter
    - Detection of khesari flour in besan
    - Detection of Metanil yellow in turmeric/coloured sweet products
    - Detection of argemone oil in edible oil
    - Detection of artificial colour/ foreign matter in tea

SEMESTER – IV

C8.T8 Nutritional Biochemistry II

1. Nucleic acids: DNA and RNA, Central dogma of life, Replication, Transcription, Translation and Protein Synthesis
2. Biochemical roles of Vitamins – Thiamine, Riboflavin, Niacin, Folic acid, Vitamin B12, vitamin C
3. Biochemical roles of Minerals – Ca, Mg, Fe, Zn

SEMESTER – IV

C9.T9 Diet Therapy I

1. General idea of diet therapy, principles of diet therapy, therapeutic adaptations of normal diet, classification of therapeutic diets
2. Types of dietitians and role of dietitians in hospital management
3. Routine hospital diets : Oral feeding, tube feeding, parenteral nutrition, pre and post operative diets, diets in surgical conditions and burn injuries
4. Energy modification of diet. Contributing factors, complications, measurement, nutritional care and prevention of overweight, obesity and underweight
5. Diets for febrile conditions and infections
6. Aetiology, symptoms, diagnostic tests, management and nutritional care of gastro-intestinal tract: peptic ulcer, diarrhoea, constipation, irritable bowel syndrome, inflammatory bowel disease, flatulence, haemorrhoids.

C9.P9 Diet Therapy I (Practical)

1. Planning and preparation of special diets : clear fluid, full fluid soft, semi solid, high protein, low fat and low calorie, high fibre diet
2. Preparation of diet chart of patient suffering from the following:
   - Obesity

- Peptic ulcer

SEMESTER – IV

C10.T10 Diet Therapy II

1. Pathogenesis and dietary management of nutritional anaemias
2. Aetiology, symptoms, diagnostic tests, management and nutritional care of liver and gall bladder: viral hepatitis, cirrhosis of liver, cholelithiasis. Liver function test.
3. Aetiology, symptoms, diagnostic tests, management and nutritional care of diabetes mellitus
4. Diseases of the cardiovascular system: aetiology, symptoms, risk factors, lifestyle modifications and nutritional care for atherosclerosis, hypertension, dyslipidemia and ischaemic heart disease
5. Aetiology, symptoms, diagnostic tests, management and nutritional care of renal diseases: Glomerulonephritis, nephrosis, renal failure

C10.P10 Diet Therapy II (Practical)

1. Planning and preparation of diet chart of patient suffering from the following:
    - Cardiovascular diseases
    - Diabetes Mellitus
    - Hypertension

- Glomerulonephritis
- Anaemia

SEMESTER – IV

GE4A.T4A Food Safety and Standards

1. Concept of food safety, factors affecting food safety
2. Basic concept of HACCP
3. Safe food handling practices
4. Food adulteration, Food additives
5. Food laws – PFA, Agmark, Codex alimentarius, BIS, FPO, MPO, FSSAI
6. Food contamination and related health hazards – botulism, aflatoxin and staphylococcal intoxication, Arsenic and lead poisoning

GE4A.P4A Food Safety and Standards (Practical)

1. Simple tests for Food Adulteration
2. Market Survey of preserved fruit and vegetable products

GE4B.T4B Therapeutic nutrition

1. Therapeutic adaptations of normal diet
2. Clear fluid, full fluid, soft and regular diet
3. Aetiology, clinical features and nutritional management of
    - GI Tract Disorders – Peptic ulcer, diarrhoea, constipation, flatulence, celiac disease
    - Liver – Viral hepatitis
    - Obesity
    - Diabetes mellitus
    - Hypertension and coronary heart disease

- Fever

GE4B.P4B Therapeutic nutrition (Practical)

1. Planning, preparation and service of diets for the following:
    - Therapeutic diets – Normal, soft, clear and full fluid
    - Obesity
    - Type 2 diabetes mellitus
    - CHD
    - Viral hepatitis

SEMESTER – IV

SEC-2 Practical Approaches in Food and Nutrition (Practical)

1. Recording of self diet by 24 hour recall method and its nutritional analysis
2. Concept of food exchange list
3. Planning of meals for adults of different activity levels for various income groups
4. Market survey on nutritional labelling of food products and deciphering nutrition label of packaged food and beverages

SEMESTER – V

C11.T11 Community Nutrition

1. Concept of community, factors affecting community health, Secondary Sources of Community Health data : vital statistics, infant, child and maternal mortality rates
2. Nutritional Status Assessment: Direct and indirect methods of assessment
    - Nutritional Anthropometry
    - Biochemical and biophysical methods of Nutritional status assessment
    - Clinical Assessment of Nutritional deficiencies
    - Diet Survey
3. Nutrition Monitoring and Nutrition Surveillance, Growth monitoring and growth chart
4. Malnutrition: causes, consequences and preventive measures
5. International and National Agencies to combat malnutrition

6. National Nutrition Intervention Programmes to combat Malnutrition: ICDS, Midday meal, PHC and Public Distribution System

C11.P11 Community Nutrition (Practical)

1. Anthropometric measurement – height, weight, BMI circumference of head and chest, MUAC, Waist-Hip ratio, measurement of fat using skin fold thickness
2. Clinical assessment and sign of nutrient deficiency : PEM, vitamin A, Anaemia, Rickets, vitamin B complex
3. Growth chart : plotting and interpretation
4. Diet Survey

SEMESTER – V

C12.T12 Community Hygiene and Sanitation

1. Concept of hygiene and sanitation and relation to nutrition, personal hygiene
2. Community water and waste management
3. Bacterial food infections (Salmonellosis, Shigellosis and Listeriosis) and food poisoning (Staphylococcal, Botulism and Aflatoxin): Symptoms, mode of transmission and methods of prevention
4. Water borne diseases (Cholera and amoebiasis): causative agent, mode of transmission, prevention and control

SEMESTER – V

DSE1.T1 Food safety and sustainable nutrition

3. Food Standards: ISI, Agmark, PFA, FPO, MPO, Codex Alimentarius, HACCP, FSSAI
4. Food preservation: general idea of food preservation and processing. Use of high and low temperature, dehydration, freezing, freeze drying, irradiation and preservatives in food preservation
5. Preserved products: jams, jellies, pickles, syrup, squash – uses and nutritional aspects
6. Nutrient losses in cooking and enhancing nutritional quality of foods – supplementation, germination, fermentation, fortification, enrichment
7. Basic concept of organic and genetically modified foods
8. Functional foods – prebiotics and probiotics, nutraceuticals

DSE1.P1 Food safety and sustainable nutrition (Practical)

1. Submission of market survey report on packaged/fortified/processed food
2. Preparation of preserved food products: jam, jelly, squash, pickle

DSE2.T2 Food Service Management

1. Definition and principles of food service management
2. Tools of food service management
3. Hygiene and sanitation in food service management
4. Menu planning : importance of menu, factors affecting menu planning
5. Various methods of cooking, different kinds of fuel- uses and advantages
6. Methods of service
7. Ideal kitchen in domestic level, industry level and hospitals
8. Criteria for selection of dieticians and food handlers

SEMESTER – V

DSE3.T3 Maternal and Child Nutrition

1. Indicators of maternal and child health, Maternal and age specific mortality rates, causes of poor maternal and child health, schedule of antenatal care
2. Physiological changes and hormonal regulation of pregnancy, physiology of lactation, hormonal regulation of milk production and secretion, let down reflex
3. Developmental problems and nutritional management of pre-term and low birth weight infants, Feeding problems and management of children with special needs
4. Nutritional problems of infancy and their management – growth faltering, obesity, GERD

DSE3.P3 Maternal and Child Nutrition (Practical)

1. Planning and preparation of weaning food
2. Planning and preparation of supplementary nutritious dishes for children, pregnant woman and lactating mother

DSE4.T4 Basic Principles of Biophysics

1. Physicochemical properties and biological applications of the following:
    - Viscosity
    - Surface tension
    - Absorption
    - Adsorption
    - Colloids
    - Osmosis
    - Diffusion
2. Acids, bases, salts, pH, buffers – chemistry and biological application, homeostasis
3. Chromatography: Principle, process and biological application of Gas chromatography, High pressure liquid chromatography, paper chromatography and thin layer chromatography

SEMESTER – VI

C13.T13 Food Microbiology

1. Sources of microorganisms in food
2. Physical and Chemical methods of sterilisation and disinfection
3. Nutritional requirements of microorganisms, Types, culture media, isolation of pure culture
4. Bacterial growth curve. Extrinsic and intrinsic parameters affecting bacterial growth. Generation time and TDT
5. Food Spoilage and Contamination: Cereal and cereal products, vegetables and fruits, fish and other sea foods, meat and meat products, milk and milk products
6. Microbiological examination of water and milk

C13.P13 Food Microbiology (Practical)

1. Gram Staining of bacteria
2. Preparation of liquid and solid media for routine cultivation of bacteria, preparation of slant and stab culture
3. Methylene blue reduction test of milk
4. Determination of potability of water by presumptive coliform test

SEMESTER – VI

C14.T14 Epidemiology

1. Concept of Health
2. Concept of Epidemiology, Principles of Epidemiology,
3. Methods of epidemiology
4. Immunization
5. Concept of disease (endemic, epidemic and pandemic, acute and chronic, communicable and non-communicable, zoonosis, epizootic, enzootic, vector-borne and nosocomial), theories of disease causation, transmission of disease
6. Epidemiology of communicable diseases: chickenpox, mumps, measles, influenza, tuberculosis, typhoid, the dengue syndrome, malaria, Japanese encephalitis and AIDS
7. Demographic Cycle

SEMESTER – VI

DSE5.T5 Public Health Nutrition

1. Introduction to Nutritional Deficiency diseases: PEM, VAD, IDA, IDD, Fluorosis, Vitamin D deficiency
2. Nutrition for special conditions: sports nutrition, nutrition during emergencies, space nutrition
3. Nutrition in extreme climates
4. Nutritional management of cancer, thalassemia, HIV-AIDS
5. Nutrition Security

DSE5.P5 Public Health Nutrition (Practical)

1. Planning and preparation of dishes to treat various nutritional deficiencies: PEM, VAD, IDA
2. Visit to any National Nutrition Programme and Preparation of Project Report

DSE6.T6 Inborn Errors of Metabolism and Food Allergies

1. Aetiology, symptoms, diagnostic tests and management of malabsorption syndrome
2. Aetiology, symptoms, diagnostic tests and management of inborn errors of metabolism:
    - Disorders of carbohydrate metabolism: lactose intolerance, galactosemia, fructosuria, glycogen storage disorders
    - Disorders of amino acid metabolism: phenylketonuria, MSUD
    - Disorders of fatty acid metabolism: MCADD
    - Disorders of organic acid metabolism: Alcaptonuria
3. Aetiology, symptoms, diagnostic tests and management of food allergies

SEMESTER – VI

DSE7.T7 Nutrigenomics

1. Concept and applications of Nutrigenomics and Pharmacogenomics
2. Health Informatics
3. Nucleic acid and protein Data base
4. Phylogenetic tree
5. Sequence similarity searching by BLAST

DSE7.P7 Nutrigenomics (Practical)

1. Retrieval of Nucleic acid or Protein sequence from data bases, storing of sequence
2. Retrieval of protein structure from Protein Data Bank, Protein Structure Visualisation
3. Sequence alignment by BLAST

DSE8.T8 Concepts in Nutrition Education

1. History, need and relevance of nutrition education and communication in India
2. Concept of Behaviour Change Communication (BCC)
3. Components of BCC: Sender, Message, Channel, Receiver
4. Various types of communication – interpersonal, mass media, visual, verbal/ non-verbal
5. Nutrition education – meaning and objectives, methods
6. Audio-visual aids to impart nutrition and health education