VIDYASAGAR UNIVERSITY

Paschim Midnapore, West Bengal

PROPOSED CURRICULUM & SYLLABUS (DRAFT) OF

BACHELOR OF SCIENCE (HONOURS)

MAJOR IN NUTRITION

4-YEAR UNDERGRADUATE PROGRAMME

(w.e.f. Academic Year 2023-2024)

Based on

Curriculum & Credit Framework for Undergraduate Programmes

(CCFUP), 2023 & NEP, 2020

VIDYASAGAR UNIVERSITY
BACHELOR OF SCIENCE (HONOURS) MAJOR IN NUTRITION
(under CCFUP, 2023)

Level	YR.	SEM	Course Type	Course Code	Course Title	Credit	L-T-P	Marks		
								CA	ESE	TOTAL
B.Sc. (Hons.)	1st	I	**SEMESTER-I**							
			Major-1	NUTHMJ101	**T: Basic Nutrition Part-I** **P: Basic Nutrition Part-1(Practical)**	4	3-0-1	15	60	75
			SEC	NUTSEC01	**P: Community Nutrition Programme**	3	0-0-3	10	40	50
			AEC	AEC01	Communicative English -1 (***common for all programmes***)	2	2-0-0	10	40	50
			MDC	MDC01	Multidisciplinary Course -1 (***to be chosen from the list***)	3	3-0-0	10	40	50
			VAC	VAC01	ENVS (***common for all programmes***)	4	2-0-2	50	50	100
			Minor (Disc.-I)	NUTMI01	**T: Fundamental Nutrition Part-I; P: Practical** ***(To be taken by students of other Disciplines)***	4	3-0-1	15	60	75
			Semester-I Total			20				400
		II	**SEMESTER-II**							
			Major-2	NUTHMJ102	**T: Basic Nutrition Part-II** **P: Basic Nutrition Part-II (Practical)**	4	3-0-1	15	60	75
			SEC	NUTSEC02	**P: Food Adulteration and Community Health**	3	0-0-3	10	40	50
			AEC	AEC02	MIL-1 (***common for all programmes***)	2	2-0-0	10	40	50
			MDC	MDC02	Multi Disciplinary Course-02 (***to be chosen from the list***)	3	3-0-0	10	40	50
			VAC	VAC02	Value Added Course-02 (***to be chosen from the list***)	4	4-0-0	10	40	50
			Minor (Disc.-II)	NUTMI01	**T: Fundamental Nutrition Part-II; P: Practical** ***(To be taken by students of other Disciplines)***	4	3-0-1	15	60	75
			Summer Intern.	CS	Community Service	4	0-0-4	-	-	50
			Semester-II Total			24				400
			TOTAL of YEAR-1			44				800

MJ = Major, MI = Minor Course, SEC = Skill Enhancement Course, AEC = Ability Enhancement Course, MDC = Multidisciplinary Course, VAC = Value Added Course; CA= Continuous Assessment, ESE= End Semester Examination, T = Theory, P= Practical, L-T-P = Lecture-Tutorial-Practical, MIL = Modern Indian Language, ENVS = Environmental Studies

Programme Specific Objectives:

i. Understand the role of nutrient for community welfare
ii. Carrier opportunities in Public Health and Nutrition Community Nutrition Sectors.
iii. Enable entrepreneurship development in the field of food science and nutrition.
iv. Pursue higher education and research in the different domains of nutrition and public health
v. Skill based knowledge up gradation.

Detailed Syllabus

MAJOR (MJ)

MJ-1: Basic Nutrition Part-I **Credits 04 (Full Marks: 75)**

COURSE LEARNING OUTCOMES:

After the completion of the course, students will have ability to

1. Importance of nutrients for basic requirement of life.
2. Importance of nutrition awareness for prevention of diseases and early recovery.
3. Dietary management of under nutrition act different phases of human lifecycle.
4. Understand the impact of digestive system in nutrition.

MJ-1T: Basic Nutrition Part-1 **Credits 03**

Course contents:

1. **Food and Nutrition : Basic concepts**
   - Concept and definition of terms Nutrition, Nutrients, Nutritional status, Malnutrition and Health. Interrelationship in maintaining good health and well-being
   - Food as source of nutrients, function of food, classification of food, Food groups. Food pyramid.
   - 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.I , B.M.R & influencing factors, S.D.A.
   - Anthropometric assessment for pre-school and school going children: MUAC, Waist-Hip ratio, Height for age. Weight for age. Growth chart.
   - Minimum Nutritional Requirements and RDA : Formulation of RDA and Dietary Guidelines: Reference Man and Reference Woman
   - Interrelationship between nutrition and health- Visible symptoms of goods health.
   - Basic function of nutrients- Carbohydrate, dietary fibre, protein, fat, vitamins, minerals and water

2. **Digestive System**
   - Anatomical structure of human digestive system, digestive juices and their functions.

- Digestion and absorption of carbohydrates, protein and lipid (General concepts)

3. **Nutrition awareness and Public Health:**
   - KAP and BAP model of nutritional awareness generation process,
   - Concept of Public health, determinants of public health.
   - Various strategies for nutritional awareness generation on public health at rural sectors; child to child strategy, child to parent strategy, women to women strategy.
4. **Under nutrition management from intrauterine life to adulthood:**
   - PEM in the context of underweight, stunting, wasting,
   - SAM; Nutritional Anaemia with special reference to Iron Deficiency Anaemia; Vitamin A deficiency (Xeropthalmia); Iodine Deficiency Disorders; Zinc deficiency: Prevalence, Causes, Consequences and its control.
   - Other Nutritional Problems: Vitamin B complex deficiencies, vitamin C deficiency, Vitamin D deficiencies.

MJ-1P: Basic Nutrition Part-1(Practical) **Credits 01**

Course contents:

1. Identification of slides
2. Small Intestine, large intestine, stomach. Tongue, liver
3. Growth chart and its interpretations
4. Undernutrition and obesity risk assessment using BMI, weight for age, height for age, waist to hip ratio, MUAC.

Preparation of audio visual aids for nutrition awareness

MJ-2: Basic Nutrition Part-II **Credits 04 (Full Marks: 75)**

COURSE LEARNING OUTCOMES:

After the completion of the course, students will have ability to

1. Learn the importance of nutrient for the health care of mother and child.
2. Understand the way of food safety and quality control for improving public health.
3. Importance of Nutrition education communication and behavior alteration for health promotion, disease prevention and early recovery from diseases.
4. Know the different components of health care system.

MJ-2T: Basic Nutrition Part-II **Credits 03**

Course contents:

1. **Mother Child health care:**
   - Definition of health care, and types.

- Adolescent pregnancy and its complications.
- Non nutritional factors affecting pregnancy outcome.
- Antenatal care and its schedule and importance
- Child immunization.
- Weaning; definition, process of weaning, hygiene and sanitation of weaning.
- Preparation for lactation, Galactogogue.

2. **Food Safety and Quality Control:**
    - Types of Food Hazards. Food borne Diseases: Cholera, Typhoid, Diarhhoea and botulism(causes, mode of transmission, symptoms, prevention strategies)
    - Personal Hygiene, Food Hygiene and Sanitation and Environmental Sanitation and Safety (Water supply, Waste Disposal) at home level.
    - Food Adulteration: Concept/Definition as given by FSSAI, Common adulterants present in foods (cereals, pulses, milk and milk products, fats and oils, sugar, honey, spices and condiments),
    - Ill effect of adulterants (metanil yellow, argemone, kesari dal) on human health common methods for detecting adulteration at home)
    - FSSAI Act 2006, HACCP.

3. **Nutrition Education, Communication and Behaviour Change:**
    - Behaviour Change: Definition and importance. Nutrition Education: Need, Scope and Importance.
    - IEC: Definition, Importance and various concepts.
    - Various Methods of imparting nutrition education (Individual, Group, and mass approach) Types (Interpersonal communication: Individual and group approach; Mass Media, Traditional Media)
4. **Health Care System:**
    - Health care system: Definition, importance and functions. Types-Primary, secondary, tertiary health care system.
    - Prevention of diseases; primordial, primary, secondary, and tertiary prevention
    - Role of anganwadi workers, ASHA workers, multipurpose health workers, role of sub-centres, ICDS centres.

MJ-2P: Basic Nutrition Part-II (Practical) **Credits 01**

1. Identification of food adulterants
   metanil yellow, argemone, kesari dal
2. Visit an anganwadi centre/ICDS centre. Prepare a report.
3. Topic based group discussion

Prepare a best practice list for lactating mothers

MINOR (MI)

MI – 1: Fundamental Nutrition Part-I **Credits 04 (Full Marks: 75)**

MI – 1T: Fundamental Nutrition Part-I **Credits 04**

COURSE LEARNING OUTCOMES:

After the completion of the course, students will have ability to

1. Importance of nutrients for basic requirement of life.
2. Importance of nutrition awareness for prevention of diseases and early recovery.
3. Dietary management of under nutrition act different phases of human lifecycle.
4. Understand the impact of digestive system in nutrition.

Course contents:

1. **Food and Nutrition : Basic concepts**

- Concept and definition of terms Nutrition, Nutrients , Nutritional status ,Malnutrition and Health. Interrelationship in maintaining good health and well-being
- Food as source of nutrients, function of food, classification of food, Food groups. Food pyramid.
- Energy in Human Nutrition: Idea of energy and its unit, energy balance, Assessment of energy requirements, Deficiency and Excess, Determination of energy in food, BMI , BMR & influencing factors, S.D.A.
- Minimum Nutritional Requirements and RDA : Formulation of RDA and Dietary Guidelines: Reference Man and Reference Woman

2. **Nutrition awareness and Public Health:**

- Nutritional awareness generation process.
- Concept of Public health, determinants of public health.

3. **Undernutrition management from intrauterine life to adulthood:**

- PEM in the context of underweight, stunting, wasting,
- SAM; Nutritional Anaemia with special reference to Iron Deficiency Anaemia; Vitamin A deficiency (Xeropthalmia); Iodine Deficiency Disorders;

MI-1P: Fundamental Nutrition Part-I (Practical) **Credits 01**

Course Outline:

1. Undernutrition and obesity risk assessment using BMI, weight for age, height for age, waist to hip ratio, MUAC.
2. Preparation of audio visual aids for nutrition awareness
3. Computation of BMI, BMR, SDA from the provided data.
4. Public health sensors assessment.

MI-2: Fundamental Nutrition Part-2 **Credits 04 (Full Marks: 75)**

MI-2T: Fundamental Nutrition Part-2 **Credits 03**

Course contents:

1. **Nutrition Education, Communication and Behaviour Change:**
   - Behaviour Change: Definition and importance. Nutrition Education: Need, Scope and Importance.
   - IEC: Definition, Importance and various concepts.
   - Various Methods of imparting nutrition education (Individual, Group, and mass approach) Types (Interpersonal communication: Individual and group approach; Mass Media, Traditional Media)

2. **Health Care System:**
   - Health care system: Definition, importance and functions. Types-Primary, secondary, tertiary health care system.
   - Prevention of diseases; primordial, primary, secondary, and tertiary prevention
   - Role of anganwadi workers, ASHA workers, multipurpose health workers, role of subcenters, ICDS centers.

3. Mother Child health care:
   - Definition of health care, and types.
   - Adolescent pregnancy and its complications.
   - Antenatal care and its schedule and importance
   - Child immunization

4. Food Safety and Quality Control:
   - Types of Food Hazards. Food borne Diseases: Cholera, Typhoid, Diarhhoea and botulism (causes, mode of transmission, symptoms, prevention strategies)
   - Personal Hygiene, Food Hygiene and Sanitation and Environmental Sanitation and Safety (Water supply, Waste Disposal) at home level.
   - Food Adulteration: Concept/Definition as given by FSSAI, Common adulterants present in foods (cereals, pulses, milk and milk products, fats and oils, sugar, honey, spices and condiments), Ill effect of adulterants (metanil yellow, argemone, kesari dal) on human health common methods for detecting adulteration at home)

MI-2P: Fundamental Nutrition Part-2 (Practical) **Credits 01**

Course Outline:

1. Prepare a best practice list for lactating mothers.
2. Common food adulteration detection test.
3. Visit an anganwadi centre/ICDS centre. Prepare a report.

SKILL ENHANCEMENT COURSE (SEC)

SEC 1: Community Nutrition Programme — Credits 03 (Full Marks: 50)

COURSE LEARNING OUTCOMES:

After the completion of the course, students will have ability to

1. To know programme formulation and its different components.
2. To understand the programme planning, designing and implementation.
3. To know the programme management and evaluation.

SEC1P: Community Nutrition Programme (Practical)

Course Outline:

Programme formulation-different components

- Pre-program survey
- Policy decision and plan of action
- Program designing
- Program implementation
- Program Management
- Program evaluation
- Program formulation to be done using secondary data set and primary data set.

SEC 2: Food Adulteration and Community Health — Credits 03 (Full Marks: 50)

COURSE LEARNING OUTCOMES:

After the completion of the course, students will have ability to

1. To understand the detection of food additives and adulteratives in different food items.
2. To understand the impact of food adulteration on different health hazards.

SEC 2P: Food Adulteration and Community Health (Practical)

Course Outline:

1. Food adulterants : Definition, types, concepts of additives, adulteratives and contaminants with example
2. Basic concepts of determination of adulterants- cereal powder, jam, jelly, spices, butter and oil, dairy products, beverages., fast foods, junk foods, processed and preserved food.
3. Adulterants for using odour, colour, taste and palatability of food.
4. Health impacts of food adulterants- carcinogenic, teratogenic, immunotoxic, infertility, hypertensive, CVD, diabetes. Sedcondary data based diagnosis process.

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BACHELOR OF SCIENCE (HONOURS) MAJOR IN NUTRITION
(Under CCFUP, 2023)

Level	YR.	SEM	Course Type	Course Code	Course Title	Credit	L-T-P	Marks		
								CA	ESE	TOTAL
B.Sc. (Hons.)	2nd	III	**SEMESTER-III**							
			Major-3	NUTHMJ03	T: Nutritional Physiology, Biophysics and Biochemistry; P: Practical	4	3-0-1	15	60	75
			Major-4	NUTHMJ04	T: Food Science and Food Commodities; P: Practical	4	3-0-1	15	60	75
			SEC	NUTSEC03	P: Low cost supplementary foods (Practical)	3	0-0-3	10	40	50
			AEC	AEC03	Communicative English -2 (***common for all programmes***)	2	2-0-0	10	40	50
			MDC	MDC03	Multidisciplinary Course -3 (***to be chosen from the list***)	3	3-0-0	10	40	50
			Minor-3 (Disc.-I)	NUTMIN03	T: Concept of Food and Nutrition; P: Practical	4	3-0-1	15	60	75
			Semester-III Total			20				375
		IV	**SEMESTER-IV**							
			Major-5	NUTHMJ05	T: Metabolism of Biomolecules; P: Practical	4	3-0-1	15	60	75
			Major-6	NUTHMJ06	T: Nutrition in different phases of Human life Cycle; P: Practical	4	3-0-1	15	60	75
			Major-7	NUTHMJ07	T: Nutritional Epidemiology; P: Practical	4	3-0-1	15	60	75
			AEC	AEC04	MIL-2 (***common for all programmes***)	2	2-0-0	10	40	50
			Minor-4 (Disc.-II)	NUTMNI04	T: Nutrition during Physiological State; P: Practical	4	3-0-1	15	60	75
			Summer Intern.	INT	Internship/ Apprenticeship - activities to be decided by the Colleges following the guidelines to be given later	4	0-0-4	-	-	50
			Semester-IV Total			22				400
			TOTAL of YEAR-2			42				775

MJ = Major, MI = Minor Course, SEC = Skill Enhancement Course, AEC = Ability Enhancement Course, MDC = Multidisciplinary Course, CA= Continuous Assessment, ESE= End Semester Examination, T = Theory, P= Practical, L-T-P = Lecture-Tutorial-Practical, MIL = Modern Indian Language

Programme Specific Objectives:

i. Understand the role of nutrient for community welfare
ii. Carrier opportunities in Public Health and Nutrition Community Nutrition Sectors.
iii. Enable entrepreneurship development in the field of food science and nutrition.
iv. Pursue higher education and research in the different domains of nutrition and public health
v. Skill based knowledge up gradation.

Detailed Syllabus

MAJOR (MJ)

MJ-3: Nutritional Physiology, Biophysics and Biochemistry Credits 04 (Full Marks: 75)

COURSE LEARNING OUTCOMES:

After the completion of the course, students will have ability to

1. Understand the impact of various physiological systems in human bodywith nutrition.
2. Nutrition physiology is the study of how food and nutrients interact with the human body, and how these interactions affect health.
3. It explains various aspects and systems of the body from a physical and nutritional perspective.
4. Biochemistry can help us understand the chemical and metabolic processes that our bodies undergo in order to use the nutrients we consume

MJ-3T: Nutritional Physiology, Biophysics and Biochemistry Credits 03

Course contents:

1. **Nutritional Physiology**
   - Concept of eukaryotic cells-structure and function. Comparison of features of prokaryotic and eukaryotic cells, structure outside the cell membrane, cell membrane transport system.
   - Structure and function of neuron and synapses. Neurotransmitters and its role. Organization of central and peripheral nervous system. Hypothalamus, pituitary gland and its role in various body functions. Neuromuscular junction-its role. Role of various nutrients on maintenance of neurological functions.
   - Function of gut-brain axis. Basic function of gut hormones, oxytocin, prolactin, thyroidal hormones, pancreatic hormones.
   - Basic concepts of Spermatogenesis, oogenesis, folleculogenesis and its regulation. Menstruation cycle-its regulation and menopause.
   - Components of blood, blood coagulation. Importance of plasma proteins- ferritin, transferrin, ceruloplasmin, prealbumin. Erythropoiesis. Structure and function of heart - Regulation of cardiac output and blood pressure.
   - Role of lungs in the exchange of gases and transport of oxygen and carbon dioxide. Lungs volume and capacity. Lungs compliances. Regulation of breathing. Urine formation. Non-excretory function of kidney.

2. **Nutritional Biophysics**
   - Biological (Nutritional) importance of diffusion, absorption, osmosis.
   - Colloids. – Physiochemical properties and their biological (Nutritional) importance.
   - Nutritional importance of viscosity and surface tension.
   - Biological importance of acid, base, buffer, pH and acid-base balance.
   - Enzymes: Definition, classification, coenzyme, isoenzyme, specificity of enzymes, enzyme kinetics (Michelis-Menten equation) including factors affecting enzyme activity, enzyme inhibition.

3. **Nutritional Biochemistry:**
   - Definition and function, Classification, Isomerism of monosaccharide, Properties of monosaccharide, Structure and functions of modified monosaccharide, disaccharides, oligosaccharides, polysaccharides and mucopolysaccharides.
   - Definition and function, Classification, Classification of fatty acids (straight chain fatty acid, Substituted fatty acids, cyclic fatty acids), Isomerism of fatty acids, Properties of fatty acids, Glycerol, Properties of fats, Characterization of fats, Phospholipids, Micelle, Bilayer, Liposome, Glycolipids, Steroids and Sterols, Structure and Properties.
   - Definition and Functions, Classification, Amino acids and their functions, Isomerism of amino acids , Classification of amino acids, Properties of amino acids , Properties of protein, Structure of proteins (Primary, Higher orders, Bonds stabilizing higher structures, secondary (alfa helix, beta pleated sheet, beta bend and omega loop and Triple helix supercoil, and tertiary supersecondary motifs with domain).

4. **Application of carbohydrates, proteins and lipids in nutrition:**
   - Glycemic index and glycemic load.
   - Fatty acids: Role and nutritional significances of PUFA, MUFA, SFA, USFA, Omega - 3 fatty acid.
   - Protein quality (BV, PER, NPU).

MJ-3P: Nutritional Physiology, Biophysics and Biochemistry (Practical) Credits 01

Course contents:

1. Determination of pH: in acids, alkalis and buffers using pH meter and indicators.
2. Qualitative test of carbohydrates, protein and fats.
3. Enzyme Assays: SerumAlkaline phosphatase (ALP), Serum Glutamate Oxaloacetate Transaminase (SGOT), Serum Glutamate Pyruvate Transaminase (SGPT), Amylase, Lipase.
4. Estimation of glucose, protein, cholesterol, triglyceride, creatinine and urea in plasma using biochemical methods and Biochemistry analyser. Compare the results.

MJ-4: Food Science and Food Commodities **Credits 04 (Full Marks: 75)**

COURSE LEARNING OUTCOMES:

After the completion of the course, students will have ability

1. To know regarding the energy rich foods, body-building foods and protective foods.
2. To enhance the knowledge about various types of foods and their uses.
3. To gather the knowledge on effect of cooking affect the nutritional value of foods.

MJ-4T: Food Science and Food Commodities **Credits 03**

Course contents:

1. **Concept about energy rich foods:**
   - Nutritional aspects of wheat, rice, oats, rye, barley, millets, quinoa, maize or corn, jowar, ragi and bajra.
   - Types, sources, use and nutritional aspects of fats and oils. Specific fats and oils (lard, butter, margarine, cotton seed oil, groundnut oil, coconut oil, soyabean oil, olive oil, rice bran oil, sesame oil, rape seed oil and mustard oil, palm oil),
   - Effect of heating on fat (smoke point, flash point and fire point, changes in fat on heating). Role of fat/oil in cookery (fat or oil used as medium of cooking, fat improves the texture of foods, fat improves palatability, improves quality of the product).
   - Specific nuts and oil seeds (almonds, coconut, flaxseed, gardencress seeds, groundnut, soyabean, sunflower seeds, walnuts, oilseed cakes)

2. **Concept about Body building foods:**
   - Types of pulses and legumes, uses, and nutritional aspects. Pulse in cookery (effects of cooking of pulse, factors affecting cooking quality).
   - Nutritive value and composition of milk, Types of processed milk, milk products (butter, curd, paneer and cheese).Role of milk products in cookery,Milk in cookery (effect of heat in various milk component).
   - Nutritional aspects and uses of edible fish and meat, concept of red and white meat.
   - Cookery of egg, fish and meat (effect of heat in various component of egg, changes during cooking of meat), role of egg in cookery.

3. **Concept about protective and immune rich foods:**
   - Uses and nutritional aspect of commonly available leafy and green vegetables.
   - Uses and nutritional aspect of commonly available others vegetables.
   - Relation between various vegetables and human immune system.
   - Vegetable cookery (preliminary preparation, changes during cooking, loss of nutrient during cooking, effects of cooking on pigment)
   - Uses and nutritional aspect of fresh fruits and dry fruits– raw and processed product.
   - Fruits and human immune system.

4. **Concept about the new foods:**
   - Genetically modified food.
   - Functional food
   - Fortified food.

- Designer food.
- Super foods

MJ-4P: Food Science and food commodities (Practical) **Credits 01**

1. Proximate analysis of foods- Ash, moisture, carbohydrate, protein, fats, pH.
2. Visit to local Food processing plants like bakery industry, milk processing unit, flour mill, dal mill, rice mill, oil extraction mill, fruit juice manufacturing units etc. And prepare a report on that visit.

MJ-5: Metabolism of Biomolecules **Credits 04 (Full Marks: 75)**

COURSE LEARNING OUTCOMES:

After the completion of the course, students will have ability

1. Understand of various enzymes in energy-producing mechanism.
2. To know how electron uses in energy production in the body.
3. Study about the various biochemical pathways of the metabolism of carbohydrates.
4. To learn about the metabolism of lipids including fatty acids.

MJ-5T: Metabolism of Biomolecules **Credits 03**

Course contents:

1. **Carbohydrate metabolism:**
   - Glycolysis-its metabolic pathway, regulation and energy generation.
   - TCA Cycle- its metabolic pathway, regulation and energy generation.
   - Glycogenolysis& gluconeogenesis- metabolic pathway, importance.
   - Pentose phosphate pathway- metabolic pathway, importance.

2. **Protein and Nucleic acid Metabolism :**
   - Transamination, deamination, transmethylation.
   - Amino acid derivatives with significances.
   - Urea cycle-Biochemical pathways, significance.
   - Synthesis of nucleic acid- purine and pyrimidine synthesis.
   - Catabolism of nucleic acid- purine and pyrimidine catabolism.

3. **Lipid metabolism:**
   - Biosynthesis of triglycerides and phospholipids.
   - Biosynthesis of palmitic acid and its significance.
   - Biosynthesis of oleic acid (Omega 9 fatty acid), linoleic acid (Omega 6 fatty acid) linolenic acid (Omega 3 fatty acid) and its significance
   - Ketone bodies types and formation, utilization of ketone bodies.
   - Beta, omega and alfa oxidation of fatty acids.

4. Metabolism of micronutrients:

- Metabolism of vitamin A, D, E, K, B6 and C.
- Metabolism of vitamin calcium, iron, iodine and zinc.

MJ-5P: Food Science and food commodities (Practical) Credits 01

1. Estimation of lactose in milk.
3. Estimation of calcium from foods.
4. Determination of acid number and saponification number of fats and oil.
2. Estimation of total carbohydrate from food.
3. Estimation of vitamin C from foods.

MJ-6: Nutrition in different phases of Human life Cycle Credits 04 (Full Marks: 75)

COURSE LEARNING OUTCOMES:

After the completion of the course, students will have ability

1. To know regarding nutritional requirements and dietary management during pregnancy.
2. To know about the physiology of lactation, nutritional requirements and dietary management during lactation.
3. To learn about nutritional requirement of toddlers / preschool / school going children / adolescent / adults.
4. To learn about geriatric nutrition.

MJ-6T: Nutrition in different phases of Human life Cycle Credits 03

Course contents:

1. Nutrition during Pregnancy:

- Physiology of pregnancy, non-nutritional factors affecting pregnancy outcome, importance of adequate weight gain during pregnancy, antenatal care and its schedule.
- Nutritional requirements during pregnancy and dietary management. Special importance of iron, folic acid and calcium during pregnancy.
- Common problems of pregnancy and their managements- morning sickness, anaemia, constipation, pregnancy induced hypertension, gestational diabetes.

2. Nutrition during Lactation and infancy:

- Physiology of Lactation.
- Nutritional requirements during lactation.
- Dietary management, food supplements.
- Increase the production of breast milk-various factors.
- Care and preparation of nipples during breast feeding.

- 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.
- Management of preterm and low birth weight baby – their special needs.

3. Nutrition during preschool stage to adult:

- Nutrition requirement of toddlers.
- Nutrition requirement of preschool.
- Nutrition requirement of school going children.
- Nutrition requirement of adolescent.
- Nutrition requirement of adults.

4. Geriatric nutrition:

- Physiological changes during aging.
- Nutritional requirement during aging.
- Dietary guidelines during aging.
- Geriatric health problems.

MJ-6P: Nutrition in different phases of Human life Cycle (Practical) Credits 01

1. Planning and preparation of balanced diet for a pregnant women at different trimester.
2. Planning and preparation of balanced diet for a lactating women in different phase.
3. Preparation of weaning food.
4. Planning and preparation of balanced diet for a pre-school children.
5. Planning and preparation of balanced diet for school going child. Preparation of packed lunch.
6. Planning and preparation of balanced diet for adolescents.
7. Planning and preparation of balanced diet for adult men and women of different Physical activity and economic status.
8. Planning and preparation of balanced diet for senior citizen.

MJ-7T: Nutritional Epidemiology Credits 03

COURSE LEARNING OUTCOMES:

After the completion of the course, students will have ability to

1. Describe major study designs in nutritional epidemiology and select an appropriate design for addressing a study question.
2. Explain implication of study design and methods of diet and nutritional status assessment in interpreting studies in nutritional epidemiology
3. Explain the role of epidemiological research in improving health and nutritional status
4. Demonstrate knowledge of epidemiological approach to defining and measuring occurrence of nutrition and health related states in population.

Course contents:

1. **Basic epidemiology concepts and methods:**
   - Definition, scope and purpose of epidemiology.
   - Measurement of mortality, morbidity and disability – rates, ratios and proportions.
   - Epidemiologic study methods- observational and experimental studies.
   - Observational epidemiology- descriptive and analytical studies – Time, place, person distribution, ecological, cross sectional, case-control and cohort.
   - Experimental epidemiology- experimental and quasi experimental trials.

2. **Study of the epidemiologic approach:**
   - Randomized control trials, Field trials and community trials.
   - Population, sampling, sample size and power.
   - Determinants of disease.
   - Vital statistics and their significance.
   - Herd immunity.

3. **Nutritional status assessment in interpreting studies in nutritional epidemiology:**
   - Nutritional status assessment- definition, scope and importance.
   - Nutritional status assessment by ABCD methods and algorithm of assessment.
   - Weight for age, Height for age, weight for height, BMI, Gomez classification, Waterlow Classification.
   - Various methods of diet survey with merits and demerits.
   - Nutritional surveillance.
   - HOMA assessment.

4. **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.

MJ-7P: Nutritional Epidemiology (Practical) Credits 01

1. Assignment programme on public health and epidemiology special emphasis on communicable **Or** non-communicable diseases. ***(Compulsory for 10 marks***)
2. Submit a report on educational excursion in research institute of public health and epidemiology **Or** related higher learning centre working on public health and epidemiology. ***(Compulsory for 10 marks)***

MINOR (MI)

MI – 3: Concept of Food and Nutrition **Credits 04(Full Marks: 75)**

MI – 3T: Concept of Food and Nutrition **Credits 04**

COURSE LEARNING OUTCOMES:

After the completion of the course, students will have ability to learn

1. The nutritional value of various foods.
2. Effect of cooking methods on nutritive value of various foods.
3. Various food products with uses.

Course contents:

1. Cereals, Millets, Pulses and legumes:

- Nutritional aspects and uses of wheat, rice, oats, rye, barley, millets, maize or corn, jowar, ragi and bajra.
- Nutritional aspects of various types of pulses and legumes.
- Effects of cooking on cereals and pulses.

2. Egg, Fish, meat, Milk and milk Products:

- Cookery of egg, fish and meat (effect of heat in various component of egg, changes during cooking of meat),role of egg in cookery.
- Nutritional aspects of edible fish and meat, concept of red and white meat,
- Nutritive value and composition of milk,
- Types of processed milk, milk products (butter, curd, paneer and cheese).
- Role of milk products in cookery,
- Substitutes of milk and milk products.

3. Vegetables and fruits:

- Uses and nutritional aspect of commonly available vegetables.
- Fresh fruits and dry fruits– raw and processed product.
- Vegetable cookery (preliminary preparation, changes during cooking, loss of nutrient during cooking, effects of cooking on pigment).

MI-3P: Concept of Food and Nutrition (Practical) **Credits 01**

Course Outline:

1. Methods of preparation and analysis of nutritive value of Breakfast cereals.
2. Methods of preparation and analysis of nutritive value of Milk and milk products.
3. Methods of preparation and analysis of nutritive value of Poultry products.
4. Methods of preparation and analysis of nutritive value of Vegetables.

MI-4: Nutrition during Physiological State **Credits 04 (Full Marks: 75)**

MI-4T: Nutrition during Physiological State **Credits 03**

COURSE LEARNING OUTCOMES:

After the completion of the course, students will have ability to learn

1. To know regarding the nutritional benefit of breast milk and management of preterm baby.
2. To know about the nutritional requirements and dietary management during pregnancy.
3. Physiology of lactation, nutritional requirements and dietary management during lactation.
4. To learn about geriatric nutrition.

Course contents:

1. **Nutrition during infancy:**
   - 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.
   - Management of preterm and low birth weight baby – their special needs.
2. **Nutrition during pregnancy and lactation**:
   - Nutritional requirements during lactation. Dietary management, food supplements. Increase the production of breast milk-various factors. Care and preparation of nipples during breast feeding.
   - Non-nutritional factors affecting pregnancy outcome, importance of adequate weight gain during pregnancy, antenatal care and its schedule.
   - Nutritional requirements during pregnancy and dietary management. Special importance of iron, folic acid and calcium during pregnancy.
   - Common problems of pregnancy and their managements- morning sickness, anaemia, constipation, pregnancy induced hypertension, gestational diabetes.
3. **Nutrition during elder person:**
   - Physiological changes during aging.
   - Nutritional requirement during aging.
   - Dietary guidelines during aging.
   - Geriatric health problems.

MI-4P: Nutrition during Physiological State (Practical) **Credits 01**

Course Outline:

1. Planning and preparation of balanced diet for a pregnant woman.
2. Planning and preparation of balanced diet for a lactating woman.
3. Preparation of weaning food.
4. Planning and preparation of balanced diet for senior citizen.

SKILL ENHANCEMENT COURSE (SEC)

SEC 3: Low cost supplementary foods **Credits 03 (Full Marks: 50)**

COURSE LEARNING OUTCOMES:

After the completion of the course, students will have ability

- To know regarding low cost supplementary foods vs. market available foods with cost effectiveness.
- To know the skills for preparation of low cost supplementary foods

SEC3P: Low cost supplementary foods (Practical)

Course Outline:

Prepare a Report on Low cost supplementary foods (LCSF) feeding by various community to their infant and pre-school children at remote villages, rural, semi-urban and urban area by considering following points-Pre-program survey

- Recipes suitable for infants or pre-school children.
- Methods of preparing different types of recipes.
- Adult food modified to suit children's' needs
- Method of feeding.
- Preparation of locally available foods.
- Compare the nutritive value and cost of LCSF and market available products.
- Compare the health status infant and pre-school children fed of LCSF and market available products.

INTERNSHIP/APPRENTICESHIP (INT)

Credit-04 Marks: 50 **(120 hours, 8 weeks)**

COURSE LEARNING OUTCOMES:

After the completion of the course, students will have ability to know regarding the various activities of dietary department in a hospital and patient care.

Guideline for Internship/Apprenticeship

A report on the basis of internship in a hospital dietary department or diet clinic to be submitted. Aspects to be covered for general knowledge to:

- Establish rapport with patients - assess the nutritional status and diet history of patients.
- Plan diet sheets after careful study of patients' case sheets - prepare and provide guidance in the production of therapeutic diets.
- Supervise preparation of diets, assist and guide in tray setting with special emphasis on portion control and therapeutic modifications.
- Supervise delivery of trays to patients.
- Get feedback from patients regarding diets
- The modification of diet through consultation doctors.
- Gain experience in the administrative set up of a dietary department.
- The role of dietician in hospital management.

VIDYASAGAR UNIVERSITY

Midnapore, West Bengal

PROPOSED CURRICULUM & SYLLABUS (DRAFT) OF

BACHELOR OF SCIENCE WITH NUTRITION

(MULTIDISCIPLINARY STUDIES)

3-YEAR UNDERGRADUATE PROGRAMME

(w.e.f. Academic Year 2023-2024)

Based on

Curriculum & Credit Framework for Undergraduate Programmes

(CCFUP), 2023 & NEP, 2020

VIDYASAGAR UNIVERSITY
BACHELOR OF SCIENCE IN LIFE SCIENCES with NUTRITION
(*Under CCFUP, 2023*)

Level	YR.	SEM	Course Type	Course Code	Course Title	Credit	L-T-P	Marks		
								CA	ESE	TOTAL
B B.Sc. in Life Sc. with Nutrition	2nd	V	**SEMESTER-V**							
			Major-A4	NUTPMJ04	T: Community Nutrition; P: Practical; *(To be studied by students taken* Nutrition. *as Discipline- A)*	4	3-0-1	15	60	75
			Major-A5	NUTPMJ05	T: Food Chemistry; P: Practical *(To be studied by students taken* Nutrition *as Discipline- A)*	4	3-0-1	15	60	75
			Major-A6	NUTPMJ06	T: Therapeutic Diet; P: Practical *(To be studied by students taken* Nutrition *as Discipline- A)*	4	3-0-1	15	60	75
			Major (Elective) -2	NUTMJE02	T: Epidemiology, Public Health and Hygiene; P: Practical *(To be studied by students taken* Nutrition *as Discipline- A)*	4	3-0-1	15	60	75
			Minor-5 (Disc.-C5)	NUTMIN05	T: Nutrition in Special Physiological Phases; P: Practical *(To be studied by students taken* Nutrition. *as Discipline- C)*	4	3-0-1	15	60	75
					Semester-V Total	20				375
		VI	**SEMESTER-VI**							
			Major-B4		*To be decided (Same as MajorA4 for* Nutrition *taken as Discipline-B)*	4	3-0-1	15	60	75
			Major-B4		*To be decided (Same as Major–A5 for* Nutrition *taken as Discipline-B)*	4	3-0-1	15	60	75
			Major-B4		*To be decided (Same as Major–A6 for* Nutrition *taken as Discipline-B)*	4	3-0-1	15	60	75
			Major (Elective) -3	NUTMJE-03	T: Food processing, preservation & spoilage; P: Practical *(To be studied by students taken* Nutrition. *as Discipline- A)*	4	3-0-1	15	60	75
			Minor -6 (Disc.-C6)	NUTMIN06	T: Therapeutic Nutrition; P: Practical *(To be studied by students taken* Nutrition *as Discipline- C)*	4	3-0-1	15	60	75
					Semester-VI Total	20				375
					TOTAL of YEAR-3	40	-	-	-	700
			Eligible to be awarded Bachelor of Science in Multidisciplinary Studies with Nutrition *on Exit*			126	**Marks (Year: I+II+III)**			2325

MJP = Major Programme (Multidisciplinary), MI = Minor, A/B = Choice of Major Discipline; C= Choice of Minor Discipline; CA= Continuous Assessment, ESE= End Semester Examination, T = Theory, P= Practical, L-T-P = Lecture-Tutorial-Practical

MAJOR (MJ)

MJ A4/B4: Community Nutrition **Credits 04 (Full Marks: 75)**

MJ A4/B4T: Community Nutrition **Credits 03 (45L)**

Learning Objectives:

Upon successful completion of this course, students will be able to:

1. Identify key nutritional problems affecting different communities.
2. Explain the socio-economic, cultural, and environmental determinants of community nutritional status.
3. Identify major public health nutrition programs and policies at the local, national, and global levels.
4. Apply foundational principles of conducting a community nutrition assessment.

Course contents:

1. **Foundations of Community Nutrition**
   - Concept of community.
   - Types of community.
   - Factors affecting health of community.
   - Key Indicators of Nutritional Status (Stunting, Wasting, Underweight, Overweight).

2. Assessing Community Needs
- Nutritional Assessment- Clinical Signs, Nutritional Anthropometry, Biochemical tests.
- Diet Survey- Need and importance, methods of dietary survey-merits and demerits.
- Indirect Assessment-Secondary sources of community health data.

3. Major Public Health Nutrition Challenges
- Nutritional problem in the community-Malnutration: Types, causes and preventive measures.
- Vit A prophylaxis Prophylaxis programme.
- Anemia prophylaxis programme.
- Iodine deficiency disorders control programme.

4. National Nutritional Intervention Programmes

- Integrated Child Development Services (ICDS).
- Mid Day Meal Programme (MDMP).
- ANP, SNP, CNP, BFP – Aims and Objectives, Target group, Service provided, Advantages, Limitation.
- Concept on public distribution system.

MJ A4/B4 P: Community Nutrition Part-II (Practical) **Credits 01 (30hrs)**

1. Anthropometric measurement of Weight, height and its comparison with reference value.
2. Determination of BMI and comments on results.
3. Measurement of circumference of mid-upper arm, waist - hip ratio.
4.Weight for age, Height for age, Weight for height, and its comparison with reference value
6. Growth chart preparation (WHO, NCHS & ICMR).

MJ A5/B5: Food Chemistry **Credits 04 (Full Marks: 75)**

MJ A5/B5T: Food Chemistry **Credits 03 (45L)**

Learning Outcomes:

Upon successful completion of this course, students will be able to:

1. Identify the major chemical components in food systems.
2. Explain the chemical basis for the properties and reactions of food constituents.
3. Predict the outcomes of common chemical reactions (e.g., Maillard browning, lipid oxidation) on food quality.
4. Relate the chemical structure of food components to their functional roles in food (e.g., solubility, gelation, emulsification).

Course contents:

1. Water

- Structure and properties of water.
- Water activity (a*w*): definition, measurement, and its critical role in food stability, microbial growth, and chemical reaction rates.

2. Carbohydrates

- Classification: sugars, oligosaccharides, polysaccharides.
- Functional properties: sweetness, solubility, crystallization, hygroscopicity.
- Starch: gelatinization and retrogradation.
- Pectins and Gums: structure and use as thickeners and gelling agents.

3. Lipids (Fats & Oils)

- Classification and structure of fats and oils.
- Chemical properties: hydrolysis, rancidity (hydrolytic and oxidative).
- Lipid oxidation: mechanism, factors affecting it, and antioxidants.
- Hydrogenation and the chemistry of trans fats.

5. Proteins

- Amino acids and protein structure.
- Functional properties: denaturation, coagulation, gelation, emulsification, foaming.
- Maillard Browning and other non-enzymatic browning reactions.
- Protein-lipid and protein-carbohydrate interactions.

6. Vitamins, Minerals, and Pigments

- Classification of major vitamins and minerals in food.
- Factors affecting vitamin stability during processing (e.g., heat, light, pH).
- Introduction to food colors: chlorophyll, carotenoids, anthocyanins.

MJ A5/B5 P: Food Chemistry (Practical) **Credits 01 (30hrs)**

1. Qualitative analysis of carbohydrate, protein, fat.
2. Estimation of reducing sugars in foods.
3. Determination of Acid value of natural fats and oils.
4. Estimation of total protein by biuret method.
5. Estimation of Ascorbic acid content of foods by biochemical method.

MJ A6/B6: Therapeutic Diet **Credits 04 (Full Marks: 75)**

MJ A6/B6T: Therapeutic Diet **Credits 03 (45L)**

Learning Objectives

Upon successful completion of this course, students will be able to:

1. Identify the key components, indications, and contraindications for major therapeutic diets.
2. Develop standardized meal plans and menus that adhere to specific therapeutic diet prescriptions.
3. Modify food textures and consistencies appropriately for patients with dysphagia and other chewing/swallowing impairments.
4. Perform nutrient analysis on therapeutic menus to ensure they meet prescribed guidelines.

Course Contents

1. Foundations of Therapeutic Diets

- Diet Progression (NPO, Clear Liquid, Full Liquid, Soft).
- Standard Hospital Diets.
- Menu Planning Fundamentals.

2. Cardiac and Lipid-Restricted Diets and Diets for Diabetes and Weight Management

- Sodium-Restricted (2g, 1g).
- Therapeutic Lifestyle Changes (TLC).
- DASH Diet
- Carbohydrate Counting, Consistent Carbohydrate Menus.

3. Diets for Gastrointestinal Disorders Allergy and Elimination Diets

- Fiber-Modified (Low-Residue, High-Fiber).
- Low-FODMAP.
- Lactose-Restricted.
- Gluten-Free diet.
- "Top 8" Allergen-Free Elemental Diets.

4. Renal Diets and Specialized Nutritional Support

- Sodium, Potassium, Phosphorus, and Fluid Control.
- Introduction to Enteral Formula Composition and Modular Components.
- **Par-enteral nutritional support.**

MJ A6/B6 P: Therapeutic Diet (Practical) **Credits 01 (30hrs.)**

1. Planning and preparation of clear fluid diets.
2. Planning and preparation of full fluid diets.
3. Planning the preparation of soft diets.
4. Planning the preparation of Therapeutic Lifestyle Changes (TLC).
5. Planning the preparation of DASH.

Major Elective

(To be studied by students taken Nutrition as Discipline- A)

Major (Elective) -2: Epidemiology, Public Health and Hygiene **Credits 04 (FM: 75)**

MJE -2T: Epidemiology, Public Health and Hygiene **Credits 03 (45L)**

Learning Objectives:

Upon successful completion of this course, students will be able to:

1. Define key terms and concepts in epidemiology, public health, and hygiene.
2. Describe the core functions and essential services of public health systems.
3. Calculate and interpret basic epidemiologic measures (e.g., incidence, prevalence, mortality rates).
4. Identify different study designs used in epidemiologic research and discuss their strengths and limitations.

Course Contents:

1. Community Water and Waste Management

- Importance of water to the community.
- Water borne diseases.
- Safe drinking water/portability.
- Sewage disposal, solid waste disposal, liquid waste disposal and treatment.

2. **Demography & Population Control**

- 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.

3. **Principles of Epidemiology**

- Definition, scope and purpose of epidemiology.
- Measurement of mortality, morbidity and disability – rates, ratios and proportions.
- Epidemiologic study methods- observational and experimental studies.

4. **Study of the epidemiologic approach**

- Randomized control trials, Field trials and community trials.

- Population, sampling, sample size and power.
- Determinants of disease.
- Vital statistics and their significance.
- Herd immunity.

Major (Elective) -2P: Epidemiology, Public Health and Hygiene (Practical) Credits 01

- Prepare a Report on public health, nutrition and disease in the community – special emphasis on communicable and non-communicable diseases.

Major (Elective) -3: Food processing, preservation and spoilage **Credits 04 (FM: 75)**

MJE -3T: Food processing, preservation and spoilage **Credits 03 (45L)**

After the completion of the course, students will have ability to

1. Identify the primary biological, chemical, and physical causes of food spoilage.
2. Explain the metabolic pathways and mechanisms used by spoilage microorganisms.
3. Describe the characteristic signs and spoilage patterns in various food commodities.
4. Analyze intrinsic and extrinsic factors that influence the rate and type of food spoilage.
5. Differentiate between food spoilage and foodborne illness.

Course Contents:

1. Food processing and Methods of cooking:

- Dry, moist, frying and microwave cooking.
- Effect of various methods of cooking on foods, nutrient losses in cooking.
- Objectives of cooking, preliminary preparation (cleaning, peeling and straining, cutting and grating, sieving, soaking, processing, blanching, marinating, sprouting or germination, fermentation, drying, filtering, grinding, roasting).
- Significance, principles of different methods of food processing: thermal processing-Cooking (moist heat, dry heat, combination method of cooking), blanching, pasteurization, sterilization, canning. Principles of microwave cooking and solar cooking.

2. Food preservation

- General principles of food preservation.
  Application of heat (pasteurization, sterilization). Application of cold (refrigeration, freezing). Water activity control (drying, adding solutes). Chemical preservatives (organic acids, nitrites, sulfites). Non-thermal technologies (HPP, Pulsed Electric Fields, Irradiation). Hurdle Technology.
- Food additives-various types and their effects on health.
- Food adjuncts and preserved products-Spices (Chilies, Turmeric, Garlic and Ginger), use and nutritional aspect. Jams, Jellies, Pickles, Syrup, Squashes–uses and nutritional aspects.

3. Food borne diseases

- Bacterial agents (e.g., Salmonella enterica, Clostridium perfringens, Escherichia coli O157, Listeria monocytogenes).
- Viral agents (e.g., Norovirus, Hepatitis A virus).
- Parasites (e.g., Giardia lamblia, Taenia solium)
- Toxin-mediated illnesses: food intoxication (e.g., Clostridium botulinum toxin, mycotoxins)

MJE -3P: Food processing, preservation, spoilage & adulteration (Practical) Credits 01

1. Post harvesting food process for later use-Foods include vegetables and fruits (Beans, Radish, cabbage, potato, cauliflower, leafy vegetables and pickle, squash.) dried by sun drying and mechanical drying.
2. To determine the moisture content in fresh and processed products.
3. To determine the ash content in fresh and processed products.
4. To determine the pH of food samples.
5. Spoilage Identification Lab-Students observe and document spoilage in various deliberately "spoiled" food samples (moldy bread, slimy meat, sour milk, etc.).

MINOR (MI)

(To be studied by students taken Nutrition as Discipline- C)

Minor-5: Nutrition in Special Physiological Phases
Credit: 4
Full Marks: 75

Learning outcomes-

After completion of the course the students will be able to:

1. To know regarding nutritional requirements and dietary management during pregnancy.
2. To know about the physiology of lactation, nutritional requirements and dietary management during lactation.
3. To learn about nutritional requirement of toddlers / preschool / school going children / adolescent / adults.

MI – 5T: Nutrition in Special Physiological Phases **Credits 04**

Course Contents-

1. Nutrition during Pregnancy:

- Importance of adequate weight gain during pregnancy, antenatal care and its schedule.
- Dietary management for a pregnant mother.
- Importance of iron, folic acid and calcium during pregnancy.
- Common problems of pregnancy and their managements- morning sickness, anaemia, constipation, pregnancy induced hypertension, gestational diabetes.

2. Nutrition during Lactation:

- Nutritional requirements during lactation.
- Dietary management, food supplements during lactation.
- Increase the production of breast milk-various factors.
- Care and preparation of nipples during breast feeding.

3. Nutrition during infancy to adult:

- 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.
- Nutrition requirement of toddlers / preschool / school going children / adolescent / adults.

MI-5P: Nutrition in different phases of Human life Cycle (Practical) **Credits 01**

1. Planning and preparation of balanced diet for a pregnant woman
2. Planning and preparation of balanced diet for a lactating women
3. Planning and preparation of balanced diet for a pre-school child
4. Planning and preparation of balanced diet for school going child.
5. Planning and preparation of balanced diet for adolescents

Minor-6: Therapeutic Nutrition
Credit: 4
Full Marks: 75

Learning Objectives

Upon successful completion of this course, students will be able to:

1. Identify the key components, indications, and contraindications for major therapeutic diets.
2. Develop standardized meal plans and menus that adhere to specific therapeutic diet prescriptions.
3. Modify food textures and consistencies appropriately for patients with dysphagia and other chewing/swallowing impairments.
4. Perform nutrient analysis on therapeutic menus to ensure they meet prescribed guidelines.
5. Demonstrate practical food preparation and cooking techniques for various therapeutic diets in a kitchen lab.

MI– 6T: Therapeutic Nutrition **Credits 03 (45L)**

Course Contents

1. Basics of Therapeutic Nutrition

- Diet Progression (NPO, Clear Liquid, Full Liquid, Soft).
- Standard Hospital Diets.
- Menu Planning Fundamentals.

2. Cardiac and Lipid-Restricted Diets and Diets for Diabetes and Weight Management

- Sodium-Restricted (2g, 1g).
- Therapeutic Lifestyle Changes (TLC).
- DASH Diet.
- Carbohydrate Counting, Consistent Carbohydrate Menu.

3. Diets for Gastrointestinal Disorders Allergy and Elimination Diets

- Fiber-Modified (Low-Residue, High-Fiber).
- Low-FODMAP.
- Lactose-Restricted.
- Gluten-Free diet.
- "Top 8" Allergen-Free Elemental Diets.

4. Renal Diets and Specialized Nutritional Support

- Sodium, Potassium, Phosphorus, and Fluid Control.
- Introduction to Enteral Formula Composition and Modular Components.
- Par-enteral nutritional support.

MI-06P: Therapeutic Nutrition (Practical) **Credits 01 (30 hrs)**

1. Planning and preparation of clear fluid diets.
2. Planning and preparation of full fluid diets.
3. Planning the preparation of soft diets.
4. Planning the preparation of Therapeutic Lifestyle Changes (TLC).
5. Planning the preparation of DASH.