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.