MUGBERIA GANGADHAR MAHAVIDYALAYA
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PROGRAMME OUTCOME (PO), COURSE OUTCOME (CO) AND PROGRAMMESPECIFIC OUTCOME (PSO) FOR END SEMESTER STUDENTS UNDERGRADUATE COURSE: 2022-2023

Programme Name: B. SC. Honours (NUTRITION)

PROGRAMME OUTCOMES (PO):

PO1	Disciplinary Knowledge	To acquire comprehensive and sufficient knowledge of understanding in Nutrition.
PO2	Develop Interdisciplinary Knowledge	To enable students in developing an effective approach to Interdisciplinary study and enable them to build their own interdisciplinary pathway by choosing courses which makes sense to them.
PO3	Problem Analysis	Identify, formulate, research literature, and analyze complex health problems and searching out the solutions by applying the modified foods and nutrients to mitigate the problems.
PO4	Environmental Awareness & Sustainability	Students will able to understand and aware the importance of environment in our life. Students will able to understand and aware the community regarding the environmental pollution and their management. A beautiful forest-like campus that provides gorgeous scenery, and a quiet and comfortable learning environment.
PO 5	Communication skill and attitudes	Excellent communication of nutrition in community survey, hospital visit, ICDS centre visit to develop other branches of sciences, to think existing open programme in mathematics.
PO6	Conduct Investigations of Complex Problems	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions regarding nutrition solving diseases.
PO7	The Nutritionist and Society	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional dietitian practice.
PO8	Ethical Values	Students will be able to discuss the ethical implications of our understanding of nutrition and nutritional discoveries and to develop the culture of value-based thinking, understand the pros and cons while taking decisions, and lead a sound value based ethical life
PO9	Familiarity with Recent Developments	Students will able to gathered recent knowledge in different practicaltechniques regarding nutrigenomics.

PO10	Ability in CreativeSkills	Students will be able to discuss and practice professional standards of scientific inquiry and responsible conduct of scientists that are essential for the pursuit of new knowledge. Students will be able to process and analyze data to make sound interpretations.

PROGRAMME SPECIFIC OUTCOME (PSO):

PSO1	To make students learn nutrition and apply nutritional knowledge to important public health issues and distribute such knowledge to population.
PSO2	Students acquire practical knowledge on diet counselling and diet planning.
PSO3	Students of nutrition will get an idea of various aspects of entrepreneurship, various food service outlets and their staff organisation, menu planning, service style, beverages.
PSO4	Nutrition graduates have ample scope in academics, higher research institutes, hospital industry, NGO services, food industry, government services and many others.

COURSE OUTCOME (CO):

CO 01: [PAPER -CC1: Basic Nutrition]

1. Utilize knowledge from the physical and biological sciences as a basis for understanding the role of food and nutrients in health and disease processes.
2. Provide nutrition counselling and education to individuals, groups, and communities throughout the lifespan using a variety of communication strategies.
3. In this course, you will learn about healthy eating, what micronutrients are and the effects on the body, and how to improve and prevent malnutrition.
4. The topics that are covered in this course include: Basic Chemistry of Vitamins and Minerals. Role of vitamins and Minerals in the body.

CO 02: [PAPER -CC2: Food Science and food commodity]

1. Atoms, Molecules, and Chemical Bonds: Understanding the structure of atoms, the formation of molecules, and the different types of chemical bonds (covalent, ionic, hydrogen bonds) that hold molecules together.
2. Chemical Reactions: Studying the various types of chemical reactions, such as oxidation-reduction reactions, hydrolysis, and condensation reactions, and their importance in biochemical processes.
3. Enzymes and Enzyme Kinetics: Understanding the role of enzymes as biological catalysts, their specificity, and how they accelerate chemical reactions. Enzyme kinetics deals with the study of enzyme reaction rates and mechanisms.
4. Proteins: Understanding the structure, function, and folding of proteins, which play critical roles in cellular structure, metabolism, and signaling.
5. Amino Acids and Protein Synthesis: Studying the 20 standard amino acids, their properties, and how they are linked together during protein synthesis (translation).

6. Carbohydrates: Understanding the structure and function of carbohydrates, including monosaccharides, disaccharides, and polysaccharides, as essential sources of energy and cellular recognition.
7. Lipids: Understanding the different types of lipids, including fats, phospholipids, and steroids, and their roles in energy storage, cell membranes, and signaling.
8. Nucleic Acids: Understanding the structure and function of DNA and RNA, including DNA replication, transcription, and translation.
9. Metabolism and Bioenergetics: Studying the biochemical pathways involved in the breakdown and synthesis of molecules for energy production and cellular processes.
10. Cellular Respiration and Photosynthesis: Understanding how cells produce energy through aerobic and anaerobic respiration and how plants convert light energy into chemical energy during photosynthesis.
11. By delving into these essential aspects of biochemistry, researchers and professionals gain a deeper understanding of the molecular basis of life, disease mechanisms, drug development, and various applications in biotechnology and medicine.

CO 03: [PAPER -CC3: Nutritional Biophysics and biochemistry]

1. Student can give knowledge about Rajasthan viscosity surface tension and colloids.
2. Gain knowledge about replication translation transcription.
3. Gain Knowledge about acid base balance and electrolyte fluid.
4. Gain knowledge about general properties digestion absorption metabolism of carbohydrate protein fat.

CO 04: [PAPER -CC4: Human Physiology]

1. Cellular Biology: Understanding the structure and function of cells is fundamental to grasping how organs and tissues are formed and how they function.
2. Anatomy: Knowledge of the body's structure, including organs, tissues, and organ systems, is crucial for understanding their physiological functions.
3. Biochemistry: Understanding the chemical processes that occur within living organisms provides insight into how cells and systems carry out their functions.
4. Molecular Biology and Genetics: Understanding the genetic basis of physiological processes helps explain variations in human physiology and susceptibility to certain diseases.
5. Neuroscience: Studying the nervous system is essential for understanding how the brain and nerves control body functions and how the body responds to various stimuli.
6. Cardiovascular Physiology: Understanding how the heart and blood vessels function to transport oxygen, nutrients, and waste products throughout the body.
7. Respiratory Physiology: Understanding how the lungs and respiratory system facilitate gas exchange and provide oxygen to the body.
8. Endocrine Physiology: Understanding the role of hormones and the endocrine system in regulating various physiological processes and maintaining homeostasis.
9. Digestive Physiology: Understanding how the digestive system processes food, absorbs nutrients, and eliminates waste products.
10. Renal Physiology: Understanding the kidney's role in maintaining fluid and electrolyte balance, filtering waste products, and regulating blood pressure.
11. Muscle Physiology: Understanding how muscles contract and enable movement.

12. Immunology: Understanding the body's immune system and how it defends against pathogens and maintains immune tolerance.
13. Reproductive Physiology: Understanding the processes involved in human reproduction and how hormones regulate reproductive functions.
14. Integumentary Physiology: Understanding the functions of the skin, such as protection, temperature regulation, and sensory reception.
15. Exercise Physiology: Studying how the body responds and adapts to physical activity and exercises

CO 05: [PAPER -CC5: Family meal management and meal planning]

1. Gain knowledge about balanced diet, food groups and planning of balanced diet.
2. Energy modification and nutritional care for weight management.
3. Methods of improving nutritional quality of foods, fermentation, fortification, germination.
4. Introduction, importance of goals of meal planning.
5. Factor affecting milk management.
6. Know the factor affecting the nutrient needs during different stages of life cycle and the RDA for various age groups.
7. Prepare diet chart for infant, preschool children, school children, old age, adolescent.
8. Prepare special nutrition for pregnancy, lactation, sports, space.

CO 06: [PAPER -CC6: Community Nutrition and Nutritional Epidemiology]

1. To understand the etiology, prevalence, clinical signs and symptoms of nutritional deficiency diseases (Vitamin A deficiency, anaemia, IDD, PEM etc).
2. To gain understanding of physiology in health and pathophysiology in disease. The Nutritional Epidemiology specialization provides rigorous training in the biological aspects of nutrition, epidemiology, biostatistics, and select related disciplines.
3. The overall objective is to enable students to investigate relationships between diet and disease. The Nutritional Epidemiology specialization provides rigorous training in the biological aspects of nutrition, epidemiology, biostatistics, and select related disciplines.
4. The overall objective is to enable students to investigate relationships between diet and disease.
5. The basic aim of nutrition education is to get consumers to eat a diet that promotes health and decreases the risk of nutrition-related diseases.
6. Public health surveillance, field investigation, analytic studies, evaluation, and linkages.
7. Epidemiology is the study of how often diseases occur in different groups of people and why.
8. Epidemiological information is used to plan and evaluate strategies to prevent illness and as a guide to the management of patients in whom disease has already developed.

CO 07: [PAPER -CC7: Basic Dietetics]

1. To understand the role, code of ethics, classification of dietitian.
2. To know about the general objective, importance, various factors of diet therapy.
3. To know about the principle of therapeutic diet and the factors to be considered in planning therapeutic diet.

4. To gain knowledge about various types of routine hospital diet (regular, clear fluid diet, full fluid diet, soft diet) and know about parenteral and enteral feeding.
5. To know about various health issues and problems, their etiology, symptoms, types, dietary management, and included and excluded food of various diseases.
6. To know issues and symptoms of feeding problem, management of feeding problem.

CO 08: [PAPER -SEC1: Biostatistics and Bioinformatics]

1. Statistics Fundamentals: Understand the basic principles of statistics, including probability, hypothesis testing, confidence intervals, sampling techniques, and study design.
2. Statistical Software: Familiarize yourself with statistical software packages commonly used in biostatistics, such as R, SAS, or SPSS. Proficiency in one or more of these tools will be essential for data analysis.
3. Epidemiology: Gain knowledge of epidemiological concepts, study designs, and measures of disease frequency and association. This will help you analyze health-related data and understand population-based studies.
4. Study Design: Learn about different types of study designs, such as randomized controlled trials, cohort studies, case-control studies, and cross-sectional studies. Understanding study design is crucial for drawing valid conclusions from data.
5. Bioinformatics: Develop skills in handling and analyzing biological data, including genomics, proteomics, and other high-throughput data sets.
6. Regression Analysis: Master regression techniques, such as linear regression, logistic regression, and survival analysis. Regression models are widely used in biostatistics to understand relationships between variables.
7. Experimental Design: Comprehend principles of experimental design, including randomization, blinding, and control groups. This knowledge is vital for designing experiments and clinical trials.
8. Statistical Inference: Learn methods for drawing conclusions about populations based on sample data, such as hypothesis testing and confidence intervals.
9. Bayesian Statistics: Familiarize yourself with Bayesian methods, which are becoming increasingly relevant in biostatistics and medical research.
10. Multivariate Analysis: Explore multivariate statistical techniques like principal component analysis (PCA), factor analysis, and cluster analysis.
11. Ethics and Research Compliance: Learn about ethical considerations in research involving human subjects and adhere to research compliance guidelines.
12. Biological Knowledge: A solid understanding of biology and medical concepts is crucial for interpreting results and designing appropriate analyses.
13. Communication Skills: Being able to effectively communicate statistical findings to a non-technical audience is essential in biostatistics. Develop skills in scientific writing and presentation.

CO 09: [PAPER -CC8: Diet and Diseases]

1. To understand about lactose intolerance, galactosemia, phenylketonuria and its dietary management.
2. To know etiology, symptoms, diagnostic tests and dietary management of various intestinal disease.

3. To know etiology, symptoms, diagnostic tests and dietary management of malabsorption syndrome, celiac sprue, tropical sprue, intestinal brushborder deficiency and understand about RUTF.
4. To understand about liver disease, liver function tests and nutritional care in liver disease.
5. To know etiology, symptoms, diagnostic tests and dietary management of anaemia, arthritis and gout.

CO 10: [PAPER -CC9: Food Microbiology]

1. Explain the interactions between microorganisms and the food environment, and factors influencing their growth and survival.
2. Explain the significance and activities of microorganisms in food.
3. Upon successful completion, students will have the knowledge and skills to: Describe diversity of microorganisms, bacterial cell structure and function, microbial growth and metabolism, and the ways to control their growth by physical and chemical means.
4. Food microbiology is the study of the microorganisms that inhabit, produce or contaminate food.
5. Its purpose is based on detecting and determining the germ content, minimizing the risks of contamination and preventing outbreaks of food borne diseases.
6. Microbiology is used in many aspects of daily life, including food production, biodegradation, the manufacture of commercial goods and genetic engineering.
7. They are required in a variety of dishes. Microorganisms, for instance, are required for the production of curd and cheese.
8. Understand the regulation of biochemical pathway and possible process modifications for improved control over microorganisms for microbial product synthesis.

CO 11: [PAPER -CC10: Food processing and Preservation]

1. Safety: Processing and preservation methods help eliminate or reduce harmful bacteria, pathogens, and contaminants in food, making it safe for consumption and reducing the risk of food borne illnesses.
2. Extended Shelf Life: These techniques extend the shelf life of food products, preventing spoilage and reducing food waste.
3. Accessibility: Processing and preservation allow food to be available throughout the year, regardless of seasonal variations in supply.
4. Nutritional Value: Certain preservation methods retain the nutritional content of food, ensuring essential vitamins and minerals are not lost during storage.
5. Convenience: Processed and preserved foods offer convenience and ease of use, making meal preparation more accessible for consumers.
6. Distribution and Trade: Preservation enables the transportation of food over long distances, facilitating global trade and ensuring food security in various regions.
7. Food Innovation: Food processing allows for the development of new and innovative products, leading to a diverse and expanded food market.
8. Economic Importance: Food processing and preservation industries create jobs and contribute significantly to the economy.

CO 12: [PAPER -SEC2: Women Health & Nutrition]

1. Studying women's health is essential to address the unique biological, psychological, and social aspects that affect women throughout their lives.
2. It helps in understanding conditions specific to women, such as reproductive health, hormonal changes, and gender-related health disparities.
3. This knowledge enables healthcare professionals to provide better care and develop targeted interventions to improve women's quality of life.

CO 13: [PAPER -CC11: Public Health and Hygiene]

1. To understand about food adulteration, various food standard and laws such as PFA, FASSAI, HACCP, ISO, Consumer guidance society, consumer rights,and the role of food inspectors.
2. To gain knowledge about the importance of water to the community, water borne disease, waste and waste disposal.
3. To gain knowledge about various food borne infections disease such as typhoid , paratyphoid, Cholera, amoebiasis and know about various toxins in food.
4. To know various communicable diseases and their prevention through hygiene and sanitation and how a food handler maintain hygiene and sanitation.
5. To know about Indices of thermal comfort, various etiology, effect and prevention of air pollution.
6. To know about health , disease, normality and mental health, prevention of mental diseases and various mental services in India and gain knowledge about alcohol related and drug related problems.
7. To know about health care delivery system, history, three tire health care delivery system, primary health care, CHV, urban health infrastructure.
8. To know about demographic cycle, population pyramid, factors affecting fertility and its indicator, population explosion as a public health problem, various approaches for population control and learn about various family planning method.

CO 14: [PAPER -CC12: Research Methodology]

1. Students who complete this course will be able to understand and comprehend the basics in research methodology and applying them in research/ project work.
2. This course will help them to select an appropriate research design.
3. How to formulate a research problem and how to design your research. We will cover how to sample data for research, collect and process the data and how to analyze and present it.
4. How to formulate a research problem and how to design your research. We will cover how to sample data for research, collect and process the data and how to analyze and present it.
5. Research methodology gives the education researcher the necessary training in gathering material and arranging or card-indexing them, participation in the field work when required, and also training in techniques for the collection of data appropriate to particular problems, in the use of statistics, questionnaires.
6. The main objective of this course is to introduce the basic concepts in research methodology in social science.
7. This course addresses the issues inherent in selecting a research problem and discuss the techniques and tools to be employed in completing a research project.

CO 15: [PAPER -DSE1: Food Sanitation and Hygiene]

1. Know everything in details about personal hygiene and its Importance.
2. Different types of food hazards and contaminants.
3. Different cleaning methods.
4. Studying food sanitation and hygiene is essential to ensure the safety of consumers.
5. It helps prevent food borne illnesses, contamination, and the spread of diseases.
6. Proper knowledge in this area ensures that food is handled, prepared, and stored in a way that minimizes risks to public health

CO 16: [PAPER -DSE2: Food Quality and Sensory Evaluation]

1. After completion of this course the learner will be able to know about the principle and method of spectrophotometry and calorimetry.
2. Gain knowledge about the mechanism and taster, colour, texture perception.
3. They understand how to apply texture on food.
4. They have knowledge about the physiology of olfaction and gestation.
5. They also gain knowledge about electronic tongue and electron nose.
6. Gain practical knowledge training of sensory panel.
7. They also gain knowledge about texture evaluation of various food samples.
8. Gain knowledge about quality evaluation of various food stuffs.

CO 17: [PAPER -CC13: Dietetics and Counselling]

1. Understand the principles and methods of counselling.
2. Understand how to apply counselling methods to patients with different diseases.
3. Gain knowledge on computer operations and applications.
4. Facilitate students to design and use computer-based projects and programs.
5. Gain practical knowledge on planning nutrition counselling session and organising health camps.
6. Impart the nutrition education using visual aids.
7. Acquire skills in collecting and submitting data of different disease.

CO18: [PAPER -CC14: Entrepreneurship development, Enterprise management and Entrepreneurship for small catering units]

1. Studyofvariousaspectsofentrepreneurshipforsettingupone'sownenterpriseinfuture.
2. Brief idea of various food service outlets and the staff organisation, menu planning, service style, beverages.
3. Understand the basic principles of management in food service units.
4. Development skills in food service industries.
5. Update the skills and techniques in food service unit successfully.
6. Gain knowledge on personnel management.
7. Learn about SWOT analysis.
8. Acquire skills in market survey.

CO 19: [PAPER -DSE3: Nutrition Communication for Health Promotion]

1. The aim of Community Nutrition actions is to adequate lifestyles related to food consumption patterns in order to improve the quality of life and contribute to health

promotion of the population in the community where programs and services are delivered.
2. Define social, economic, cultural, and environmental influences on food access and dietary choices.
3. Evaluate and predict ways in which complex interactions of components of the food system influence human health and nutrition.
4. Demonstrate an understanding of public health.
5. Community nutrition provides fundamental knowledge to individuals and families regarding nutrition facts, eating habits, food security, and resources. It is a field dedicated to providing information and resources to the community to promote healthy lifestyles.

CO 20: [PAPER -DSE4: Sea food and Dairy Technology]

1. Full procedure of milk preparation from production to supply.
2. Gain knowledge about how the quality of milk can be determined.
3. Manufacturing process of different milk products.
4. Full procedure of fish from farming to supply.
5. Manufacturing process of different fish products.
6. Different types of pasteurisation process.

DETAILED SYLLABUS OF ALL SEMESTER UG (HONOURS) COURSES

Semester-I

Core Courses (CC)

CC-1: Basic Nutrition **Credits 06**

C1 T1: Basic Nutrition (Theory) **Credits 04**

1. Concept and definition of terms Nutrition, Malnutrition and Health: Brief history of nutritional science. Scope of nutrition.
2. Minimum Nutritional Requirements and RDA: Formulation of RDA and Dietary Guidelines: Reference Man and Reference Woman.
3. Body Composition and Changes through the life cycle.
4. Energy in Human Nutrition: Idea of energy and its unit, energy balance, Assessment of energy requirements, Deficiency and Excess, Determination of energy in food, B.M.R & influencing factors, S.D.A.
5. Energy and other nutritional requirement of adult male and female engaged in different types of work (Sedentary, moderate, heavy).
6. Food as source of nutrients, function of food, definition of nutrition, nutrients and energy, adequate, optimum and good nutrition, malnutrition.
7. Nutrition- Fitness, Athletics and sports.
8. Food Guide- Basic food groups, how to use food guide (according to RDA).
9. Interrelationship between nutrition and health- Visible symptoms of goods health.

10. Function of nutrients- Carbohydrate, dietary fibre, protein, fat, vitamins, minerals, anti-oxidants, water.
11. Effect of cooking and heat processing on the nutritive value of foods.
12. Processed supplementary foods.
13. Food sanitation in hygiene.

C1 P1: Basic Nutrition (Practical) Credits 02

1. Use and care of kitchen equipment.
2. Weights and measures standards; household measures of raw and cooked foods.
3. Food preparation and classifying recipes as good, moderate or poor, sources of specific nutrients, Amount of ingredients to be in standard recipe
   a) Portion size
   b) Beverages: tea, coffee, cocoa, fruit juice, milk, milkshakes.
   c) Cereals and flour mixtures- basic preparation and there nutritive value- Boiled rice and rice pulao, chapatti, paratha, sandwiches, pastas, pancakes, cookies and cakes.
4. Vegetables and fruits: Simple salad, dry vegetables, curries, fruits preparation using fresh and dried stewed fruit, fruit salad.
5. Milk and milk products: Porridges, curds, anner and their commonly made preparations, milk based simple desserts and puddings, custard, kheer, ice-cream.
6. Meat- Cut of meats Meat preparations, Fish, poultry, hard and soft cooked, poached, scrambled, fried omelette, eggnogs.
7. Soups: Basic, clear and cream soups.
8. Snacks: pakoras, cheese toast, upma, poha, peanut, chikki, ti and laddu.

CC2: Food Science and food commodity Credits 06

C2 T2: Food Science and food commodity Credits 04

1. Basic concept on Food, Nutrients, Nutrition.
2. Classification of Food, Classification of Nutrients
3. Carbohydrates - Definition, Classification, Structure and properties. Monosaccharides -glucose, fructose, galactose. Disaccharides - Maltose, lactose, sucrose. Polysaccharides - Dextrin, starch, glycogen, resistance starch.
4. Lipids - Definition, Classification & Properties. Fatty acids - composition, properties, types.
5. Proteins - Definition, Classification, Structure & properties. Amino acids - Classification, types, functions.
6. Carbohydrates - Sources, daily requirements, functions. Effects of too high - too low carbohydrates on health. Digestion & Absorption. Blood glucose and effect of different carbohydrates on blood glucose. Glycaemic Index. Functional role of Sugars in food, Fermentation of Sugar.
7. Proteins - Sources, daily requirements, functions. Effect of too high - too low proteins on health. Digestion & absorption. Assessment of Protein quality (BV, PER, NPU). Factors affecting protein bioavailability including anti-nutritional factors.
8. Lipids - Sources, daily requirements, functions. Digestion & Absorption. Role & nutritional significances of PUFA, MUFA, SFA, W-3 fatty acid.
9. Dietary Fibre - Classification, sources, composition, properties & nutritional

significance.

10. Minerals & Trace Elements, Bio-Chemical and Physiological Role, bio-availability & requirements, sources, deficiency & excess (Calcium, Sodium, Potassium Phosphorus, Iron, Fluoride, Zinc, Selenium, Iodine, Chromium).
11. Vitamins - Bio-Chemical and Physiological Role Physiological role, bio-availability and requirements, sources, deficiency & excess.
12. Water - Functions, daily requirements, Water balance.
13. Sensory characteristics of food.
14. Food behaviour, modification of food behavior.
15. Cereals and Millets: Cereal products, breakfast cereals, fast foods. Structure, processing, storage, use in various preparations, variety, selection and cost.
16. Pulses and Legumes: Production (in brief), structures, selection and variety. Storage, processing and use in different preparations. Nutritional aspects and cost.
17. Milk and Milk-products: Composition, classification, selection quality and cost, processing, storage and uses in different preparations. Nutritional aspects, shelf - life and spoilage.
18. Eggs: Production, grade, quality, selection, storage and spoilage, cost, nutritional aspects and use in different preparations.
19. Meat, Fish and Poultry: Types, selection, purchase, storage, uses, cost, spoilage of fish poultry and meat, uses and preparations.
20. Vegetables and Fruits: Types, selection, purchase, storage, availability. Cost of use and nutritional aspects of raw & processed products and use in different preparations.
21. Sugar and Sugar products: Types of natural sweeteners, manufacture, selection, storage and use as preserver, stages in sugar cookery.
22. Fats and Oils: Types and sources (animal and vegetable), processing, uses in different preparations, storage, cost and nutritional aspects.
23. Raising and Leavening agents: Types, Constituents, Uses in cookery and bakery, Storage.
24. Food Adjuncts: Spices, Condiments, Herbs, Extracts, Concentrates, Essences, Food Colours. Origin, classification, Description, uses, Specifications, procurements and Storage.
25. Convenience Foods: Role, types, advantages, uses, cost and contribution to diet.
26. Salt: Types and uses.
27. Beverages: Tea; Coffee. Chocolate and Cocoa Powder-Processing, cost and nutritional aspects, other beverages-Aerated beverages, juices.
28. Preserved Products : Jams, Jellies, Pickles, Squashes, Syrups types, composition and manufacture, selection, cost, storage, uses and nutritional aspects.
29. Food Standards: ISI, Agmark, FPO, MPO, PFA.
30. New food: fast food, junk food, GM food, Free food.
31. Food, preservation, food processing, food adulteration and food storage.

C2 P2: Nutritional Biochemistry (Practical) Credits 02

1. Carbohydrate

a. Reactions of Mono, Di and Polysaccharides and their identification in unknown mixtures.

b. Estimation of reducing and total sugars in foods.
c. Estimation of lactose in milk.

2. Fats

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

3. Proteins

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

Semester-II

Core Courses (CC)

CC-3 Nutritional Biophysics and biochemistry Credits 06

C3T Nutritional Biophysics and biochemistry Credits 04

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

C3P Nutritional Biophysics and biochemistry (Practical) Credits 02

1. To study the general properties of urease and salivary amylase.
2. Preparation of buffer of particular PH (Phosphate buffer, tris buffer)
3. Determination of strength of KMNO4 using primary standard (oxalic acid).
4. Electrophoresis.
5. Dialysis.

CC-4: Human Physiology **Credits 06**

C4T: Human Physiology **Credits 04**

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

C4 P: Human Physiology (Practical) **Credits 02**

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

Semester-III

Core Courses (CC)

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

C5T: Family meal management and meal planning **Credits 04**

1. Nutrition during Pregnancy: Physiology of pregnancy, factors (no nutritional) affecting pregnancy outcome, importance of adequate weight gain during pregnancy,

antenatal care and its schedule, Nutritional requirements during pregnancy and modification of existing diet and supplementation, nutritional factors affecting breast feeding. Deficiency of nutrients and impact- energy, iron, folic acid, protein, calcium, iodine. Common problems of pregnancy and their managements- nausea, vomiting, pica, food aversions, pregnancy induced hypertension, obesity, diabetes and Adolescent Pregnancy.

2. Nutrition during Lactation: Physiology of Lactation: Nutritional requirements during lactation, dietary management, food supplements, galactagogues, preparation for lactation. Care and preparation of nipples during breast feeding.
3. Nutrition during infancy: Infant physiology relevant to feeding and care. Breast feeding - colostrum's, its composition and importance in feeding. Initiation of breast-feeding and duration of breast-feeding, Advantages of exclusive breast-feeding, Nutritional and other advantages of breast-feeding. Introduction of complementary foods, initiation of management of weaning, breast feeding etc. Bottle feeding circumstances under which bottle-feeding is to be given. Careand sterilization of bottles. Preparation of formula. Mixed feeding, breast feeding and artificial feeding. Teething and management of problems.
4. Nutrition to toddlers / preschool/school going children or adolescent.
5. Management of preterm and low birth weight children – their special needs.
6. Growth and development from infancy to adulthood: Importance of nutrition for ensuring adequate development, Preventions of growth faltering. Growth assessment by Height, Weight, BMI, Skin fold thickness, Waist Hip Ratio.
7. Geriatric nutrition – Dietary requirement, Geriatric health problems, Nutritional care.
8. Sports Nutrition- nutritional demand on different sports and dietary recommendations.
9. Space Nutrition- Body composition changes in space, special diet in space persons.
10. Meal planning for the family
11. Indian meal pattern- vegetarian and non- vegetarian
12. Food faddism and the faulty food habits
13. Nutritive value of common Indian recipes.

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

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

CC-6: Community Nutrition and Nutritional Epidemiology Credit 06

C6T: Community Nutrition and Nutritional Epidemiology Credit 04

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

C6P: Community Nutrition and Nutritional Epidemiology (Practical) Credit 02

1. Diet and nutrition surveys
   a. Identification of vulnerable and risk groups
   b. Diet survey for breast feeding and weaning practices of specific groups
   c. Use of anthropometric measurement of children and adolescent girls and boys
2. Preparation of visual aids to highlight community nutrition, nutritional awareness, nutritional surveillance.
3. Field visit to-
   a. Observe the working of nutrition and health-oriented programmes (survey-based result).
   b. Hospitals to observe nutritional deficiencies.

CC-7: Basic Dietetics **Credits 06**

C7T: Basic Dietetics **Credits 04**

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

C7P: Basic Dietetics (Practical) **Credits 02**

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

Skill Enhancement Course (SEC)

SEC 1: Biostatistics and Bioinformatics **Credits 02**

SEC1T: Biostatistics and Bioinformatics:

1. Data and Data Types: Primary data and Secondary Data.
2. Measures of Central Tendency: Mean, Median, Mode.
3. Dispersion: Range, Standard Deviation.
4. Hypothesis Testing: Chi-square Test, Student's' test, Analysis of Variance (ANOVA).
5. Bioinformatics and Health Informatics: Concept and applications.

6. Nucleic acid and Protein Data Bases, Nutrient data bases.
7. Sequence similarity searching by BLAST, Principle, features and types of BLAST, Significance of Multiple Sequence Alignments, Phylogenetic Tree.

Semester-IV

Core Course (CC)

CC-8: Diet and Diseases **Credits 06**

C8T: Diet and Diseases **Credits 04**

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

C8P: Diet and Diseases (Practical) **Credits 02**

1. Planning and preparation of diet for diarrhoea patient.
2. Planning and preparation of diet for Steatorrhea patient.
3. Planning and preparation of diet for Diverticular disease patient.
4. Planning and preparation of diet for Ulcerative Colitis patient.
5. Planning and preparation of diet for Flatulence patient.
6. Planning and preparation of diet for Constipation patient.
7. Planning and preparation of diet for irritable bowel syndrome patient.
8. Planning and preparation of diet for Haemorrhoids patient.
9. Planning and preparation of diet for Celiac sprue patient.
10. Planning and preparation of diet forViral Hepatitis patient.
11. Planning and preparation of diet for Cirrhosis ofliver patient.
12. Planning and preparation of diet for Cholelithiasis patient.
13. Planning and preparation of diet for Pancreatitis patient.
14. Planning and preparation of diet for Anaemia patient.
15. Planning and preparation of diet for Thalassemia patient.

CC-9: Food Microbiology **Credits 06**

C9T: Food Microbiology **Credits 04**

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

C9P: Food Microbiology (Practical) **Credits 02**

1. Study of equipment's in a microbiology lab.
2. Preparation of different culture media.
3. Staining of bacteria with gram staining.
4. Microbiological examination of milk (Methylene blue reduction test)
5. Preparation of traditional Indian fermented food and its quality checking e.g. testing of physical, chemical and nutritional properties.

CC-10: Food processing and Preservation **Credits 06**

C10T: Food processing and Preservation **Credits 04**

1. Significance, principles of different methods of food processing: thermal processingCooking (moist heat, dry heat, combination method of cooking), blanching, pasteurization, sterilization, canning.
2. Principles of microwave cooking and solar cooking.
3. Principle of freezing, changes occurring during freezing. Types of freezing - slow freezing, quick freezing. Food preservation by drying and dehydration, differences

between sun drying and dehydration (i.e. mechanical drying), types of driers used in the food industry.

4. Preservation by Irradiation: Units of radiation, kinds of ionizing radiations used in food irradiation. Mechanism of action, concept of cold sterilization.
5. Principle and methods of making pickles, jam and jellies from different vegetables / fruits.
6. Principle and methods of preparation of food from cereals.
7. Principle and methods of preparation of meat, fish, poultry and egg products.

C10P: Food processing and Preservation (Practical) Credits 02

A:

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

B: Visit to a food processing industry.

Skill Enhancement Course (SEC)

SEC-2: Women Health & Nutrition Credits 02

SEC2T: Women Health & Nutrition

1. Factors (non-nutritional) affecting pregnancy outcome, importance of adequate weight gain during pregnancy, antenatal care and its schedule, Nutritional requirements during pregnancy and modification of existing diet and supplementation, Deficiency of nutrients, specially energy, iron folic acid, protein, calcium, iodine. Common problems of pregnancy and their managements, specially - nausea, vomiting, pica, food aversions, pregnancy induced hypertension, obesity, diabetes. Adolescent pregnancy.
2. Nutritional requirements during lactation, dietary management, food supplements, galactagogues, preparation for lactation. Care and preparation of nipples during breast feeding.

Semester-V

Core Courses (CC)

CC- 11: Public Health and Hygiene **Credits 06**

C11T: Public Health and Hygiene **Credits 04**

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

C11P: Public Health and Hygiene (Lab) **Credits 02**

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

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

CC-12: Research Methodology **Credits 06**

C12T: Research Methodology **Credits 04**

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

C12P: Research Methodology Practical (Lab) **Credits 02**

A Project work on public health / nutritional biochemistry / nutritional survey to be submitted. Formulation of the Project:

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

Discipline Specific Electives (DSE)

DSE-1: Food Sanitation and Hygiene **Credits 06**

DSE1T: Food Sanitation and Hygiene **Credits 04**

1. The relationship of microorganisms to sanitation. Role of microbiology – Environmental effects of microbial growth. Effects of micro- organisms on food degradation and food borne illnesses- bacteria, virus, molds, yeasts, and parasites.

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

DSE1P: Food Sanitation and Hygiene (Lab) Credits 02

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

DSE-2: Food Quality and Sensory Evaluation Credits 06

DSE2T: Food Quality and Sensory Evaluation Credits 04

UNIT- 1: Introduction to quality attributes of food

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

UNIT- 2: Gustation

• Introduction and importance of gustation.

• Structure and physiology of taste organs- tongue, papillae, taste buds, salivary glands.

• Mechanism of taste perception.

• Chemical dimensions of basic tastes- sweet, salt, sour, bitter and umami.

• Factors affecting taste quality, reaction time, taste modification, absolute and recognition threshold.

• Taste measurement- Electronic Tongue.

• Taste abnormalities.

UNIT- 3: Olfaction

• Introduction, definition and importance of odour and flavor.

• Anatomy of nose, physiology of odour perception.

• Mechanism of odour perception.

• Theories of odour classification, chemical specificity of odour.

• Odour measurement techniques – historical perspective and emphasis on recent techniques- e-nose,etc. Merits and Demerits of each methods.

• Olfactory abnormalities.

UNIT- 4: Colour

• Introduction and importance of colour.

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

UNIT- 5: Texture

• Introduction, definition and importance of texture.
• Phases of oral processing.
• Texture perception, receptors involved in texture perception.
• Rheology of foods.
• Texture classification.
• Texture measurement – basic rheological models, forces involved in texture measurement and recent advances in texture evaluation.
• Application of texture measurement in cereals, fruits and vegetables, dairy, meat and meat products.

DSE2P: Food Quality and Sensory Evaluation (Lab) Credits 02

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

Semester-VI

Core Course (CC)

CC-13: Dietetics and Counselling Credits 06

CT13: Dietetics and Counselling Credits 04

Unit-I: Introduction to Psychology and counselling

Introduction to psychology – Definition , Nature and Scope. Attention and perception – Types of attention and factors influencing attention , principles of perceptual organization and abnormalities in perception. Learning and memory- Types of learning, Types of memory,

Forgetting and its causes. Motivation and emotion- Types of motives, types of emotions, emotional expression. Personality- nature and definition , factors influencing personality, Psycho analytic theory of personality. Nature and goals of counselling. Principles of counselling. Characteristics of a good counsellor. Ethical principles of counselling. Special areas of counselling: Educational, family, health, community and counselling of alcoholic, and drug addicts.

Unit-II:Counselling Skills

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

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

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

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

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

Unit-III:Basics of Diet Counselling

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

Processes involved in dietary counselling

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

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

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

Unit-V: Counselling and educating patient

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

Unit-VI: Teaching aids used by dietitians

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

Unit-VII: Diet Counselling at Hospital and Community level

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

Dietary counselling through the life span - Diet counselling plans for obese people, Diabetics, CVD, dyslipidaemia, cancer risk prevention, renal diseases, liver disorders mother and child care, Prenatal and pregnant women, Lactating women Childhood nutrition problems like,

SAM, weight management, vitamin and mineral deficiencies, School children, adolescents, young adults, fitness, weight management, eating disorders. Geriatric counselling. Patient follow up / home visits,

Unit-VIII: Computer application

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

Unit-IX: Computer application in dietetic management

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

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

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

C13P: Dietetics and Counselling (Practical) Credits 02

1. Computer application for collection of data of different diseases. Submitting computed data.
2. Preparations of teaching aids in the field of nutrition.
3. Preparation of case history of a patient and feeding of information in the hard disc.
4. Understanding the use of conventional and non-conventional methods of counselling i. Face to face counselling. ii. Use of software for counselling e.g. Diet Cal. iii. Use of any one Diet App for counselling and assessing food intake.
5. Planning Nutrition counselling sessions and identifying ways to adhere to dietary changes for the following conditions: Lactation counselling, SAM. Eating disorders. Overweight / Obesity in School children, adolescent and adults. Metabolic syndrome. Diabetes- Gestational Diabetes. Renal disease, Liver disorders.
6. Organizing health camps and patient feedback – both at hospital level and community level.
7. Project planning for any one disease.

CC- 14: Entrepreneurship development, Enterprise management and Entrepreneurship for small catering units Credits 06

C14T: Entrepreneurship development, Enterprise management and Entrepreneurship for small catering units Credits 04

Unit-I:Entrepreneurship development

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

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

Unit- II: Enterprise Planning and Launching

Types of enterprises classification based on capital, product, location, ownership pattern and

process. Sensing business opportunities and assessing market potential; market research. Appraising of project and feasibility

Unit-III: Enterprise Management and Networking

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

Unit - IV: Personnel management

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

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

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

Unit VI: Planning of a small food service unit

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

Unit-VII: Development of a business plan

CC14P: Entrepreneurship development, Enterprise management and Entrepreneurship for small catering units (Practical) Credits 02

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

c. School/college canteens.

9. Demonstration of a specialized cuisine.
10. Develop a checklist for good hygiene practices.

Discipline Specific Electives (DSE)

DSE-3: Nutrition communication for Health promotion Credits 06

DSE3T: Nutrition communication for Health promotion Credits 04

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

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

Unit-II: Nutrition and behaviour inter-relationship

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

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

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

Unit-IV: Nutrition Advocacy

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

Unit V: Ethics in nutrition and health communication

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

DSE3P: Nutrition communication for Health promotion (Practical) Credits 02

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

DSE-4: Sea food and Dairy Technology Credits 06

DSE4T: Sea food and Dairy Technology Credits 04

<u>Technology of Sea food:</u>

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

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

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

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

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

Unit-VI: Fermented fish- Flowchart of Indigenous products- Fish sauce and Paste Unit-VII: Concept of other Sea foods - Crabs, lobsters, prawns, shrimps, shell- fish.

Technology of milk and milk products

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

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

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

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

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

DSE4P: Sea food and Dairy Technology (Practical) Credits 02

1. Perform platform tests in milk. (Acidity, COB, MBRT, specific gravity, SNF)
2. Estimate milk protein by Folin method.
3. Estimate milk fat by Gerber method.
4. Preparation of flavoured milk. Pasteurization of milk.

5. Prepare casein and calculate its yield.
6. Quality evaluation of fish/prawn.
7. Subjective evaluation of Fresh Fish.
8. Cut out examination of canned fish.(Sardine, Mackerel, Tuna)
9. Fish product formulation/canning.

MAPPING OF CO, PO, PSO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	✓	✓		✓			✓		✓		✓	✓		
CO2	✓	✓		✓					✓		✓			
CO3	✓	✓	✓				✓			✓	✓			
CO4	✓	✓	✓	✓		✓				✓	✓			
CO5	✓	✓		✓			✓	✓	✓			✓	✓	✓
CO6	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		
CO7	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓		
CO8		✓	✓			✓				✓				
CO9	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓		
CO10	✓	✓	✓	✓		✓					✓			
CO11	✓	✓		✓	✓		✓			✓	✓	✓		
CO12	✓	✓	✓	✓							✓	✓		
CO13	✓	✓	✓	✓			✓			✓	✓	✓		
CO14	✓	✓	✓	✓		✓		✓		✓				
CO15	✓		✓	✓		✓	✓				✓		✓	
CO16		✓	✓											
CO17		✓	✓		✓		✓	✓		✓	✓	✓		
CO18		✓	✓		✓					✓			✓	✓
CO19		✓	✓	✓	✓		✓	✓			✓			✓
CO20				✓			✓						✓	✓

Justification matrix of CO with PO & PSO (high: 3, medium: 2, low: 1)

	Mapping	Correlation	Justification
CO1	PO1	High	Students are gathering sufficient knowledge and term of nutrition.
	PO2	High	Learn about RDA, Food guide, Function of nutrients.
	PO4	High	Students will able to understand and aware the importance of environment in our life about nutrition.
	PO7	High	Taking concept about nutrition a student act as a nutritionist.
	PO9	Medium	Students will able to gather recent knowledge about nutrition.
	PSO1	High	Students learn nutrition and apply nutritional knowledge on social place.
	PSO2	High	Students acquire practical knowledge on diet planning.
CO2	PO1	High	Understanding the nutrition properly.
	PO2	High	Learn about nutrition, food sciences, nutritional physiology, nutritional biochemistry, nutritional biophysics.
	PO4	Medium	Aware to social public in proper way.
	PO9	Medium	Students will able to gathered recent knowledge about nutrigenomics.
	PSO1	High	Students learn nutrition and apply nutritional knowledge on social place.
CO3	PO1	High	Acquire comprehensive and sufficient knowledge of understanding in Nutrition.
	PO2	High	Knowledge gather about nutritional biochemistry, nutritional biophysics.
	PO3	High	Knowledge about general properties digestion, absorption, metabolism of carbohydrate, protein, fat and their problems.
	PO7	Medium	To understand the digestion problems and getting to known the public.
	PO9	Medium	Known about nutrigenomics.
	PSO1	High	Gain knowledge on nutrition education.
CO4	PO1	High	Acquire comprehensive and sufficient knowledge for the understanding of human Nutrition.
	PO2	High	Learn about human physiology.
	PO3	Medium	By studying these essential aspects of human physiology, researchers and medical professionals gain a deeper understanding of the human body, enabling them to diagnose and treat diseases.
	PO4	Medium	Students will able to understand and aware the importance of environment in our life about human body physiology.
	PO6	High	Learn about different physiological problems.
	PO10	Medium	Students will be able to discuss and try to solve the problems.
	PSO1	High	Students learn nutrition and apply nutritional knowledge on social.
	PO1	High	Acquire comprehensive and sufficient knowledge of understanding in Nutrition.
	PO2	High	Gain knowledge about balanced diet, food groups and

			planning of balanced diet.
	PO4	High	Students will able to understand and aware the importance of balanced diet, RDA, food groups and planning of balanced diet.
	PO7	Medium	Taking concept about nutrition a student act as a nutritionist.
CO5	PO8	Medium	Students will be able to discuss the complication and understanding of pregnant and lactating mother nutrition and nutritional quarries.
	PO9	Medium	Students learn about family meal management.
	PSO2		Students acquire practical knowledge on mother diet and understanding diet planning.
	PSO3	High	Students of nutrition will get an idea of menu planning.
	PSO4	Medium	Nutrition graduates can build a communication skill with social person and understand their problems.
	PO1	High	Acquire comprehensive and sufficient knowledge of understanding in Nutrition.
	PO2	High	To gain understanding of statistics, epidemiology, demography.
	PO3	Medium	Students will able to understand and aware the importance of environment in our life about nutrition.
	PO4	High	To gain understanding of statistics, nutritional epidemiology, and diet survey.
	PO5	High	Identify, formulate and analyse complex health problems of community and communicate with them perfectly.
	PO6	High	By studying students can able to understand the community nutrition health problems.
CO6	PO7	Medium	To enable students to investigate relationships between diet and disease, and play a role such as nutritionist.
	PO8	Medium	Students will be able to discuss the problems and understanding community nutrition and nutritional quarries.
	PO9	Medium	Learner learn about child malnutrition.
	PSO1	High	Acquire comprehensive and sufficient knowledge on public health hazards and understanding community nutrition.
	PSO2	High	Students acquire practical knowledge on infection, statistic, demography, epidemiology and diet survey.
	PO1	High	Students are gathering sufficient knowledge and term of therapeutic nutrition
	PO2	High	To gain knowledge about various types diet therapy and different types of disease problems.
	PO4	High	Learner will able to understand and aware the importance of diet in our daily life.
	PO5	High	Students are properly prepared for diet chart and menu planning.
	PO6	High	To know about various health issues and problems with the application of diet therapy.
	PO7	High	Apply reasoning informed by the contextual knowledge to assess societal, health, safety and the consequent responsibilities relevant to the professional dietitian practice.

CO7	PO9	Medium	How functional foods and nutrigenomics play role in our life.
	PO10	High	Create an idea or creative skill to improve the diet chart and menu planning for different disease patient.
	PSO1	High	Acquire comprehensive and sufficient knowledge of diet therapy and understanding different diseases nutrition.
	PSO2	High	Students acquire practical knowledge on diet planning.
CO8	PO2	High	Apply the knowledge of biostatistic and bioinformatics.
	PO3	High	Identify, formulate and solved the statistical problems.
	PO6	High	Problems analysis and interpretation of statistical data.
	PO10	Medium	Get a idea to solved different types of statistical problems.
CO9	PO1	High	Gather knowledge diet, disease and nutrition.
	PO2	High	Students can know about some specific disease and their diet briefly.
	PO3	High	Identify, analyze and solving health problems and symptoms related to different diseases using diet therapy.
	PO4	Medium	Students will able to understand about any disease and spread awareness of this disease.
	PO5	Medium	Students are properly prepared for planning of different types diet for minimizing disease complication.
	PO6	High	To know about various health issues and problems.
	PO8	High	Students will be able to discuss the ethical implications of our understanding of nutrition, health and diseases.
	PO10	Medium	Create an idea or creative skill to suggest the diet planning for specific disease.
	PSO1	High	Students gathering sufficient knowledge on diet and diseases.
	PSO2	High	Students acquire practical knowledge on diet and menu planning in various diseases.
CO10	PO1	High	Learn about food microbiology and how microorganisms occur food spoilage.
	PO2	High	Apply the knowledge of food microbiology.
	PO3	Medium	How microbial diseases can be transmitted by foods & identify the microbial health problems.
	PO4	Medium	By studying students are able to aware community about microbial health problems.
	PO6	High	Investigate the health issue for microbial contamination.
	PSO1	High	Acquire comprehensive and sufficient knowledge of microbial nutrition.
	PO1	High	Acquire comprehensive and sufficient knowledge on food processing and food preservation.
	PO2	High	Apply the knowledge of food sciences on different cooking and preservation method.
	PO4	Medium	Students will able to understand and aware the importance of environment in our life and acquit and comfortable learning on food processing and food preservation.
	PO5	Medium	Think existing open programme in solar and microwave cooking method on nutrition.
	PO7	High	Apply reasoning informatiom by the contextual knowledge to healthy, safety cooking and preservation.

CO11	PO10	High	Students will be able to discuss and practice professional standards of scientific inquiry and responsible conduct of scientists that are essential for the pursuit of new knowledge on different cooking and preservation method.
	PSO1	High	Students learn cooking nutrition and apply nutritional preservation knowledge to important public health issues and distribute such knowledge to population.
	PSO2	Medium	Students acquire practical knowledge on food processing and food preservation of different milk, eggs, vegetables and fruits.
CO12	PO1	High	Acquire comprehensive and sufficient knowledge of understanding the women health and nutrition.
	PO2	High	Apply the knowledge of nutrition, dietetics, nutritional physiology on pregnant and lactating women.
	PO3	High	Analyze complex health problems and searching out the solutions by applying the modified foods and nutrients to mitigate the problems.
	PO4	High	Students will able to understand and aware the community regarding the pregnant and lactation women health Problems and their management.
	PSO1	High	Students learn and apply nutritional knowledge on important public health issues and distribute such knowledge to mother.
	PSO2	High	Students acquire practical knowledge on dietary planning of pregnant and lactating women.
CO13	PO1	High	Acquire comprehensive and sufficient knowledge on public health and hygiene.
	PO2	High	Apply the knowledge of nutrition, dietetics, food sciences, nutritional physiology, epidemiology, immunology, metabolomic and epigenetic to the solution of health problems
	PO3	High	Analyze complex health problems and searching out the solutions by applying the modified foods and nutrients to mitigate the problems.
	PO4	High	Students will able to understand and aware the importance of environment in our life. Students will able to understand and aware the community regarding the environmental pollution and their management.
	PO7	High	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional dietitian practice.
	PO10	High	Students will be able to discuss and practice professional standards of scientific inquiry and responsible conduct of scientists that are essential for the pursuit of new knowledge.
	PSO1	High	Make students learn nutrition and apply nutritional knowledge to important public health issues and distribute such knowledge to population.
	PSO2	High	Students acquire practical knowledge on diet counselling and diet planning.
	PO1	High	Acquire comprehensive and sufficient knowledge of

			understanding on research methodology.
	PO2	High	Gain the knowledge of research problems.
	PO3	High	Identify, formulate, research literature, and analyze complex health problems and searching out the solutions by applying the modified foods and nutrients to mitigate the problems.
	PO4	Medium	Gain the knowledge of research problems, identify, formulate, research literature
	PO6	High	Research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and of the information to provide valid conclusions regarding nutrition solving diseases.
CO14	PO8	Medium	Students will be able to discuss the ethical implications of our understanding of nutrition and nutritional discoveries and to develop the culture of value-based thinking, understand the cons while taking decisions, and lead a sound value based ethical life.
	PO10	High	Students will be able to discuss and practice professional standards of scientific inquiry and responsible conduct of scientists that are essential for the pursuit of new knowledge.
	PO1	High	Acquire comprehensive and sufficient knowledge of understanding in Nutrition related to sanitation process.
	PO3	High	Analyze complex health problems and searching out the solutions by applying the modified foods and nutrients to mitigate the problems.
	PO4	High	Students will able to understand and aware the importance of environment in our life. Students will able to understand and aware the community regarding the environmental pollution and their management.
CO15	PO6	High	The information to provide valid conclusions regarding food born diseases.
	PO7	High	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional dietitian practice.
	PSO1	High	Make students learn nutrition and apply nutritional knowledge to important public health issues and distribute such knowledge to population.
	PSO3	High	Students of nutrition will get an idea of various aspects of entrepreneurship, various food service outlets and their staff organisation, menu planning, service style, beverages.
	PO2	High	Apply the knowledge of food sciences, nutritional physiology.
CO16	PO3	Medium	Analyze complex health problems and searching out the solutions by applying the modified foods and nutrients to mitigate the problems.
	PO2	High	Apply the knowledge of nutrition, dietetics.
	PO3	High	Analyze complex health problems and searching out the solutions by applying the modified foods and nutrients to mitigate the problems.
	PO5	High	Excellent communication of nutrition in community survey,

			hospital visit, ICDS centre visit to develop other branches of sciences, to think existing open programme in nutrition.
CO17	PO7	High	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional dietitian practice.
	PO10	High	Students will be able to discuss and practice professional standards of scientific inquiry.
	PSO1	High	To make students learn nutrition and apply nutritional knowledge to important public health issues and distribute such knowledge to population.
	PSO2	High	Students acquire practical knowledge on diet counselling and diet planning of different diseases and health problems.
CO18	PO2	High	Apply the knowledge of food sciences.
	PO3	High	Analyze complex health problems and searching out the solutions by applying the modified foods and nutrients to mitigate the problems.
	PO5	Medium	Excellent communication of nutrition in community survey.
	PO10	High	Students will be able to discuss and practice professional standards of scientific inquiry.
	PSO3	High	Students of nutrition will get an idea of various aspects of entrepreneurship, various food service outlets and their staff organization.
	PSO4	Medium	Nutrition graduates can build a communication skill with social person and understand their problems.
CO19	PO2	High	Apply the knowledge of nutrition, dietetics, food sciences and communication for nutrition and health promotion.
	PO3	High	Analyze complex health problems and searching out the solutions by applying the modified foods and nutrients to mitigate the problems.
	PO4	High	Students will able to understand and aware the importance of environment in our life and acquit and comfortable learning environment.
	PO5	High	Excellent communication of nutrition in community survey.
	PO7	High	Apply reasoning informed by the contextual knowledge to assess societal, health, safety.
	PO8	High	Students will be able to discuss the ethical implications of our understanding of nutrition and nutritional discoveries and to develop the culture of value-based thinking.
	PSO1	High	To make students learn nutrition and apply nutritional knowledge to important public health issues and distribute such knowledge to population.
	PSO4	High	Nutrition graduates can build a communication skill with social person and understand their problems.
	PO4	High	Students will able to understand and aware the importance of environment in our life and acquit and comfortable learning Sea food and dairy technology.
	PO7	High	Apply reasoning informed by the contextual knowledge of Sea food and airy technology to assess societal, health, safety.

CO20	PSO1	High	To make students learn nutrition and apply nutritional knowledge to important public health issues and distribute such knowledge to population about milk and sea food.
	PSO3	Medium	Students of nutrition will get an idea of various aspects of entrepreneurship on milk and sea food service outlets and their staff organization.
	PSO4	High	Nutrition graduates can build a communication skill with social person and understand their problems. Students can able to know how much important in milk, milk product and milk industry and also get knowledge about various sea foods.

ARTICULATION MATRIX OF CO WITH PO & PSO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	3	3		3			3		2		3	3		
CO2	3	3		2					2		3			
CO3	3	3	3				2		2		3			
CO4	3	3	2	2		3				2	3			
CO5	3	3		3			2	2	2			3	3	2
CO6	3	3	2	3	3	3	2	2	2		3	3		
CO7	3	3		3	3	3	3		2	3	3	3		
CO8		3	3			3				2				
CO9	3	3	3	2	2	3		3		2	3	3		
CO10	3	3	2	2		3					3			
CO11	3	3		2	2		3			3	3	3		
CO12	3	3	3	3							3	3		
CO13	3	3	3	3			3			3	3	3		
CO14	3	3	3	2		3		2		3				
CO15	3		3	3		3	3				3		3	
CO16		3	2											
CO17		3	3		3		3			3	3	3		
CO18		3	3		2					3			3	2
CO19		3	3	3	3		3	3			3			3
CO20				3			3				3		2	3
Target	3	3	2.71	2.6	2.57	3	2.73	2.4	2	2.66	3	3	2.75	2.5

The following list of students from 2022-2023 Batch have taken admission into HEIs for higher studies:

Name of student enrolling into higher education	Program graduated from	Name of institution joined	Name of programme admittad to
Anuja Guria	MGM(Nutrition)	Barrackpore Rastraguru Surendranath College	M.Sc. in Applied Food &Nutrition
Aparna Rajak	MGM(Nutrition)	Mugberia Gangadhar Mahavidyalaya	M.Voc. in Applied Food technology &Nutrition Management
Barsha Jana	MGM(Nutrition)	Mahishadal Raj College	Applied in RSH(Rital Management)
Chayan Panigrahi	MGM(Nutrition)	Mugberia Gangadhar Mahavidyalaya	M.VOC I n Applied Food technology &Nutrition Management
Dipsikha Paria	MGM(Nutrition)	Mugberia Gangadhar Mahavidyalaya	M.Voc. in Applied Food technology &Nutrition Management
Kabita Das	MGM(Nutrition)	Madinipur City College	M.Sc. in Applied Nutrition & Dietetics
Krishna Jana	MGM(Nutrition)	Vidyasagar University	M.Sc. in Applied Clinical nutrition & Dietetics
Mousumi Mondal	MGM(Nutrition)	Government Women of ITI College	In Applied ITI (COPA)
Priyanka Samanta	MGM(Nutrition)	Vidyasagar University	M.Sc. in Applied Nutrition& Dietetics
Rajaram Giri	MGM(Nutrition)	Swami Vivekananda University	M.Sc. in Applied MHA
Riya Bhattacharya	MGM(Nutrition)	Mugberia Gangadhar Mahavidyalaya	M.Voc. in Applied Food technology &Nutrition Management
Ruma Mandal	MGM(Nutrition)	Mugberia Gangadhar Mahavidyalaya	M.Voc. in Applied Food technology & Nutrition Management
Sabitri Bera	MGM(Nutrition)	Vidyasagar University	M.Sc. in Applied Clinical nutrition & Dietetics
Saheli Jana	MGM(Nutrition)	Vidyasagar University	M.Sc. in Applied Clinical nutrition & Dietetics
Shrabani Maity	MGM(Nutrition)	Mugberia Gangadhar Mahavidyalaya	M.Voc. in Applied Food technology &Nutrition Management
Shreya Maity	MGM(Nutrition)	Vidyasagar University	M.Sc. in Applied Clinical nutrition & Dietetics
Shreya Maity	MGM(Nutrition)	Raja Narendra lal Khen Womens College	M.Sc. in Applied Food Science

Shreyasmita Barik	MGM(Nutrition)	Mugberia Gangadhar Mahavidyalaya	M.Voc. in Applied Food technology &Nutrition Management
Sudeshna Sau	MGM(Nutrition)	Raja Narendra lal Khen Womens College	M.Sc. in Applied Food Science
Sukanta Bhunia	MGM(Nutrition)	Vinoba Bhave University	M.Sc. in Applied Clinical nutrition & Dietetics
Uma Dolai	MGM(Nutrition)	Vidyasagar University	M.Sc. in Applied Clinical nutrition & Dietetics

DIRECT METHOD

Academic Session: 2022-2023

Semester - VI

Programme Name: B. SC. HONS (NUTRITION)

ATTAINMENT LEVELS FOR

Result of UG 6 of the academic year 2022-2023			
NAME	**CLASS ROLL NO**	**CGPA**	**SGPA**
Anuja Guria	103	9.34	9.00
Aparna Rajak	104	9.39	9.00
Barsha Jana	105	8.85	7.25
Chayan Panigrahi	106	8.93	8.00
Dipsikha Paria	108	9.08	8.50
Kabita Das	109	9.44	8.50
Krishna Jana	110	9.59	9.00
Mousumi Mandal	111	9.28	8.50
Priyanka samanta	112	8.41	8.41
Rajaram Giri	113	9.30	8.25
Riya Bhattacharya	114	8.75	7.25
Ruma Mandal	115	8.68	6.25
Sabitri Bera	116	9.18	8.25
Saheli Jana	117	9.63	9.50
Sangita Hazra	118	9.38	8.50
Shrabani Maity	119	9.30	8.75
Shreya Maity	120	9.31	8.50
Shreya Maity	121	9.38	8.75
Shreyasmita Barik	122	8.38	6.25
Sudeshna Sau	123	8.96	7.25
Sudipa Jana	124	8.42	6.50
Sukanta Bhunia	125	9.44	9.00
Susmita Bera	126	8.96	7.25
Uma Dolai	128	9.13	9.13

PO & PSO ATTAINMENT

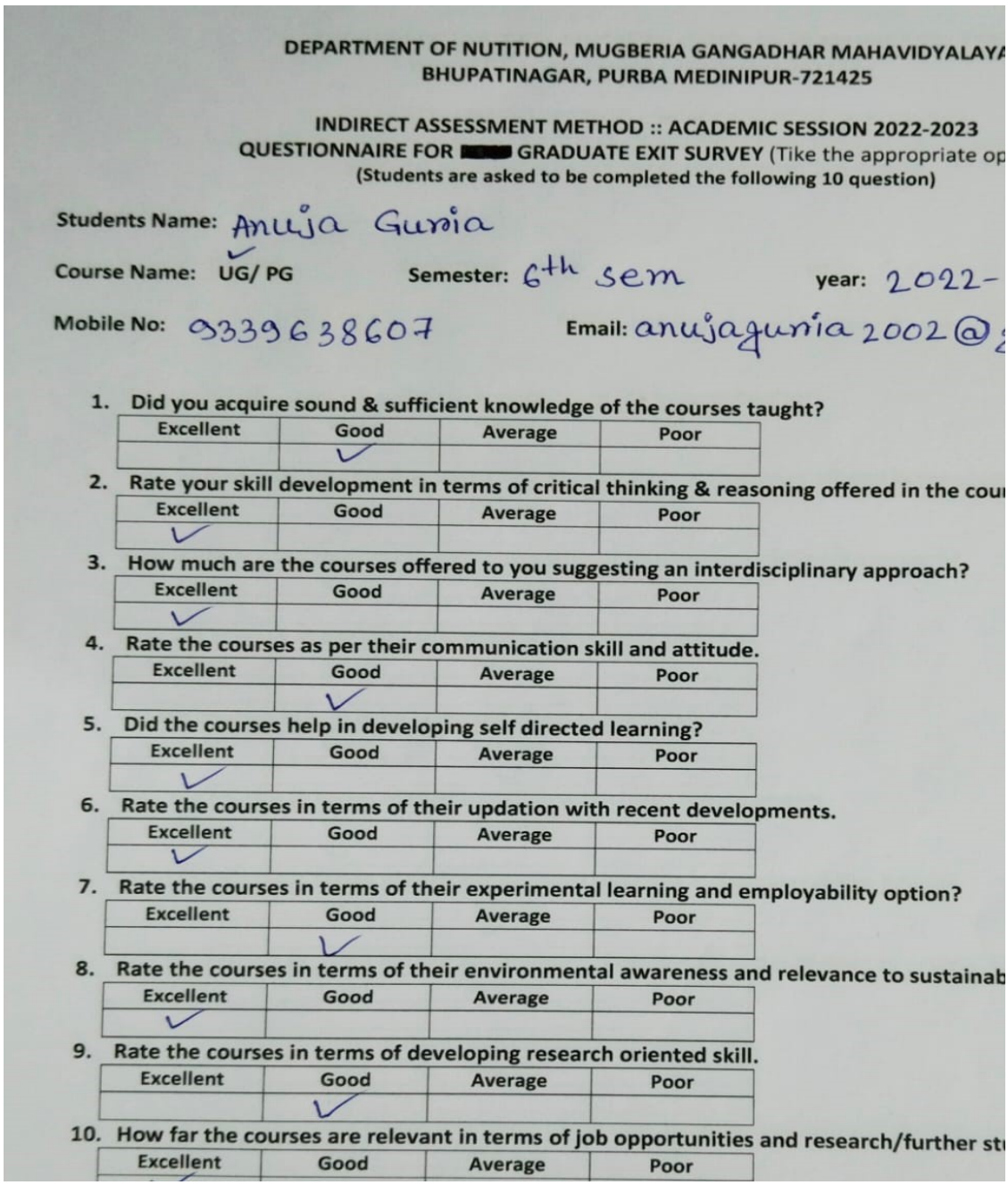
INDIRECT METHOD

Academic Session: 2022- 2023

Semester - VI

Programme Name: B. SC. HONS (NUTRITION)

Exit form survey is conducted through questionnaire methods. Out of 10 questions, first 7 of them relate directly to the POs & the last 3 questions relate to the PSOs. A sample form is given below:



DEPARTMENT OF NUTITION, MUGBERIA GANGADHAR MAHAVIDYALAYA
BHUPATINAGAR, PURBA MEDINIPUR-721425

INDIRECT ASSESSMENT METHOD :: ACADEMIC SESSION 2022-2023
QUESTIONNAIRE FOR [redacted] GRADUATE EXIT SURVEY (Tike the appropriate op
(Students are asked to be completed the following 10 question)

Students Name: Anuja Guria

Course Name: UG/ PG Semester: 6th sem year: 2022-

Mobile No: 9339638607 Email: anujaguria2002@

1. Did you acquire sound & sufficient knowledge of the courses taught?

Excellent	Good	Average	Poor
	✓		

2. Rate your skill development in terms of critical thinking & reasoning offered in the cou

Excellent	Good	Average	Poor
✓			

3. How much are the courses offered to you suggesting an interdisciplinary approach?

Excellent	Good	Average	Poor
✓			

4. Rate the courses as per their communication skill and attitude.

Excellent	Good	Average	Poor
	✓		

5. Did the courses help in developing self directed learning?

Excellent	Good	Average	Poor
✓			

6. Rate the courses in terms of their updation with recent developments.

Excellent	Good	Average	Poor
✓			

7. Rate the courses in terms of their experimental learning and employability option?

Excellent	Good	Average	Poor
	✓		

8. Rate the courses in terms of their environmental awareness and relevance to sustainab

Excellent	Good	Average	Poor
✓			

9. Rate the courses in terms of developing research oriented skill.

Excellent	Good	Average	Poor
	✓		

10. How far the courses are relevant in terms of job opportunities and research/further st

Excellent	Good	Average	Poor

RATING AND RELATION OF POs AND PSOs WITH QUESTIONNARIE

Average Rating (Excellent- 4, Good-3, Average-2, Poor-1) Target level: 3

Sl.No.	Questions	Average Rating (of 24 students)
1.	Did you acquire sound & sufficient knowledge of the courses taught?	3.25
2.	Rate your skill development in terms of critical thinking & reasoning offered in the courses?	3.20
3.	How much are the courses offered to you suggesting an interdisciplinary approach?	3.54
4.	Rate the courses as per their communication skill and attitude.	3.62
5.	Did the courses help in developing self directed learning?	3.37
6.	Rate the courses in terms of their updating with recent developments.	3.08
7.	Rate the courses in terms of their experimental learning and employability option?	3.08
8.	Rate the courses in terms of their environmental awareness and relevance to sustainable measures?	3.16
9.	Rate the courses in terms of developing research oriented skill.	3.33
10.	How far the courses are relevant in terms of job opportunities and research/further studies?	3.37

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
Questioner	Q1, Q3, Q5	Q1, Q4, Q7	Q1, Q7, Q6	Q1, Q5, Q5	Q2, Q4, Q8	Q1, Q6, Q3	Q1, Q5, Q9	Q1, Q10 Q5	Q1, Q6, Q9	Q1, Q4, Q8	Q2, Q6, Q10	Q1, Q3, Q8	Q1, Q7, Q10
Average Rating	3	2.6	3	3	2.6	2.8	3	2.4	2.8	2.8	3	3	3

MUGBERIA GANGADHAR MAHAVIDYALAYA, MUGBERIA 72

DEPARTMENT OF NUTRITION

FINAL ATTAINMENT OF CO, PO & PSO

PROGRAMME NAME: B.Sc. HONOURS IN NUTRITION
(BATCH 2022-2023)

Direct Method: Average COs of all courses

	CO	CO	CO	CO	C
	12.1,12.2,12.3	13.1, 13.2,13.3	15.1,15.2,15.3	17.1,17.2,17.3	19.1,19
Direct Attainment	3	3	3	3	

Direct Method, the target level is reached successfully.

Indirect Method: Average of PO & PSO with the questionnaire

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
	1	2	3	4	5	6	7	8	9
Indirect Attainment	3.25	3.20	3.54	3.62	3.37	3.08	3.08	3.16	3.33

Indirect Method, the target level is reached successfully for POs & PSOs.

The report is prepared by Pranati Bera, SACT Teacher, Dept of Nutritio

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