Shri Rawatpura Sarkar University,

Raipur

Examination Scheme & Syllabus as per Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

for

BACHELOR OF SCIENCE

IN

NUTRITION & DIETETICS

Semester - II

(Effective from the session: 2022-23)

Program Outcome	**PO 1: Development of intra-disciplinary skills** - This opens wide range of opportunities for students in job sector. Studying wide range of subjects like Dietetics, Community Nutrition, Family Meal Management, Quantity Food Production & Service, Food Safety and Quality Control, Bakery Science, Geriatric Nutrition - both theory and practical, help students in developing skills related to various fields of nutrition. **PO 2: Scientific and Critical Thinking** - Development of knowledge, skills and holistic understanding of the discipline among students. Encouragement of scientific mode of thinking and scientific method of enquiry in students. This goal is achieved through the on job trainings conducted by the Department in Hospitals and Community and the writing of a report on it. **PO 3: Health management and community upliftment** - The course equips students with ability to manage a healthy society and country. This goes a long way in progress of entire nation and thus world. Students can work at both national and international level after completion of higher studies in this course. **PO 4: Self dependency**- The course gives an opportunity to willing students to establish an enterprise of their own in health & food sectors. **PO 5: Promoting healthy environment-** To inculcate social values promoting healthy environment and reaching out to the community. **PO 6: Provide advanced knowledge-** Provide advanced knowledge and skills in highly job oriented courses in the areas of Food Processing, Quality Control, Food Safety, and Nutritional Sciences. **PO7: Identify food based strategies-** Identify food based strategies for alleviating nutritional problems to achieve nutrition and health security. **PO 8: Provide quality education-** The course provide quality education to make the students technically competent to face the challenges in the field of Food Science, Nutrition and Dietetics. **PO 9: Understanding specific diseased conditions-** The programme provides in-depth understanding of the role of food under specific diseased conditions. **PO 10: Inter-disciplinary programme:** Basically this is an inter-disciplinary programme with knowledge of human anatomy, microbiology, biochemistry and their role in relation to food and health.

Shri Rawatpura Sarkar University, Raipur

Faculty of Science

Scheme of Teaching and Examination

BACHELOR OF SCIENCE IN NUTRITION & DIETETICS

Semester - II

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the session: 2022-23)

SN	Course Code	Course Title	Type of Course	Hours/Week			Credits	Maximum Marks			Sem End Exam Duration (Hrs.)
				L	**T**	**P**		Continuous Evaluation	Sem. End Exam	Total	
1.	SBS06201T	Nutritional Biochemistry	Core	4	-	-	4	30	70	100	3
2.	SBS06202T	Family Meal Management	Core	4	-	-	4	30	70	100	3
3.	SBS06203T	Basic Dietetics	Core	4	-	-	4	30	70	100	3
4.	SBS06211T	Environmental Studies	AECC	4	-	-	4	30	70	100	3
5.	SBS06291P	Lab course: IV	Core Practical	-	-	4	2	15	35	50	5
6.	SBS06292P	Lab Course: V	Core Practical	-	-	4	2	15	35	50	5
7.	SBS06293P	Lab Course: VI	Core Practical	-	-	4	2	15	35	50	5
TOTAL				**16**		**12**	**22**			**550**	

Course Title	**Nutritional Biochemistry**				
Course Code	**SBS06201T**				
Course Credits	**L**	**T**	**P**	**TC**	
	4	-	-	4	
Prerequisites	**Fundamental knowledge of biology and chemistry.**				
Course Objectives	• List major properties, functions, and important food sources of the nutrients; • Describe human nutrient and energy needs throughout the life span and in physical training; • Translate human nutrient and energy needs into daily food selection utilizing appropriate standards and guidelines; • Explain the significance of food practices to nutrition and disease prevention; • Effectively evaluate meal plans for nutritional adequacy, nutrient density, balance, variety, and calorie control; • Evaluate and effectively communicate accurate nutrition information to target audiences.				
Course Contents	**UNIT I** Introduction To Nutritional Biochemistry: Meaning and Importance, Development of Nutritional Biochemist Chemistry of carbohydrates: Introduction, definition, classification, biomedical importance. Digestion, Absorption and Transport of Carbohydrate. Carbohydrate Metabolism: Glycolysis, TCA cycle, Gluconeogenesis, Glycogenolysis, HMP shunt, Regulation of blood glucose level (Brief outline and its significance). **UNIT II** Chemistry of Protein: Introduction, Definition, classification, Structure, function, Digestion, and Absorption of protein. Amino acids: Definition, classification, Structure and properties of amino acid. essential & non-essential amino acids. Amino Acid Metabolism: Introduction, Transamination Reaction, Deamination Reaction, Urea Cycle, Decarboxylation Reaction and Biogenic Amines, Non- protein functions of Amino Acid. **UNIT III** Chemistry of Lipids & their related metabolism- Introduction, definition, classification, Structure, chemical composition, biomedical importance. Fatty Acids: Saturated Fatty Acids, Unsaturated fatty acid. Neutral Fats, Phospholipids, Steroids. Properties of Fatty Acids and Neutral Fats. Identification of fats & oils (saponification no, acid no, iodine no, acetyl no, reichertmiesel no. etc.) Brief out line of metabolism: Beta oxidation of fatty acids, Ketosis, Cholesterol & it's clinical significance. **UNIT IV** Enzymes -Introduction, definition, classification, coenzymes, isoenzymes, properties, factors affecting enzyme action, enzyme inhibition, diagnostic value of serum enzymes - Creatinine kinase, Alkaline phosphatase, Acid phosphatase, LDH, SGOT, SGPT, Amylase, Lipase, Carbonic anhydrase etc. Acid base balance concepts & disorders - pH, Buffers, Acidosis,				

	Alkalosi. Hormones - Classification, general mode of action, hormones of Pituitary, Thyroid, Parathyroid, Adrenals, Reproductive Glands, Pancreas, hormonal disorders, counter regulatory hormones. Vitamins – Water & fat soluble vitamins, sources, requirement, deficiency disorders & functions. Water Metabolism: Distribution of fluids in the body, ECF, ICF, Water metabolism, dehydration. **UNIT V** Hyperglycemia & hypoglycemia, glucose tolerance test, glycosuria, Liver functions and their assessment -Based on - a) Carbohydrate metabolism b) Protein metabolism c) Lipid Metabolism d) Measurements of serum enzyme levels e) Bile pigment metabolism: Jaundice - its types and their biochemical findings. Renal functions tests - Various tests, GFR & clearance. Tumor markers & their clinical applications - Including oncofeatal antigens, CEA etc. General concepts & functions of immunoglobulins
Course Outcomes	Student will be able to • Capable of describing biochemical pathways relavent in nutrient metabolism. • Learn to find credible sources of information on food science and nutrition. • Capable of using selected biochemical techniques that are relavent for the investigation of the nutrient metabolism. • Clear the general concept of enzyme, hormones and vitamins. • Learn about the condition of random blood glucose level.
Text Books	**1.** Manjula Shantaram, Biochemistry & Nutrition for B. Sc. Nursing, Jaypee Brothers Medical Publishers (P) Ltd. **2.** Ruma Singh, Food and Nutrition for Nurses, Jaypee Brothers Medical Publishers (P) Ltd.
Reference Books	**1.** D. C. Sharma & Devanshi Sharma, Nutritional Biochemistry, CBS Nursing. **2.** U Satyanarayana & U Chakrapani, Biochemistry.

<table>
<tr><td>Course Title</td><td colspan="5">Family Meal Management</td></tr>
<tr><td>Course Code</td><td colspan="5">SBS06202T</td></tr>
<tr><td rowspan="2">Course Credits</td><td>L</td><td>T</td><td>P</td><td>TC</td><td></td></tr>
<tr><td>4</td><td>-</td><td>-</td><td>4</td><td></td></tr>
<tr><td>Prerequisites</td><td colspan="5">Fundamental knowledge of nutrition science</td></tr>
<tr><td>Course Objectives</td><td colspan="5">• Develop a philosophy of why meal preparation and consumption at the family table is an important component in development and stability of families.
• Plan attractive meals with consideration for nutritional adequacy, income level, social, cultural, psychological, palatability, and aesthetic factors.</td></tr>
<tr><td>Course Contents</td><td colspan="5">UNIT I
Food and Nutrition: Introduction, Definition, Importance.
Introduction to meal management- balanced diet, food groups & the planning of balance diet. Food guides for selecting adequate diet.
UNIT II
Menu planning for the family. Indian meal patterns- vegetarian & non-vegetarian. Food faddism & the faulty food habits.
Nutritive value of common Indian recipie, Low cost balanced diet.
UNIT III
Nutrition in pregnancy- Physiological stages of pregnancy, nutritional requirements, food selection, complication of pregnancy.
Nutrition during lactation- Physiology of lactation, nutritional requirements.
Nutrition during infancy- growth & development, nutritional requirements, breast feeding, infant formula, Low Birth Weight, Preterm Baby, Weaning, Problems in weaning. Supplementary foods.
UNIT IV
Nutrition during early childhood (Toddler/Preschool)- Growth & nutrient need, nutrition related problems, feeding patterns.
Nutrition of school children- Nutritional Requirement, importance of snacks, school lunch.
Nutrition during adolescence- Growth & nutrient needs, food choices, eating habits, factor influencing needs.
UNIT V
Nutrition during adulthood - Nutritional requirements, feeding pattern.
Geriatric nutrition: Process of Ageing, Nutritional Requirement, Food requirements, Factors affecting food intake and Nutrients use, Nutrition Related Problems of old age, Degenerative Diseases, Exercise and Old Age, Drugs and Old Age.</td></tr>
<tr><td>Course Outcomes</td><td colspan="5">Student will be able to
• Demonstrate the importance of a balanced diet and use tools that can be utilized to evaluate the nutritional adequacy of a diet (RDA, Dietary Guidelines, MyPlate, etc.).</td></tr>
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	• Explain rationale for nutrient intake recommendations across the lifespan. • Understanding the basic concept of nutritional requirement during pregnancy, lactation and infancy. • Learn about the nutritional requirement during childhood and adolescence. • Describe a healthy diet and food choices, and explain why such choices will help prevent health problems.
Text Books	1. Air Cmde, L. K. Sharma, Nutrition, Dietician and Health Management, Surendra Publications. 2. Nutrition for the community, Neeraj Publications. 3. B. Srilaskshmi, Dietetics, New Age Internatinal Publishers
References Books	1. McWilliams Ph.D. R.D. Professor Emeritus, Margaret, Fundamentals of Meal Management (5th Edition), Pearson Publications.

Course Title	**Basic Dietetics**				
Course Code	**SBS06203T**				
Course Credits	**L**	**T**	**P**	**TC**	
	4	-	-	4	
Prerequisites	**Fundamental knowledge of basic nutrition.**				
Course Objectives	• list major properties, functions, and important food sources of the nutrients; • describe human nutrient and energy needs throughout the life span and in physical training; • Translate human nutrient and energy needs into daily food selection utilizing appropriate standards and guidelines; • Explain the significance of food practices to nutrition and disease prevention; • Effectively evaluate meal plans for nutritional adequacy, nutrient density, balance, variety, and calorie control; and • Evaluate and effectively communicate accurate nutrition information to target audiences.				
Course Contents	**UNIT I** Role of dietitian: The hospital & community. Basic concepts of diet therapy. Therapeutic Diet: Principle of therapeutic diet, nutrition for changing needs. Nutrition Support: Enteral Nutrition and Parenteral Nutrition. **UNIT II** Modification of diet - Diet in Febrile conditions and infections, Diet in surgical conditions, Diet for Burn. Diet for Cancer **UNIT III**				

	Diet for gastro - intestinal disorders: constipation, diarrhoea, peptic ulcer. Diet for Bariatic Surgery Diet for renal diseases - Nephritis, Nephrotic syndrome and renal failure, renal calculi. **UNIT IV** Nutrition in Immune system dysfunction, AIDS & Allergy. Nutrition support in metabolic disorders: Maple syrup Urine Disease, PKU, Gaucher Disease. Nutrition - Addictive behaviour in annorexia nervosa, bulimia & alcoholism. **UNIT V** Diet in Diabetes Mellitus: Prevalence, types, Symptoms, Diagnosis, Treatment, Complications, Nutrition support during Diabetes. Diet in Obasity and Underweight: Obesity, Aetiology, Theories, Assessment, Types, Treatment. Nutrient drug interaction.
Course Outcomes	Student will be able to • Gain experience to plan and calculate the modified diet. • Gain knowledge about basics in nutrition during fever, burn and cancer. • Understanding the nutritional requirement during gastro- intestinal disease. • Know about the general concept of immune system disfunction and metabolic syndrome. • Understand the DM, obesity, underweight, drug interaction and their dietary treatment.
Text Books	1. Y. K. Joshi, Basics of clinical nutrition, Jaypee Brothers Medical Publishers (P) Ltd. 2. B. Srilaskshmi, Dietetics, New Age Internatinal Publishers.
Reference Books	1. Darshan Sohi, Nutrition & Dietetics, Pee Vee Publishers.

Course Title	**ENVIRONMENTAL STUDIES**				
Course Code	**SBS06211T**				
Course Credits	**L**	**T**	**P**	**TC**	
	2	**-**	**-**	**2**	
Prerequisites	**Basic Science**				
Course Objectives	• Upon completion of the course the student shall be able to • Create the awareness about environmental problems among learners • Impart basic knowledge about the environment and its allied problems. • Develop an attitude of concern for the environment.				

	• Motivate learner to participate in environment protection and environment improvement. • Acquire skills to help the concerned individuals in identifying and solving environmental problems, Strive to attain harmony with nature.
Course Contents	**UNIT 1**: The multidisciplinary nature of environmental studies Definition, scope and importance. Need for public awareness **UNIT 2**: Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems. (a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people. (b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. (c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. (d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. (e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies. (f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. · Role of an individual in conservation of natural resources. · Equitable use of resources for sustainable lifestyles. **UNIT 3**: Ecosystems · Concept of an ecosystem · Structure and function of an ecosystem · Producers, consumers and decomposers · Energy flow in the ecosystem · Ecological successionFood chains, food webs and ecological pyramids · Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries) **UNIT 4**: Biodiversity and its conservation · Introduction – Definition: genetic, species and ecosystem diversity · Biogeographical classification of India · Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values · Biodiversity at global, national and local levels · India as a mega-diversity nation · Hot-spots of biodiversity · Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts · Endangered and endemic species of India · Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity **UNIT 5**: Environmental Pollution Definition · Causes, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear pollution · Solid waste management: Causes, effects and control measures of urban and industrial wastes. · Role of an individual in prevention of pollution · Pollution case studies · Disaster management: floods, earthquake, cyclone and landslides
Course	Student will be able to • On the Completion of this course successfully student will be able to analyze the nature

Outcomes	as per the modern scientific context of environmental change. • Clear the general concept of natural resources. • Gain knowledge of ecosystem. • Understanding the biodiversity and its conservation. • Know about the environmental pollution and its prevalence.
Text Books	1. Environment and Ecology by Piyush Kant Pandey and Dipti Gupta (Sum India Publication). 2. A Textbook of Environmental Chemistry and Pollution Control by S.S. Dara (S. Chand and Company)
Reference Books	1. Masters, G.M. Introduction to Environment Engineering and Science (Prentice Hall of India). 2. Environmental Chemistry by A.K. Dey (Eastern Ltd.). 3. Environmental Chemistry by B.K. Sharma (Krishna Prakashan). 4. Nebel B.J. Environmental Science (Prentice Hall of India-1987). 5. Environmental Biotechnology by S.N. Jogdand (Himalaya Publishing House). 6. Introduction to Environmental Biotechnology by A.K. Chatterji (Prentice Hall of India).

Course Title	**Lab Course IV**				
Course Code	**SBS06291P**				
Course Credits	**L**	**T**	**P**	**TC**	
			2	2	
Prerequisites	**Nutritional Biochemistry theory paper.**				
Course Objectives	• Understanding the basic properties of nutrients. • Effectively perform qualitative tests on Nutrients.				
Course Contents	1. Identification of carbohydrates (Qualitative Tests). 2. Identification of proteins (Qualitative Tests). 3. To study general properties of the enzyme Urease & Achromatic time of salivary amylase. 4. Estimation of glucose in urine by Benedict's methods. 5. Urine analysis - normal & abnormal constituents of urine. 6. Blood glucose estimation. 7. Carbohydrate: Starch- digestible and resistance starches, Dietary fiber- soluble and insoluble. 8. Qualitative test for lipids. 9. Separation of sugars by paper chromatography.				

	10. Identification of lipids by thin layer chromatography.
Course Outcomes	Student will be able to • Identify the presence of food nutrients in given sample. • Qualitative and Quantitative analysis of food samples. • Gain knowledge of urine analysis and blood glucose estimation. • Learn about the starch and qualitative test of lipids. • Understanding the chromatography methods.
Text Books	**1.** Manjula Shantaram, Biochemistry & Nutrition for B. Sc. Nursing, Jaypee Brothers Medical Publishers (P) Ltd. **2.** Ruma Singh, Food and Nutrition for Nurses, Jaypee Brothers Medical Publishers (P) Ltd.
Reference Books	**1.** D. C. Sharma & Devanshi Sharma, Nutritional Biochemistry, CBS Nursing.

Course Title	**Lab Course V**				
Course Code	**SBS06292P**				
Course Credits	**L**	**T**	**P**	**TC**	
	-	-	2	2	
Prerequisites	**Family Meal Management Theory Paper.**				
Course Objectives	• The course aims at planning and preparation of balanced diet for different age-groupswithin and community according to their individual health factors.				
Course Contents	1. Planning and preparation of a balanced diet for a pregnant woman. 2. Diet during complication of pregnancy. 3. Planning and preparation of a balanced diet for a lactating woman. 4. Preparation of weaning foods. 5. Planning and preparation of a balanced diet for pre-school child. 6. Balanced diet for school going child. Preparation of packed lunch. 7. Planning and preparation of a balanced diet for adolescence. 8. Planning of meals for adult belonging to different income group. 9. Planning meal for senior citizen. 10. Project work with proper diet plan based on survey.				

Course Outcomes	Student will be able to • Demonstrate the importance of a balanced diet and use tools that can be utilized to evaluatethe nutritional adequacy of a diet (RDA, Dietary Guidelines, My Plate, etc.). Recall current nutritional recommendations for healthy eating habits (American Heart Association, American Cancer Society, etc.) and able to read and interpret a nutrition label. • Utilize nutrition terminology and related terminology appropriately. • Know about the diet preparation for various stages of life. • Clear the basic concept of diet survey.
Text Books	1. Air Cmde, L. K. Sharma, Nutrition, Dietician and Health Management, Surendra Publications. 2. Nutrition for the community, Neeraj Publications. Y. K. Joshi, Basics of clinical nutrition, Jaypee Brothers Medical Publishers (P) Ltd.
Reference Books	1. McWilliams Ph.D. R.D. Professor Emeritus, Margaret, Fundamentals of Meal Management (5th Edition), Pearson Publications

Course Title	**Lab Course VI**				
Course Code	**SBS06293P**				
Course Credits	**L**	**T**	**P**	**TC**	
			2	2	
Prerequisites	**Basic Dietetics Theory Paper.**				
Course Objectives	• Understanding the basic properties of nutrients. • Effectively perform qualitative tests on Nutrients.				
Course Contents	1. Planning, preparation and calculation of following diets: a) Normal diet. b) Liquid diet c) Soft diet. 2. Planning, preparation and calculation of following diets: a) High calorie and low calorie diet. 3. Give a diet plan for a patient recovering from tuberculosis. 4. Planning and preparation of diet for elderly in health and sickness. 5. Planning diets and formulating dietary guidelines for following: a) Obesity management. b) Management of burn 6. Planning and preparation of diet for an executive suffering from peptic ulcer. 7. Planning and preparation of diet for a patient suffering from renal calculus. 8. Planning and preparation of diet for an executive suffering from constipation. 9. Planning and preparation of diet for a patient recovering from typhoid. 10. Planning and preparation of diet for a patient suffering from dialysis.				
Course Outcomes	Student will be able to • Identify the relationship between diet and chronic diseases/illnesses (CKD, fever, burn, obesity, gastrointestinal disease etc.) and what modifications can be made in the diet to reduce the risk for these diseases/illnesses. • Plans, develops, control and evaluates food service system. • Develops menu patterns and evaluates client acceptance. • Consults with the health care team concerning the nutritional care of clients. • Learn about the therapeutic diet for different disease.				
Text Books	1. Manjula Shantaram, Biochemistry & Nutrition for B. Sc. Nursing, Jaypee Brothers Medical Publishers (P) Ltd. 2. Ruma Singh, Food and Nutrition for Nurses, Jaypee Brothers Medical Publishers (P) Ltd.				
Reference Books	1. B Srilaklshmi, Dietetics, CBS Nursing. 2. T. Longvah, R. Ananthan, K. Bhaskaracharya, K. Venkalah, Indian Food Composition Tables, NIN.				