

Shri Rawatpura Sarkar University,

Raipur



**Examination Scheme & Syllabus as per
UGC pattern**

for

**BACHELOR OF SCIENCE IN
NUTRITION & DIETETICS**

Semester – IV

(Effective from the session: 2021-22)

Program Outcome	<p>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.</p> <p>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 onjob trainings conducted by the Department in Hospitals and Community and the writing of a report on it.</p> <p>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.</p> <p>PO 4: Self dependency- The course gives an opportunity to willing students to establish an enterprise of their own in health & food sectors.</p> <p>PO 5: Promoting healthy environment- To inculcate social values promoting healthy environment and reaching out to the community.</p> <p>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.</p> <p>PO7: Identify food based strategies- Identify food based strategies for alleviating nutritional problems to achieve nutrition and health security.</p> <p>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.</p> <p>PO 9: Understanding specific diseased conditions- The programme provides in-depth understanding of the role of food under specific diseased conditions.</p> <p>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.</p>
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Shri Rawatpura Sarkar University, Raipur

Faculty of Science

BACHELOR OF SCIENCE IN NUTRITION & DIETETICS

Semester - IV

Examination Scheme in UGC Pattern (Effective from the session: 2021-22)

S. No.	Course Code	Th/ Pr	Subject	Type of Course	Teaching Hours / Week			TC	Examination Scheme				Total Marks
					L	T	P		Theory		Practical		
									EX	IN	EX	IN	
1	SBS06401	Th	Food Microbiology	Core	4	-	-	4	70	30	-	-	100
2	SBS06402	Th	Food Science	Core	4	-	-	4	70	30	-	-	100
4	SBS06451	Th	Herbal Science	GE	4	-	-	4	70	30	-	-	100
5	SBS06411	Th	Bakery	SEC	4	-	-	4	70	30	-	-	100
6	SBS06491	Pr	Lab course X	Core Practical	-	-	4	2	-	-	35	15	50
7	SBS06492	Pr	Lab Course XI	Core Practical	-	-	4	2	-	-	35	15	50
7	SBS06493	Pr	Lab Course XII	GE Practical	-	-	4	2	-	-	35	15	50
Total					16		12	22					550

Course Title	Food Microbiology				
Course Code	SBS06401				
Course Credits	L	T	P	TC	
	4	-	-	4	
Prerequisites	Fundamental Knowledge of General microbiology				
Course Objectives	<ul style="list-style-type: none"> To provide students with a firm understanding of the Microorganisms related to Food. 				
Course Contents	<p>UNIT I Introduction of microbiology and its relevance to everyday life. General characteristics of bacteria, fungi, virus, protozoa, and algae, Growth of microorganisms: Growth curve, effect of environmental factors in growth of microorganism - pH, water activity, oxygen availability, temperature and others.</p> <p>UNIT II Microbiology of deficient food: Spoilage. Contamination sources, types, effect on the following: a. Cereal and cereal products b. Sugar and sugar products. c. Vegetables and fruits. d. Meat and meat products. e. Fish, egg and poultry, Milk and milk products. Canned foods.</p> <p>UNIT III Environmental microbiology: a. Water and water borne diseases. b. Air and air borne diseases. c. Soil and soil borne diseases. d. Sewage and diseases.</p> <p>UNIT IV Beneficial effect of microorganisms. Relevance of microbial standards for food safety. Waste product handling: - a. Planning for waste disposal. b. Solid wastes and liquid wastes.</p> <p>UNIT V Microbial intoxication and infections: Sources of contamination of food, toxin production and physiological action, sources of infection of food by pathogenic organisms, symptoms and method of control. 9. Relevance of microbiology standards for food safety.</p>				
Course Outcomes	<p>Student will be able to</p> <ul style="list-style-type: none"> Recognition and understanding of the essential terminology necessary to properly describe the fundamental relationships of Microorganisms affecting Food. Comprehend various techniques used for isolation, purifications, identifications and controlling the growth of micro-organisms. Assess the microbial safety of personal hygiene, water, milk and food products in various food operations. Gain knowledge of environmental microbiology. Understand the nature of micro-organisms involved in food spoilage, infections and intoxications. 				

Text Books	<ol style="list-style-type: none"> 1. Willey, Sherwood & Woolverton, Prescott, Harley and Klein's Microbiology, McGraw Hill Education. 2. S. S. Purohit, Microbiology, Fundamentals & Applications, Agrobios (India). 3. Rangaswamy and Bhagyaraj, Agricultural Microbiology, Phi Learning.
Reference Books	<ol style="list-style-type: none"> 1. S. P. Narang, Food Microbiology, APH Publication Corporation.

Course Title	Food Science				
Course Code	SBS06402				
Course Credits	L	T	P	TC	
	4	-	-	4	
Prerequisites	Fundamental knowledge of basic food science.				
Course Objectives	<ul style="list-style-type: none"> • Employ sanitation standards and safety procedures in food handling and in the use and care of kitchen utensils, equipment, and food storage. • Demonstrate an understanding of factors affecting food habits, meal consumption patterns, and trends in food cost. • Utilize managerial skills and available resources in food purchasing, and meal planning, preparation, and service 				
Course Contents	<p>UNIT I Cereal- Structure and composition, Nutritional value, Processing- Milling, polishing, parboiling, flaking, parching, roasting, use in variety of preparations selection, storage and care, breakfast cereals. Pulses: composition and nutritional value, processing, soaking, germination. Fats and oils: Types, role of fat in cookery.</p> <p>UNIT II Cooking and fermentations: Toxic constituents of pulses, Lathyrism. Nuts and oil seeds: Nutritive value, importance & classification. Milk and milk products: Composition of milk, properties and effect of heat, nutritional importance, milk processing, milk products.</p> <p>UNIT III Flesh foods- selection, storage, uses and nutritional aspects of meat, fish and poultry, spoilage of fish. Fruits and vegetables: Classifications, composition and importance in human nutrition storage, cooking of vegetables, changes during cooking, effect of heat, acid and alkali.</p> <p>UNIT IV Sugar and Sugar products (a) Form of sugar and liquid sweetness. (b) Caramelization, Hydrolysis, Crystallization (c) Indian confectionery Beverages: Coffee, tea, and cocoa,</p>				

	processing composition and preparation, spices and condiments, types and composition, Role of spices in food science. UNIT V Egg – Structure, composition & classification of egg, quality test of egg, egg products, its nutritive value. Baking - Types of bake products & its nutritive value, Leavening agent.
Course Outcomes	Student will be able to <ul style="list-style-type: none"> • Recognition and understanding of the essential terminology necessary to properly describe the fundamental on Food Science. • Know about the cooking and fermentation process. • Gain knowledge of flesh foods and its nutritive value. • Understanding the sugar and sugar products. • Know about the egg and quality of egg.
Text Books	1. B. Srilakshmi, Food Science, New Age International Publishers. 2. S. M. Reddy, Basic Food Science & Technology, New Age International Publishers
Reference Books	1. Avantina Sharma, Textbook of Food Science and Technology, CBS Publishers and Distributors Pvt Ltd.

Course Title	Herbal Science				
Course Code	SBS06451				
Course Credits	L	T	P	TC	
	4	-	-	4	
Prerequisites	Fundamental knowledge of Herbal Science				
Course Objectives	<ul style="list-style-type: none"> • This course aims at enabling the students to reach the advanced level of Herbal Nutrition. 				
Course Contents	<p>UNIT I: Introduction to Herbal Science:Historical Background, Present Status and Scope of the following with special reference to literature: Medicinal Botany, Pharmacognosy, Aroma Therapy, Cosmetology.</p> <p>UNIT II: Further Studies,</p> <p>Herbal ScienceProgramme: Herbal Science programme concentrates on the science of:Herbal and Natural Products for medicinal, healthcare and cosmetic purposes Horticulture / Agronomics Nutrition / Nutraceuticals / Food Science.</p> <p>UNIT III: Preventive Health by Herbs: Preventive Health care through Rejuvenative Herbs and its formulation, Supplements for daily use from Common Herbs in Indian Medicine.</p>				

	<p>UNIT IV: Entrepreneurship opportunity: Entrepreneurship opportunity Necessity to promote Indian Traditional health Concept, Demand& opportunity for Herbal products Retailing, Marketing techniques, Sales & Promotion.</p> <p>UNIT V: Career Opportunities: Graduates can expect to work in a variety of sectors including: Healthcare / Cosmetic Industry Food Industry / Nutraceutical Industry Biopharmaceutical Industry Quality Control / Analysis Medicinal Plant Production</p>
Course Outcomes	<p>Student will be able to</p> <ul style="list-style-type: none"> • Educate and create awareness among the students about plant based medicinal practices from Indian Systems of Medicine. • Able to learn about the herbal science programme. • Clear the basic concept of preventive health by herbs. • Gain knowledge of entrepreneurship opportunities. • Student will be able to career opportunities in various field.
Text Books	1. Sunita Pant Bansal, Healing Power of foods, VS Publications.
Reference Books	<ol style="list-style-type: none"> 1. Robert Young, Herbal Nutrition, Inner Light Biological Research Foundation. 2. Thirugnanasambantham, et al. (2012). Introduction to Herbal Entrepreneurship, Rohini Institute of Alternative Medicine, 40/41, Spartan Avenue, Mugappair East, Chennai.

Course Title	Bakery				
Course Code	SBS06411				
Course Credits	L	T	P	TC	
	4	-	-	4	
Prerequisites	Fundamental knowledge of Bakery				
Course Objectives	<ul style="list-style-type: none"> • This course aims students able to understand the bakery and bakery product. 				
Course Contents	<p>Unit I: Introduction to baking science: Basic materials used in bakery and confectionery Selection, properties and functions.</p> <ul style="list-style-type: none"> • Scope of Bakery & Confectionery, • Bakery terms. • Organization chart of Bakery. 				

	<p>Unit II: Wheat and Flour:• Different types of flours available,</p> <ul style="list-style-type: none"> • Constituents of flours, • pH Value of flour, • Water absorption power of flour, • Gluten, diastatic capacity of flour, • Grade of flour. • Temperature/ Weight conversions 1 unit; °F/ °C /gms / lb serving size. <p>Unit III: Raw material required for bread making: Role of flour, water, yeast, salt - Sugar, milk and fat.</p> <p>Yeast: • An elementary knowledge of Baker’s yeast, the part it plays in the fermentation of dough and conditions influencing it’s working. • Effect of over and under fermentation and under proofing of dough and other fermented goods.</p> <p>Unit IV: Bread improvers-improving physical quality.</p> <p>Oven & Baking:• Knowledge and working of various types of oven. • Baking temperatures for bread, confectionery goods.</p> <p>Methods of bread making: • Straight dough method • Delayed salt method • No time dough method • Sponge and dough method.</p> <p>Characteristics of good bread• External characteristics • Volume, symmetry of shape • Internal characteristics - colour, texture, aroma, clarity and elasticity.</p> <p>Unit V: Bread faults and their remedies.</p> <p>Bakery layout: The required approvals for setting up of a Bakery – Government procedure and Bye-laws.</p> <ul style="list-style-type: none"> • Selection of site • Selection of equipment. • Layout design • Electricity.
<p>Course Outcomes</p>	<p>Student will be able to</p> <ul style="list-style-type: none"> • Know about the bakery. • Gain knowledge of baked product. • Learn about the raw material. • Clear the basic concept of bread. • Understanding the bakery layout.
<p>Text Books</p>	<p>1. Edwards WP (2006): The Science of Bakery Products, 1st Ed. Royal Society of Chemistry.</p>
<p>Reference Books</p>	<p>1. Khetarpaul N, Grewal Rajbala and Jood S (2005): Bakery Science and Cereal Technology, Daya Publishing House. 2. Hui YH (2005): Bakery Products: Science and Technology, 1st Ed. Wiley India.</p>

Course Title	Lab Course X				
Course Code	SBS06491				
Course Credits	L	T	P	TC	
	-	-	2	2	
Prerequisites	Food Microbiology theory paper.				
Course Objectives	<ul style="list-style-type: none"> This course aims at enabling the students to know about the general microbiology. 				
Course Contents	<ol style="list-style-type: none"> Introduction to the Basic Microbiology Laboratory Practices and Equipment. Functioning and use of compound microscope. Preparation of slant, stab and plates using nutrient agar. Cleaning and sterilization of glassware. Morphological study of bacteria and fungi using permanent slides. Simple staining. Gram's staining. Standard Plate Count Method. Visits (at least two) to food processing units or any other organization dealing with advanced methods in food microbiology. Preparation and sterilization of nutrient broth. Cultivation and sub-culturing of microorganisms. 				
Course Outcomes	<p>Student will be able to</p> <ul style="list-style-type: none"> Microbiology laboratory practice and use of microscope. Learn about the morphological study. Clear the basic concept of staining. Gain knowledge of plate count. Preparation of nutrient broth. 				
Text Books	<ol style="list-style-type: none"> R. C. Dubey & D. K. Maheshwari, Practical microbiology, S. Chand & Co Ltd. J. P. Soman, Practical Food Microbiology, Enkay Publishing House. 				
Reference Books	<ol style="list-style-type: none"> Neelima Garg, K.L. Garg, K.G. Mukerji, Laboratory manual of food microbiology. S. P. Narang, Food Microbiology, APH Publication Corporation. 				

Course Title	Lab Course XI				
Course Code	SBS06492				
Course Credits	L	T	P	TC	
	-	-	2	2	
Prerequisites	Food Science theory paper.				
Course Objectives	<ul style="list-style-type: none"> This course aims at enabling the students to know about the basic food science. 				
Course Contents	<ol style="list-style-type: none"> Food group- Grouping of foods, discussion on nutritive value. Measuring ingredients Methods of measuring different types of foods – grains, flours & liquids. Edible portion: Determination of edible portion percentage of different foods. Prevention of darkening in fruits & vegetables. Cooking methods Moist heat methods – (i) boiling, simmering, steaming, & Pressure cooking, (ii). Dry heat methods – baking. (iii) Fat as a medium for Coking-shallow and deep fat frying. Cooking of soaked and un-soaked pulses, Common preparations with pulses. Experimental cookery using vegetables of different color & textures. Common Preparations with vegetables. Preparation of soups and salads. Beverages Preparation of hot beverages- coffee, tea. Preparation of cold Beverages-fruit drinks & milk shake. Egg Experimental cookery- boiled egg, poached egg. Common preparations with egg. To make a caramelize food product. 				
Course Outcomes	<p>Student will be able to</p> <ul style="list-style-type: none"> Clear the basic concept of food group and measuring ingredient. Learn about the protein determination and preservation of food. Gain knowledge of cooking methods and experimental cookery. Able to beverages preservation. Clear the basic concept of egg cookery and caramelize food product. 				
Text Books	<ol style="list-style-type: none"> B. Srilakshmi, Food Science, New Age International Publishers. S. M. Reddy, Basic Food Science & Technology, New Age International Publishers 				
Reference Books	<ol style="list-style-type: none"> Mc William, M.(2001). Foods – Experimental Perspectives (4th Ed.), New Jersey: Prentice Hall Inc. Jameson K. (1998). Food Science – A Laboratory Manual, New Jersey:Prentice Hall Inc. 				

Course Title	Lab Course XII				
Course Code	SBS06493				
Course Credits	L	T	P	TC	
	-	-	2	2	
Prerequisites	Herbal Science theory paper.				
Course Objectives	<ul style="list-style-type: none"> This course aims at enabling the students to able gain knowledge and analytical level of practicing Herbal Science. 				
Course Contents	<ol style="list-style-type: none"> 1. Identification of herbal plan. 2. Collection and cultivation of herbs (herbarium). 3. Liquid diet of Herbal recipes. 4. Soft diet of Herbal recipes. 5. Normal diet of Herbal recipes. 6. Survey on the demand and requirement of Herbal products / formulations. 7. Product promotion techniques. 8. Product Branding and strategy. 9. Public awareness campaign on Health care need. 10. Uses and precautions of herbal products. 				
Course Outcomes	<p>Student will be able to</p> <ul style="list-style-type: none"> Identify and collection of herbs. Know about the general knowledge of herbal liquid and soft diet. Learn about the normal herbal recipes and survey of herbal products. Clear the general concept of product promotion and product branding. Know about the public awareness campaign and uses of herbal products. 				
Text Books	1. Sunita Pant Bansal, Healing Power of foods, VS Publications.				
Reference Books	<ol style="list-style-type: none"> 1. Thirugnanasambantham, et al. (2012). Introduction to Herbal Entrepreneurship, Rohini Institute of Alternative Medicine, 40/41, Spartan Avenue, Mugappair East, Chennai. 2. Robert Young, Herbal Nutrition, Inner Light Biological Research Foundation. 				