



ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION

Programme: B.Sc. Honours in Food Science and Nutrition (Major)

w.e.f. AY 2023-24

COURSE STRUCTURE

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits	
I	I	1	Introduction to Food Science and Nutrition	3+2	4	
		2	Health, Hygiene & Wellness	3+2	4	
	II	3	Food Science	3	3	
			Food Science Practical Course	2	1	
		4	Food Chemistry-I	3	3	
			Food Chemistry-I Practical Course	2	1	
II	III	5	Basic Nutrition	3	3	
			Basic Nutrition Practical Course	2	1	
		6	Food Service Management	3	3	
			Food Service Management Practical Course	2	1	
		7	Functional Foods and Nutraceuticals	3	3	
			Functional Foods and Nutraceuticals Practical Course	2	1	
		8	Food Processing and Preservation	3	3	
			Food Processing and Preservation Practical Course	2	1	
		IV	9	Human Physiology	3	3
				Human Physiology Practical Course	2	1
			10	Family and Community Nutrition	3	3
		Family and Community Nutrition Practical Course		2	1	
	11	Food Safety and Quality Control	3	3		
		Food Safety and Quality Control Practical Course	2	1		
	III	V	12	Therapeutic nutrition	3	3
Therapeutic nutrition Practical Course				2	1	
13			Food Microbiology	3	3	
			Food Microbiology Practical Course	2	1	
14			Biochemistry (OR) Sports Nutrition	3	3	
			Biochemistry (OR) Sports Nutrition Practical Course	2	1	

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits		
		15	Food hygiene and Sanitation (OR) Food packaging	3	3		
			Food hygiene and Sanitation (OR) Food packaging Practical Course	2	1		
	VI	Semester Internship/Apprenticeship with 12 Credits					
IV	VII	16	Food Product Development and Marketing (OR) Sensory Evaluation	3	3		
			Food Product Development and Marketing (OR) Sensory Evaluation Practical Course	2	1		
		17	Food Cost and Quality Control (OR) Clinical Nutrition	3	3		
			Food Cost and Quality Control (OR) Clinical Nutrition Practical Course	2	1		
		18	Research Methodology (OR) Nutrition Management in Disasters	3	3		
			Research Methodology (OR) Nutrition Management in Disasters Practical Course	2	1		
		SEC					
		19	Traditional Foods (OR) Principles of Culinary Science	3	3		
			Traditional Foods (OR) Principles of Culinary Science Practical Course	2	1		
		20	Nutrition and Diet Counselling (OR) Computer Applications in Nutrition	3	3		
			Nutrition and Diet Counselling (OR) Computer Applications in Nutrition Practical Course	2	1		
		VIII	21	Food Analysis (OR) Food Laws and Regulations	3	3	
	Food Analysis (OR) Food Laws and Regulations Practical Course			2	1		
	22		Food Additive, Contaminants and Toxicology (OR) Maternal and Child Nutrition	3	3		
			Food Additive, Contaminants and Toxicology (OR) Maternal and Child Nutrition Practical Course	2	1		
	23		Food and Nutrition Security (OR) Advanced Nutrition	3	3		
			Food and Nutrition Security (OR) Advanced Nutrition Practical Course	2	1		
	SEC						
	24	Mini Project Work (OR) Entrepreneurship in Food Industry	3	3			

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
			Mini Project Work (OR) Entrepreneurship in Food Industry Practical Course	2	1
		25	Nutritional Assessment Techniques (OR) Case Studies	3	3
			Nutritional Assessment Techniques (OR) Case Studies Practical Course	2	1

SEMESTER-I

COURSE 1: INTRODUCTION TO FOOD SCIENCE AND NUTRITION

Theory

Credits: 4

5 hrs/week

Objectives

- Understanding the role of foods in our daily life
- To gain knowledge of different plant and animal derived foods and their nutritive values and properties
- Understand the vital link between nutrition and health.

Course Outcome: On completion of the course, the students shall display ability to/ knowledge about

- Design food products that meet the various food regulations and laws.
- Comprehend the idea of food safety of the product and preserving it in good condition
- Plan adequate meals for different stages of life cycle to maintain health.
- Principles of diet therapy and different therapeutic diets.

UNIT – I

- Introduction to nutrition – Definition of nutrition, nutrients, and Food.
- Functions Of Food – Physiological, Social, Psychological and Emotional.
- Food Groups— Sources and functions of Basic five food groups.

UNIT- II

- Classification of Nutrients- Macronutrients and Micronutrients- Sources and functions.
- My Plate, Food Pyramid and portion size- Definition and Illustration
- Inter relationship between Food , nutrition and health.

UNIT-III

- Nutrition during Life cycle- Nutritional requirement for all age groups.
- Nutritional requirement during – Pregnancy, Lactation.
- Nutritional requirement during Childhood – Infancy (weaning) and school going.
- Nutritional requirements of youngsters- Adolescents and Adults.
- Geriatric Nutrition- Physiological changes and nutritional requirement.

UNIT- IV

- Nutrition During Disease- Classification of Diseases- Communicable and Non-Communicable, mode of transmission.
- Communicable diseases- Types, Diet and lifestyle modifications.
- Non-Communicable diseases- Types, Diet and lifestyle modifications.
- Relation Between Immunity, Health and Nutrition.

Unit -V

Research and standards organization of Food Science and Food Technology-

- Role and Function of the organizations.
- Nutritional research organization- ICMR-NIN, NNMB.
- Food Technology research organization- AFSTI, CFTRI, DFRL, NIFTEM.
- Food Standards- FSSAI, AMARK, FPO, MMPO.

References:

1. Food Facts & Principles by Shakunthala manay & Shadakhraswamy.
2. Food Science by Srilakshmi , second edition,2002
3. Food science, Chemistry and Experimental foods by M. Swaminathan.
4. Food Science by Norman.N.Potter.
5. Experimental study of Foods by Griswold R.M.
6. Food Science by Helen Charley.
7. Vijaya Khader, Text book of food science and technology, Indian council of Agricultural research New Delhi, 2001.
8. Stainley Sacharous. Roger C Griffin. Principles of food packaging 2nd Ed. Avi pub Co. Westport.
9. F.A. & Paine. H.Y. Leonard hill. A hand book of food packaging. Blackie Sons Ltd London.

Recommended Activities

- Visits to food industries
- Market survey of preserved fruits and vegetable products.
- Visit to food testing lab or any agency of food standards.

SEMESTER-I

COURSE 2: HEALTH, HYGIENE & WELLNESS

Theory

Credits: 4

5 hrs/week

Learning Outcome: On completion of the course a student shall

- Possess an understanding of the concept of good health and means to achieve it.
- Display the ability to identify the morphology, growth and reproductive features of various microorganisms
- Acquire the skills in various sterilization techniques

Theory

Unit I Health & wellness – Definition & meaning

- Dimension/ Elements of health and wellness – Physical, Social, Emotional, Intellectual, and Spiritual.
- Factors affecting Health and Wellness
- Indicators of health- concept of Mortality, Morbidity, Disability

Unit II Classification & Study of Microorganisms- in terms of morphology, growth, Nutrition and Reproduction

- Bacteria, Virus, Yeasts, Algae and Mould
- Beneficial Applications of Microorganisms in Food Industry, Agriculture and other areas.

Unit III Mode of infection

- Infection- sources, mode of transmission.
- Diseases caused by microorganisms-Symptoms, aetiology, mode of transmission of
 - a. Bacterial diseases- Typhoid, Tuberculosis, Jaundice, Dysentery;
 - b. Viral Diseases: Influenza, Measles, Poliomyelitis, AIDS
 - c. Parasite transmitted diseases- Malaria, Dengue, Filariasis.

Unit IV Prevention & Control

- Control of Micro-organisms – Sanitation, Sterilization & Disinfection- Physical and chemical method.
- Immunity- definition & types, Immunization schedule
- Hygiene - Meaning and importance of personal hygiene
- Standard precautions to prevent infections

Unit V Management of Health & Wellness

- Modern lifestyle and hypo-kinetic diseases; prevention and management through Physical exercise
- Stress, anxiety, and depression- Definition and concept
- Role of Yoga, asanas and meditation in maintaining health and wellness.
- Role of sleep-in maintenance of physical and mental health.

Suggested Activities

1. Demonstration of the use and care of Microscope
2. Demonstration of the Microscopic observation of different Microorganism
3. Visit to Diagnostic Laboratory
4. Demonstration of Slide Preparation & staining of molds.
5. Study of permanent slides of parasites.
6. Visit to Water treatment plant/Milk factories to assess sanitation
7. Hanging drop preparation to observe true motility of bacteria
8. First aid during cut, fractures, burns, accidents, shocks, unconscious, convulsions, Poisoning, foreign bodies in the eyes

References:

1. Frazier, W. Candwestnoff, D.C (1997) Food Microbiology, Tata McGraw Hill
2. A.S. Rao 2001 Introduction to microbiology, Prentice Hall of India
3. Anna k. Joshua, Microbiology, popular book depot, Madras
4. R. Ananthanarayanan, C.K.J. Paniker, 2001, Orient Longman Private Limited.
5. General Microbiology , 1982, power &Daginawala, Himalaya Publishing House
6. Stanier R. Y., Adelberg, E.A. and Ingraham, J.L. (1989) General Microbiology.
7. Atlas R. M. (1988) Microbiology, fundamentals and application. Micmillon N. Y.

SEMESTER-II

COURSE 3: FOOD SCIENCE

Theory

Credits: 3

3 hrs/week

Objectives: To enable students

1. Obtain knowledge of different food groups, their composition and role in diet.
2. To gain knowledge of different plant and animal derived foods and their nutritive values and properties.
3. Different methods of processing and cooking.

Learning outcomes:

1. Demonstrate and use the different methods of cooking
2. Understand the composition and nutritive value of both animal and plant food
3. Apply the different techniques to check the stages in sugar cookery.
4. Able to identify different structures and identification of spoilage of egg
5. Interpret the importance and functions of food and its nutrients

UNIT –I

Food groups: 8 hours

1. Basic food groups in foods and nutrition. Functional and objectives of food groups-energy yielding, body building and protective foods. Food Pyramid, My Plate.
2. Study of various cooking methods - Boiling, steaming, stewing, frying, baking, roasting, broiling, cooking under pressure.
3. Solar cooking and Microwave Methods-Advantages and disadvantages
4. Cereals – Structure, composition and nutrition of rice, wheat, milling process, cooking on parboiled and raw rice, principles of starch cookery, gelatinization.

UNIT –II 10 hours

1. Pulses and grams – Varieties of pulses & grams, composition, nutritive value, forms of pulses, effects of cooking, role of pulses in cookery, toxic constituents.
2. Vegetables - Classification, composition, nutritive value, selection and processing for cooking, methods and principles involved in cooking.
3. Fruits - Composition, nutritive value, changes during ripening, methods and effects of cooking, enzymatic browning.

UNIT –III 10 hours

1. Spices and Condiments - Uses and abuses. Fats and Oils - Types of oils, function of fats and oils, shortening effects of oil, smoking point of oil, factors affecting absorption of oil.
2. Sugar cookery- Stages of sugar cookery, crystallization and factors affecting crystallization.

UNIT –IV 10 hours

1. Milk - Composition, nutritive value, kinds of milk, pasteurization and homogenization of milk, changes in milk during heat processing, preparation of cheese and milk powder
2. Egg - Structure, composition, classification, nutritive value, uses of egg in cookery, methods of cooking, foam formation and factors affecting foam formation.

UNIT –V 10 hours

1. Meat -Structure, composition, nutritive value, selection of meat, post mortem changes in meat, aging, tenderness, methods of cooking meat and their effects.
2. Poultry – types, composition, nutritive value, selection, methods of cooking.
3. Fish - Structure, composition, nutritive value, selection of fish, methods of cooking and effects.

SEMESTER-II

COURSE 3: FOOD SCIENCE

Practical

Credits: 1

2 hrs/week

Learning Outcomes:

1. Knowledge on standardization of weights.
 2. Differentiate different methods of cooking
 3. Understanding different pre preparation methods and time saving procedures
 4. Able to calculate energies required for various health conditions
 5. Skill in preparation of score cards for sensory evaluations
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1. Measuring ingredients Methods of measuring different types of foods – grains, flours & liquids
 2. Cooking methods Moist heat methods – (i) boiling, simmering, steaming, & Pressure cooking, (ii). Dry heat methods – baking. (iii), Fat as a medium, Cooking-shallow and deep fat frying.
 3. Methods of cooking fine and coarse cereals. Examination of starch
 4. Cooking of soaked and unsoaked pulses, Common preparations with pulses.
 5. Experimental cookery using vegetables of different colours & textures. Common Preparations with vegetables. Preparation of soups and salads. Prevention of darkening in fruits & vegetables.
 6. Milk & milk products: Common preparation with milk, cheese & curd.-cheese curry & cooking vegetables in milk.
 7. Flesh foods: Fish, meat & poultry- preparations.
 8. Egg Experimental cookery- boiled egg, poached egg. Common preparations with egg.
 9. Beverages Preparation of hot beverages- coffee, tea. Preparation of cold Beverages-fruit drinks & milk shake.
 10. Sensory Evaluation and preparation of score card.

Reference Books:

1. Food science, Chemistry and Experimental foods by M. Swaminathan.
2. Food Science by Norman.N.Potter.
3. Experimental study of Foods by Griswold R.M.
4. Food Science by Helen Charley.
5. Foundation of Food Preparation by A.G. Peckam.
6. Modern Cookery for teaching and trade, volume I&II, Thangam Philip. OrientLongmans Ltd.
7. Food Fundamentals by MacWilliams, John Willy and son's, New York.
8. Food Facts & Principles by Shakunthala manay & Shadakhraswamy.
9. Food Science by Srilakshmi, second edition,2002.

Co-Circular activities

1. Student Seminars on different food groups
2. Collection of samples of different food products available in the market and studytheirnutrient composition and use in cookery.
3. Field visits – Visit to food processing units.
4. Field study – Survey on Food Additives used in various food products/ processed foods.
5. Collection of different ready to eat foods and processed foods.
6. Celebration of Important Days (National and International)
 - World Nutrition day-May 28th
 - Nutrition week (Sep 1st 7th)
 - World food day - October16th

SEMESTER-II

COURSE 4: FOOD CHEMISTRY

Theory

Credits: 3

3 hrs/week

Objectives: To enable students

1. To understand the chemistry of foods - composition of food, role of each component and their interaction.
2. To understand the functional aspects of food components and to study their role in food processing.

Learning outcomes:

1. Acquiring knowledge on components and functions cooking.
2. Understanding different formations of gels and solutions.
3. Gaining knowledge foaming agents
4. Discovering the effects of water activity
5. Gaining knowledge about biochemical changes in food

UNIT – I 8 hours

1. Definitions – Food, nutrients, principle components of foods, functions of foods
2. Classification of foods, properties of foods, physical, chemical, functional and kinetic properties.

UNIT –II 10 hours

1. Colloidal system in foods – meaning, types, properties.
2. Sols – meaning, types, properties:
3. Gels – meaning, type, properties, theory of gel formation, factors influencing gel formation.

UNIT – III 10 hours

1. Emulsion – meaning, types, properties, emulsifying agents, natural and synthetic emulsifier, functions of emulsifying agent, common food emulsions:
2. Foams – meaning, methods of foam formation, theory of foam formation, properties – factors influencing foam formation, factors affecting stability of foam, foaming agents – natural and synthetic.

UNIT – IV 8 hours

1. Water –Types of water, hydrogen bonding in water, water and ice properties, functions of water in food.
2. Water activity– definition, measurement and control of water activity, estimation of moisture in foods.

UNIT – V 10 hours

1. Heat transfer operations in foods – conduction, convection, radiation, gelatinization, retro gradation, dextrinization of starches
2. Enzymatic and non-enzymatic browning reaction in foods, rancidity – types and prevention. Biochemical changes in foods.

SEMESTER-II

COURSE 4: FOOD CHEMISTRY

Practical

Credits: 1

2 hrs/week

Learning Outcomes:

1. Practically applying different methods of thickening agents
 2. Identifying moisture content in foods
 3. Knowing sugar cookery- application in preparation of desserts and confectionaries.
 4. Determination of smoking points
 5. Identification of different Ph in foods to control microorganisms.
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1. To study the gelatinization temperature range & percentage sag of various cereal starches.
 2. To study dextrinization properties of various cereals and legumes.
 3. To study the development of gluten in various flours.
 4. To study the effect of enzymatic browning in fruits and vegetables and non enzymatic browning, caramelization in various sugars.
 5. Determination of P^H of foods.
 6. Determination of Moisture content in foods.
 7. To study pasteurization of milk & fruit juices.
 8. Specific gravity of fats and oils

Reference Books:

1. Food science, Chemistry and Experimental foods by M. Swaminathan.
2. Food Science by Norman.N.Potter.
3. Experimental study of Foods by Griswold R.M.
4. Food Science by Helen Charley.
5. Foundation of Food Preparation by A.G. Peckam.
6. Modern Cookery for teaching and trade, volume I&II ,Thangam Philip. OrientLongmans Ltd.
7. Food Fundamentals by MacWilliams, John Willy and son's, New York.
8. Food Facts & Principles by Shakunthala manay & Shadakhraswamy.
9. Food Science by Srilakshmi , second edition,2002.

Co-Circular activities

1. Preparation of poster, charts, ppt and videos on different concepts
2. Seminar presentation, Quiz, JAM and fun games on food system
3. Celebration of weeks related to food and nutrition
4. Visits to various food industry and record the process
5. Food mela for monthly once with on well balanced diet

SEMESTER-III

COURSE 5: BASIC NUTRITION

Theory

Credits: 3

3 hrs/week

Objectives: To enable students

1. Understand the vital link between nutrition and health.
2. Gain knowledge on functions, metabolism and effects of deficiency of nutrients

Learning outcomes:

1. Knowledge on dietary foods and its importance
2. Learning about deficiency symptoms macro nutrients
3. Understanding energy imbalances and RDA calculations
4. Able to calculate energies required for various health conditions.
5. Skilled to give diet counselling and ORS supplements

UNIT-I -10 hours

1. Energy - Definition of Kilocalories, Joule, energy value of foods. Basal metabolic rate- definition, factors influencing BMR. Recommended Dietary Allowances for energy. Energy imbalance: undernutrition and obesity.
2. Carbohydrates – Classification, functions, source, utilization, Sources Role of dietary fiber in human nutrition.

UNIT-II -10 hours

1. Protein - Functions, sources and requirements, utilization, Protein quality – PER, BV, NPU, digestibility coefficient.
2. Essential amino acids, their importance.
3. Fats and Lipids – Classification of Fatty acids, functions, sources, requirement, importance of essential fatty acids, their requirements and deficiency.

UNIT-III -10 hours

1. Vitamins – Fat soluble vitamins –A, D, E and K- functions, source, requirements, deficiency disorders.
2. Vitamins – Water soluble vitamins –The B-complex vitamins – Thiamine, Riboflavin, Niacin, Folic acid, Biotin, Pantothenic acid, B12 and Vitamin C - functions, source, requirements and deficiency disorders.

UNIT-IV-10 hours

1. Minerals - General functions in the body, classification- macro and micro minerals. Micro minerals – Iron, Fluorine, Zinc, copper, Iodine -functions, absorption, utilization, requirements, deficiency and toxicity.
2. Macro minerals – Calcium & phosphorus - functions, absorption &utilization of iron, deficiency and toxicity.

UNIT-V -10 hours

1. Water Balance – Functions of water, water distribution, maintenance of water and regulation of acid-base balance in the body
2. Disturbances in fluid balance – Dehydration, oedema and water toxicity

SEMESTER-III

COURSE 5: BASIC NUTRITION

Practical

Credits: 1

2 hrs/week

Learning Outcomes:

1. Skills on selection of seasonal foods for planning of nutrient foods
2. Planning sessions for different combinations of foods
3. Critical analysis on sensory evaluation
4. Awareness on government schemes on food system.

(PRACTICAL)

1. Menu Planning and preparation of combination foods for different age groups
2. Plan and calculate one recipe mentioning the portion size and nutritive value of each.
3. Study of the nutritive foods supplied by the government through ICDS projects during the current 5 year plan.
4. Preparation and calculation of nutritive values of low-cost weaning foods.

Reference Books:

1. Essential of food & Nutrition –Vol. 1 M. Swaminathan, Bappco,Bangalore.
2. Human Nutrition and Dietetics –Davidson S. Passmore
3. Normal and Therapeutic Nutrition- Corinne. H.Robinson & Marilyn Lawler
4. Contemporary Nutrition - Gordon M. Wardlaw, Paul Insel et, al., (2000) Mosby,Chicago.
5. Nutrition- concepts and controversies- Eleanor Whitney –Eighth Edition (2000)
6. Basic principles of Nutrition- Seema Yadav, First edition (1997)
7. Essentials of Nutrition and Diet therapy -Sue Rodwell Williams, fifth edition, Times Mirror Mosby College Publishing, 1990.
8. Understanding Nutrition -Whitney P.N. and Roes S.R., West Publication Co, 1996.

Co-Circular activities:

1. Student seminars on different nutrients.
2. Preparation of posters, charts, flashcards etc. related to different nutrients – Functions, RDA dietary sources, nutrient content of foods and deficiency symptoms.
3. Collections of food samples rich in particular vitamins and minerals like calcium, iron etc.
4. Visit to food stores, vegetable and fruit markets to study locally available foods.
5. Study projects to collect the data from people. Eg. Foods avoided or given in specific conditions.
6. Celebration of Important Days (National and International)
 - World's Breast Feeding Week(August 1st - 7th)
 - Nutrition Week – September 1st - 7th
 - Nutrition Month – September month
 - Hand Washing Day – October 15th
 - World Food Day – October 16th

SEMESTER-III

COURSE 6: FOOD SERVICE MANAGEMENT

Theory

Credits: 3

3 hrs/week

Objectives: To enable students

1. Understand the principles of planning, organizing and controlling hospital food service.
2. Develop skills in meal planning, production and service.
3. Understand the principles of sanitation and hygiene in hospital food service units.

Learning objectives:

1. Standardize production of recipes and evaluate and price menus.
2. Understand the different purchasing methods, product specifications and standards.
3. Plan, organize and implement large scale production and distribution of food.
4. Manage food service and understand different food and beverage service techniques.
5. Execution of planning and accounting for production scale.

UNIT I- 8 hours

1. Food service definition and factors, equipment used for serving the food, food service systems.
2. Types of food service system-Traditional, Convectional, Centralized and decentralized services, Commissary, Ready prepared, assembly services, Cryogenic chill system.
- 3.

UNIT-II-10 Hours

1. Table Service Styles: Types of Table service styles- Banquet services, Restaurant services, Buffet
2. Services, self-service, tray service, trolley, waiter services, Travel services, Canteen services, portable services, vending and Kiosk. Food services in selected areas- schools, hospitals. Restaurant, industries, Hotels.

UNIT III- 10 hours

1. **Physical requirements:** Kitchen area – Size and type of kitchen, design of kitchen, ventilation, lighting, flooring, carpets, wall covering and sample layout of kitchen.
2. Storage area – Meaning, types of storage, infrastructure, sanitary measures and safety storage of food materials.
3. Equipment - Equipment required for hospital food service - major and minor equipment with reference to food storage, preparation, holding and food service.

UNIT IV -10 hours

1. **Purchasing** – Meaning of purchase and buying methods. Receiving & Storing – Importance of receiving raw materials and storage procedures.
2. Production – Menu planning for patients and process of food production. Holding of foods – methods and specifications.
3. Cleaning – Meaning of cleaning, dishwashing, types of cleaning & sanitizing agents, bleaches and disinfectants.

UNIT V -10 hours

1. **Management** - Definition, principles and techniques of effective management, leadership and managerial abilities (in a hospital & dietary).

2. Tools of management - organisational chart of the food service team of the hospital.
3. Accounting - Definition and principles. Journal and ledger. Book of account – Cash book, purchase book, sales book, purchase returns & sales returns book.

SEMESTER-III

COURSE 6: FOOD SERVICE MANAGEMENT

Practical

Credits: 1

2 hrs/week

Learning Outcomes

1. Menu planning as per different cuisine, as per different service styles
2. Standardization of recipes- standardization of 11, 10,50,100 servings
3. Preparation of large-scale meal (optional)
4. Visits to star hotels and food service units of industries- to observe kitchen layout, table setting
5. Market survey to know the availability of large-scale food preparation equipment/ tools

Practical

1. Standardization of recipes
2. Observation of raw and prepared food storage in hospitals and hotels
3. Observation of pest control program.
4. Organisation chart and identification of duties in a local hospital and hotels
5. Records maintained in a dietary department.
6. Purchasing methods for food items.
7. Visit to different hotels kitchen and hospital kitchen
8. Market survey on different industrial equipment's.

Reference Books:

1. Sethi M and Mahan S.-Catering Management an integrated approach , 2006, 2nd edition, John wiley & Sons, New York.
2. Tersel MC and Harger – Profession food preparation , John wiley & Sons, New York.
3. Joan C Boason , Lennox M.-Hotel, hostel & hospital housekeeping , 2004, 5th edition, Book power publishers, New York.
4. Mcswane D, Linton R – Essentials of food safety & sanitation, 1998, Prentice hall international, London.

Co-Circular activities:

1. Preparation of posters, charts, videos
2. Small scale cooking and selling food
3. Budget planning for the above mela
4. Visiting to small scale and large scale industries
5. Visiting hotels to check different storage rooms
6. Maintaining record in the lab

SEMESTER-III

COURSE 7: FUNCTIONAL FOODS AND NUTRACEUTICALS

Theory

Credits: 3

3 hrs/week

Objectives: To enable the students

1. To develop comprehensive understanding of different nutraceuticals and functional
2. foods
3. To understand phytochemical components and its management on health and diseases.
4. To understand the potential of various functional foods in promoting human health

Learning outcomes:

1. To gain knowledge on Functional foods and their effects on human health.
2. To apply knowledge the role of antioxidants, polyphenols, omega-3 fatty acids, to prevent different physiological disorders.
3. Application of probiotics and prebiotics for gut health
4. Development of personalized foods
5. Knowledge of fortified foods for health benefits.

Unit I-10 hours

1. Functional foods and Nutraceuticals -Definitions, sources, Health benefits, bioactive components of functional foods.
2. Development of functional foods, challenges and safety considerations, Future trends of functional foods.
3. Dietary supplements and fortified foods- need, health benefits adverse effects

Unit II-8 hours

1. Functional foods of animal origin: Dairy products, sea foods, egg,
2. Functional foods of plant origin: fruits, vegetables, nuts, spices, cereals, beverages.
3. Probiotics, prebiotics and symbiotic as functional foods, Effects of probiotics on health.

Unit III-10 hours

1. Types of functional foods: whole foods, enriched foods, enhanced foods, fortified foods, modified foods.
2. Market of functional foods, Challenges for Functional food delivery
3. Factors affecting consumer interest.

Unit IV-10 hours

1. Diet and disease relationship – nutrition and health claims
2. Food component – approved health claims, labeling considerations for functional ingredients, Permissible and impermissible functional claims
3. Role of biotechnology in the development of functional foods.

Unit V-10 hours

1. Nutraceutical compounds – Phytochemicals, phytosterols and other bioactive compounds.
2. Peptides and proteins, carbohydrates, prebiotics, probiotics and symbiotic, lipids, vitamins and minerals; their sources and role in promoting human health.

SEMESTER-III

COURSE 7: FUNCTIONAL FOODS AND NUTRACEUTICALS

Practical

Credits: 1

2 hrs/week

Learning Outcomes:

1. Knowledge on research analysis
2. Development of shelf life study
3. Formulation of health benefit products

PRACTICAL)

1. Market research analysis of functional foods
2. Market survey of locally available functional foods
3. Formulation of the functional foods and assessment of its nutritional value.
4. Formulation of the food products using nutraceuticals
5. Shelf-life studies on developed functional foods

References:

Text Book(s)

1. N. Shakuntalamanay and M. Shadaksharaswam, Food Facts and Principles,3/e, New Age International, 2008.
2. L. Branen, P. M. Davidson and S. Salminen, Food Additives. 2/e, Marcel Dekker, 2001.
3. B. Gerorge, Encyclopedia of Food and Color Additives, Vol. III, CRC Press,1996.
4. A. B. Gerorge. Fenaroli's Handbook of Flavor Ingredients. 5/e,.CRC Press,2004.
5. D. L. Madhavi, S. S. Deshpande and D. K. Salunkhe, Food Antioxidants:Technological, Toxicological and Health Perspective. CRC press, 1995.
6. D. Morton and A. J. Macleod, Food Flavours, Part C, Elsevier, 1990

Co-Circular activities:

1. Collection of samples of different food products available in the market and check the nutritive label.
2. Field visits – Visit to food processing units.
3. Field study – Survey on Food Additives used in various food products/ processed foods.
4. Collection of different ready to eat foods and processed foods
5. Formulation of small food products and go for sensory evaluation
6. Rally on food awareness and health benefits.
7. Celebration of Important Days (National and International)
 - World Nutrition day-May 28th
 - Nutrition week (Sep 1st 7th)
 - World food day - October 16th

SEMESTER-III

COURSE 8: FOOD PROCESSING AND PRESERVATION

Theory

Credits: 3

3 hrs/week

Objectives: To enable students

1. To enable students to learn different methods of processing of plant and animal derived foods.
2. To understand the principles of food preservation and acquire skills in methods of food preservation

Learning objectives:

1. Knowledge on importance of food preservation
2. Application of various food by chemical and sugar to increase shelf life
3. Understanding concepts of fermentation
4. Identification of food additives and its usages
5. Comprehend the use of different temperature in food processing

UNIT I-10 hours

1. Principles of food processing and preservation- Preservation by Low and high temperatures, Canning, osmotic pressure, dehydration & drying, Irradiation. & use of Preservatives
2. Food additives, Definition, types, importance and industrial uses of Food additives.

UNIT-II -8 hours

1. Sugar concentrates: Preparation and preservation of fruit juices, RTS, Preparation of jams and jellies, marmalades, squashes, candid's, crystallized fruits
2. Chemical preservations: definition, role of preservation, permitted preservatives, FPO specifications.

UNIT III- 8 hours

1. Introduction to food processing: Principles of different food processing-membrane filtration, pulse electric, high pressure processing, hurdle technology.
2. Methods of Processing and milling of wheat, rice, corn barley, oats, other millets and fortified flour
3. Processed foods- bakery products, pasta, value added products.

UNIT IV-10 hours

1. Milling, processing of edible oil, meal, flour, protein concentrates and isolates, snack food, development of low-cost protein foods
2. Manufactures of different types of milk, drying methods of whole and skim milk, separation of cream, churning of butter, processing of cheese, probiotic milk product- yoghurt, ice cream, indigenous milk products-Channa, panner, gulab jamun, lassi, srikhand etc.

UNIT V -10 hours

1. Canning, drying, cooking, curing, pickling, smoking, kebabs, salads, sausages, corned, minced, whole egg powder, egg yolk powder, fish protein concentrates, fish oils
2. Food fortification and enrichment -current trends & applications. fermented food products.

SEMESTER-III

COURSE 8: FOOD PROCESSING AND PRESERVATION

Practical

Credits: 1

2 hrs/week

Learning outcomes:

1. Analyze different drying methods and food concentration methods
2. Understand the role of chemicals, natural preservatives
3. Gain knowledge between various freezing methods and its changes
4. Identification of adulterated foods

Practical

1. Methods of Food Preservation using salt and sugar.
2. Drying and Dehydration
3. Food Adulteration tests for some common foods.
4. Preservation and bottling of fruit and vegetable products.
5. Preservation by using chemicals
6. Sensory analysis of preserved and processed foods.

BOOKS AND JOURNALS

1. Sri Lakshmi B (2004) Food Science. New Age Int.
2. Pecham GG, Foundation of food preparation. 1972. Mac millan Pbs.
3. Subbulakshmi G and Udipi A. 2004. Food Processing and Preservation techniques. New Age Int.
4. Swaminathan M (1992) Handbook of Food Science and Experimental foods. 2nd Ed. Bangalore.
5. Potter NH and Hotchkiss JH (1996) Food Science. 5th ed.. New Delhi, CBS pbs.
6. Sethi M and Rao SE (2001) Food science experiments and application. CBS pbs. New Delhi.
7. Journal of Food chemistry
8. Indian food Industry Journals- AFST Pbs
9. J of Food Sc. And Technology- AFST Pbs.

Co-Circular Activities:

1. PowerPoint presentation showing examples of raw food products and the final products they may be turned into.
2. Processing may include: crushing, grinding, pressing, flaking, chopping, peeling, pitting, dehydrating, canning, freezing, pickling, smoking, salting, bottling, or bagging.
3. Seminar in community preparation of different preservation and processing
4. Preparation and Sale on food preservation by the students

SEMESTER-IV

COURSE 9: HUMAN PHYSIOLOGY

Theory

Credits: 3

3 hrs/week

Objectives: To enable students

1. Understand the structure and functions of various organs of the body.
2. Understanding of the physiology of various organ systems in human body.

Learning outcomes:

1. Gain knowledge on structure of different organs
2. Comprehend different mechanism action of organs
3. Acquire knowledge on biochemical test for assessment of clinical symptoms
4. Understand the physiology of different organs and its connection
5. Relate the different enzymes involved absorption and digestion of food

UNIT-I -8 hours

1. Cell - Structure and functions. Tissues - Structure and functions
2. Digestive system - Anatomical consideration – structure & functions, Brief study of the organization of the digestion, absorption and assimilation of carbohydrate, protein and fat. Structure, function of liver, gall bladder and pancreas

UNIT-II-10 hours

1. Blood and its composition, functions RBC, sWBC, Platelets and Lymph.
2. Clotting factor, blood grouping and blood transfusion and Rh factor.
3. Circulatory system - Heart structure and functions, blood vessels, types of circulation. Cardiac cycle and cardiac output, Blood pressure and its factors affecting blood pressure.

UNIT-III -10 hours

1. Respiratory system - Basic Physiology of the respiratory system, process of respiration, mechanism of transport and exchange of oxygen and carbon di oxide in the body. Oxygen dissociation curve, tidal values
2. Endocrine glands - Structure and function of pituitary, thyroid, parathyroid, islets of Langerhans and adrenal gland.

UNIT-IV -12 hours

1. Reproductive system - Physiology of the male and female reproductive organs. Menstrual cycle. Pregnancy and associated changes.
2. Sense organs - Structure and function of eye, ear, nose, tongue and skin.

UNIT-V -10 hours

1. Excretory system - Excretory organs - structure of kidney and functions, formation of urine, composition of urine.
2. Central nervous system - Physiology of the nerve cell, parts of the central nervous system and function.

SEMESTER-IV

COURSE 9: HUMAN PHYSIOLOGY

Practical

Credits: 1

2 hrs/week

Learning outcomes:

1. To identify different tissues
2. Assessment of different biochemical parameters
3. Acquire knowledge on blood grouping
4. Complete picture on CBC count

Practical

1. Identification of tissues
2. Bleeding time, Clotting time
3. Blood groups – identification
4. Measurement of Hemoglobin
5. Measuring Pulse Rate, Measuring Blood Pressure
6. RBC, WBC – demonstration

Reference Books:

1. Chaterjee, C.C., Human Physiology, Vol-I&II Medical allied agency, Calcutta 1981.
2. Best and Taylor, Living body. Mc.Graw hill company, Newyork.
3. Sathya Narayana, Essentials of Biochemistry (2000).
4. Saratha Subramanian, Text of Human Physiology(2000).
5. Stuart Ira Fox, Human Physiology(2003)

Co-Circular activities

1. Preparation of posters, charts, ppt of different organs
2. Model making of different mechanisms of organs
3. Visits to different lab to learn the techniques of blood samples
4. Seminar, quiz, JAM and games for improving knowledge
5. Week celebration related to human organs- Heart day, Aids day, Hypertension week, Diabetes week

SEMESTER-IV

COURSE 10: FAMILY AND COMMUNITY NUTRITION

Theory

Credits: 3

3 hrs/week

Objectives: To enable students

1. Understand the nutritional demands in various stages of life cycle.
2. Acquire skills in planning adequate meals in different stages of life cycle to maintain health.

Learning Outcomes:

1. Comprehend dietary guidelines and menu planning
2. Skills in planning a balanced and menu plan for all age groups
3. Aware of all complication and risk factors during pregnancy and lactation
4. Acquire knowledge of epidemiological aspects
5. Excel in assessment of nutritional status in community

UNIT I-8 hours

1. Basic Principles of Meal Planning –Basic Principles & factors to be consider while planning menu for different age groups
2. Recommended dietary allowances for adults with different lifestyles (sedentary, moderate, heavy workers) and nutritional requirement, reference man and reference woman.

UNIT II-10 hours

1. Nutritional Needs during Pregnancy – Physiological and psychological changes, hormonal changes and weight change, symptoms, complications, Nutritional requirements, &meal planning.
2. Nutritional needs during Lactation - physiology of lactation, hormonal control, nutritional components of colostrum and mature milk. Nutritional requirements of lactating women, galactagogues, Meal planning.

UNIT III- 10 hours

1. Nutrition during Infancy - Growth and development, factors influencing growth, , exclusive breastfeeding and its benefits, difference between breast feeding and bottle feeding, factors to be considered in bottle feeding, different types of milk formulae available commercially.
2. Weaning Foods – Preparation of Weaning foods, types of weaning food. Uses of growthchart to monitor growth & development. Nutritional requirements of infants“ upto oneyear. Problems of feeding in normal and premature infants.
3. Nutritional needs of toddlers (1-5 year) &School children - Nutritional requirements of toddlers &school going children. Factors to be considered while planning meals for pre-school children. Eating problems of children and their management, packed lunch.

UNIT IV -10 hours

1. Nutrition during Adolescence - Physical growth and changes. Nutritional requirement, nutritional problems in adolescence- anemia, obesity, eating disorders of adolescent-anorexia nervosa, bulimia nervosa and binge eating. Nutrition in Menopausal women- hormonal changes.
2. Nutrition during Old Age - Physiological changes in ageing- psycho-social factors effecting nutrition. Nutritional problems of aged and their nutritional and dietary management.

UNIT V-10 hours

1. Definition of community nutrition and its scope and functions
2. Direct methods of nutritional assessment-Anthropometry, Biochemical, Clinical and Dietary assessment, Biophysical assessment.
3. Indirect methods- Ecological factors, vital statistics

SEMESTER-IV

COURSE 10: FAMILY AND COMMUNITY NUTRITION

Practical

Credits: 1

2 hrs/week

Learning Outcomes:

1. Skills in preparation of different menu plans for different age groups
 2. Acquire knowledge on meal planning, meal management and portion sizes
 3. Application of variety of food according to age group and nutritional requirement
-
1. Standardization of portions for cooked food.
 2. Preparation and serving the planned menu for men and women of different occupations.
 3. Planning a low-cost balanced menu for a pregnant mother and display.
 4. Planning a low-cost balanced menu for a lactating mother and display. Calculation of nutritive value for the prepared menu.
 5. Planning and preparing diet for infants and preschool children
 6. Packed lunch planning for school going children.
 7. Menu planning for and adolescent girls and boys.
 8. Menu planning for adult Man and Woman (moderate man and sedentary woman).
 9. Preparation of diet for old age.

Reference Books:

1. Nutrition Trends in India - Vinodhini Reddy, Prahlad Rao, Govmth Sastry and Kashinath, NIN, Hyderabad, 1993.
- 2 Modern Nutrition in Health and Diseases- Shills, E.M. Olson, A.J. and Shike, Lea and Febiger
3. Dietetics -B. Srilakshmi, New Age International Pvt. Ltd, 2003.
- 4.NutritionScience-B.Srilakshmi,NewAgeInternationalPvt.Ltd., 2003.
- 5.Food,nutrition and diet therapy -Krause, Eleventh edition
6. Human Nutrition and Dietetics- Davidson S Passmore R, Brock JP, ELBS and Churchill, Livingstone.
- 7.Fundamentals of foods and Nutrition - Mudambi SR and Rajagopal M Y, Wiley Eastern Ltd.
- 8.ICMR- Nutritive value of Indian Foods, 1989.
- 9.Nutrition throughout the life cycle, Bonnie S.Worthinton, Roberts, Sue Rod well Williams.,The McGraw- Hill company,1996.
- 10.Nutrition in the life span- Virginia Beal, John Wiley & sons New York.

Co-Circular activities:

1. Academic based: -
 - Preparation of charts and posters for Nutrition education
 - Essay writing competitions
 - Group discussions on topics relevant to community nutrition
 - Exhibition on low cost nutritious foods and balanced diet
1. Lab/Research based: -
 - Visit to Anganwadi centre

- Visit to school lunch programs
- Visit to village and urban slum area for assessing the nutritional status of rural and urban slum population

2. Value based: -

- Nutrition and Health awareness camp
- Poster and puppet show regarding nutrition education and importance of community participation

3. Celebration of Important Days (National and International): -

- Breast feeding week-August 1 to 7th
- International Women's day-March 8th
- World Health day-April 7th
- International day of elderly-October 1st

SEMESTER-IV

COURSE 11: FOOD SAFETY AND QUALITY CONTROL

Theory

Credits: 3

3 hrs/week

Objectives: To enable the students

1. To gain knowledge about food laws and standards for food quality
2. To know about food additives and quality control of foods.

Learning outcomes:

1. Identify and examine the methods for measuring food attributes.
2. Understand and estimate the principles of sensory evaluation of food products.
3. Acquire skills in selection and training of sensory panel.
4. Skills on grading of foods
5. Knowledge on National and international standardization protocols

UNIT-I -8 hours

1. Principles of Quality control of foods –Raw material control, processed food control and finished product inspection.
2. Leavening agents- classification, uses and optimum levels.
3. Food additives - Preservatives, coloring, flavorings, sequestering agents, emulsifiers, antioxidants.

UNIT-II -10 hours

1. Standardization systems for quality control of foods: -National and International standardization system, GMP, GHP. ISO, TQM, PFA, AGMARK. FSSAI
2. Different types of food grade materials.
3. Food adulteration - Common adulterants in foods and tests to detect common adulterants.

UNIT-III -10 hours

1. Standards for foods: Cereals and pulses, milk and milk products, Coffee, tea, sugar and sugar products.
2. Food packaging and labelling methods – Recent trends

UNIT-IV -8 hours

1. Sensory assessment of food quality-appearance, color, flavour, texture and taste,
2. Different methods of sensory analysis, preparation of score card, Panel criteria, sensory evaluation room.
3. Sensory evaluation- (Differential test, Rating test, Sensory threshold test)

UNIT-V -10 hours

1. Food safety, Risks and hazards: Food related hazards
2. Microbial consideration in food safety
3. HACCP-principles and structured approach.

SEMESTER-IV

COURSE 11: FOOD SAFETY AND QUALITY CONTROL

Practical

Credits: 1

2 hrs/week

Learning outcomes:

1. Exhibit skills in quality assessment of food materials.
2. Evaluate techniques related to quality assessment of food products.
3. Knowledge on equipment's used in different labs

Practical

1. Market survey of preserved fruits and vegetable products.
2. Visit to food testing lab or any agency of food standards.
3. Nutrition labeling requirements and developments.
4. Simple tests for food adulteration.
5. Case study on food safety issues – ICDS/MDM, Diarrheal our break / any other.

Reference Books:

1. Food science-Norman potter
2. Food Technology-Presscott.S.C.and Procter
3. Food chemistry-Meyer
4. Food science, Chemistry and experimental foods-M.Swaminathan
5. Food chemistry-Lee
6. Food science-Srilakshmi(2001)2nd edition, New age international publishers-(2001)
7. Rerfus.K.Guthrie-Food sanitation –3rd edition –Van Nostrand Reinhold Newyork 1988.
8. Mahirdra-S.N.-Food safety –A techno-legal analysis-Tata McGrawhill publishers 2000.
9. Manoranjan Kalia-Food processing and preservation.
10. Roday-Food hygiene and sanitation.
11. Indian Food industry,2000, Vol19:2

Co-Circular Activities:

1. Visit to food processing industries to understand the principles and methods of quality control and assurance in foods.
2. Visit to food testing lab or any agency of food standards.
3. Adulteration demonstration in the community
4. Recording the labelling of food items purchases
5. Packaging techniques to be initiated in the lab
6. Ppt and development of labelling

SEMESTER-V

COURSE 12: THERAPEUTIC NUTRITION

Theory

Credits: 3

3 hrs/week

Objectives: To enable students

1. Gain knowledge about principles of diet therapy and different therapeutic diets.
2. Develop aptitude for taking up dietetics as a profession.

Learning outcomes:

1. Understands about modification of normal diets to therapeutic diets.
2. Skills in Planning and preparation of diets for different diseases like Obesity, Cardiovascular, Renal, Diabetes mellitus etc,
3. Assessment on nutritional status
4. Acquire knowledge of IV feeds
5. Comprehend on calculation of various disease conditions

UNIT – I -10 hours

1. **Objectives of diet therapy** - Role of a dietitian. Principles of diet preparation and counselling.
2. Therapeutic diet: clear fluid, full fluid, semi soft diet, soft diet, bland diet and regular diet
Different types of Feeding - Basic concepts of oral feeding, tube feeding, IV feeding, gastrostomy feeding.

UNIT – II -10 hours

1. Underweight and Obesity - definition, etiology, complications, risk factors, types and nutritional requirement
2. Diseases of the gastro intestinal tract- peptic ulcer, constipation & diarrhea
3. Diet in febrile conditions - Short duration e.g. Typhoid, Long duration e.g. Tuberculosis.

UNIT – III -10 hours

1. **Cardiac disease:** Atherosclerosis-etiology, complication, symptoms, dietary management.
Hypertension-types, etiology, complication, symptoms, dietary management.
2. **Liver disease: Hepatitis-** types, etiology, complication, symptoms, dietary management.
Liver cirrhosis- etiology, complication, symptoms, dietary management.

UNIT – IV-10 hours

1. **Diabetes mellitus** – Types, causes, symptoms, bio-chemical changes, insulin therapy, dietary management.
2. **Renal disease:** Acute and chronic nephritis, Nephrotic syndrome, Renal failure, Urinary calculi: Causes and dietary treatment of kidney diseases and dialysis, ESRD (End Stage Renal Dialysis).

UNIT – V -10 hours

1. **Nutrition and cancer-** types, symptoms, complications and Dietary guidelines for management.
2. **Diet in Allergy** - Definition, classification, common food allergy, test of allergy, diet therapy.
Diet in relation to deficiency diseases-Protein calorie deficiency, vitamin A deficiency and anemia.

SEMESTER-V

COURSE 12: THERAPEUTIC NUTRITION

Practical

Credits: 1

2 hrs/week

Learning Outcomes:

1. Demonstrate the ability to plan hospital diets for different health conditions
2. Be familiar with all clinical condition that impact diet planning.
3. Possess hands-on knowledge of physiology of diseases, to be considered in diet planning under different disease conditions
4. Be qualified to take up career as a diet planner in a hospital

Practical

1. Planning and preparation of hospital diets a. normal diet, regular diet, light diet, soft diet, full liquid diet, clear liquid diet & bland diet.
2. Diet for obesity & under weight
3. Diet for anaemia
4. Diet for diseases of the GI tract – peptic ulcer, diarrhea, constipation.
5. Diet for Cardio-vascular diseases- atherosclerosis, hypertension.
6. Diet for diseases of the kidney – nephritic and nephrotic syndrome.
7. Diet for diabetes mellites
8. Diet in febrile conditions- Short duration – typhoid; long duration – tuberculosis
9. Diet in liver diseases – Viral hepatitis and cirrhosis
10. Preparation of power point presentations on diet and disease conditions

Reference Books:

1. Krause and Mahan – Food ,Nutrition and Diet therapy, 6th Edition W.B. Saunders company, London
2. Normal and therapeutic nutrition –17th Edition, Robinson et. al ., Mac Millan Pub.Co., New York
3. ICMR(1989) Nutrient Requirements and recommended dietary allowances for Indians.
4. Antia FP (1987) Clinical Dietetics and Nutriton, Oxford University Press, New Delhi
5. Srilakshmi (2002) Dietetics, IVth Edition. New Age International (P) Limited, Publishers, New Delhi
6. Shubhangini. A. Joshi (2002) Nutrition and dietetics, Tata Mc Graw- Hill publishing company limited, New Delhi.
7. B. Srilakshmi (2002) Nutrition science, New age international (P) limited, New Delhi
8. Carolyn E. Townsend and Ruth A. Roth (2002) Nutrition and Diet Therapy, Delmar publisher
9. Sue rod Williams, Nutrition and diet Therapy, Times Mirror Mosby College publishing, Boston, 1989.
10. The Indian journal of nutrition and dietetics, Avinashilingam Deemed University, Coimbatore

Co-Circular Activities:

1. Academic based: -
 - Visit to dietetics Dept. and diet counselling centre
 - Exhibition on therapeutic diets

- Diet plans and laboratory reports
- 2. Research based: -
 - Case studies
 - Project work on assessment of obesity among staff members and students of the college
- 3. Value based: -
 - Clean and green, nutrition games
 - Drama, dance, and music to propagate and promote nutrition education
- 4. Celebration of Important Days (National and International): -
 - World Diabetes day -November 14th
 - World Cancer day -February 4th
 - World Health day -April 7th
 - National Cancer Awareness Day-Nov 7th

SEMESTER-V

COURSE 13: FOOD MICROBIOLOGY

Theory

Credits: 3

3 hrs/week

Objectives: To enable students

1. To know the important genera of microorganisms associated with food and their characteristics.
2. To understand the role of microbes in fermentation, spoilage and food borne diseases.

Learning Outcomes:

1. Understanding the concept of sterilization and disinfectant
2. Knowing about the microbial analysis and assessment and comparing with indices
3. Comprehending importance of microbes in food fermentation.
4. Learning different staining techniques and isolation methods
5. Knowing about factors effecting microorganisms' survival and practically applying it

UNIT 1

1. History and Development of Food Microbiology. Definition and Scope of food microbiology.
2. General characteristics of bacteria, molds, virus and yeast- Beneficial effect of microorganisms. Types of microorganisms associated with food, their morphology and structure.

UNIT2. -10 hours

1. **Cultivation of Micro-organisms:** Methods of isolation and cultivation, Serial dilution method, Pure culture technique.
2. **Microbial Growth in Food:** Bacterial growth curve and microbial growth in food. Factors affecting the growth of micro organisms in food, effect of environmental factors in growth of microorganism - pH , water activity , oxygen availability, temperature and others.

UNIT3: 10 hours

1. **Microbial Food Spoilage:** Sources of Microorganisms in foods.
2. Spoilage of specific food groups- Milk and dairy products, Meat, poultry and seafoods,
3. Spoilage of specific food groups -Cereal and cereal products, Fruits and vegetables and Canned products.

UNIT4. 10 hours

1. **Foodborne Diseases:** Microbial intoxication and infections:
2. Common and Recent Examples of Food borne out breaks. Food borne diseases: Bacterial, and viral foods-borne disorders, Food-borne important animal parasites, Mycotoxins.
3. HACCP-principles

UNIT5. 10 hours

1. **Control of Microorganisms in Foods:** Principles and methods of preservation.
2. Physical Methods of Food Preservation- Dehydration, Freezing, Cool Storage, Heat Treatment), Irradiation, Chemical methods, Bio preservative.
3. Rapid Methods of detection and recent advances.
4. Introduction to Hurdle concept and Non-Thermal methods.

SEMESTER-V

COURSE 13: FOOD MICROBIOLOGY

Practical

Credits: 1

2 hrs/week

Learning outcomes:

1. Display ability to explore beneficial and harmful activities of microorganism
2. Demonstrate skill in the usage of equipment used for sterilization and disinfectants
3. Exhibit skill in scheduling and types of immunity
4. Acquire skills in studying microorganisms in sewage and water treatment

Practical:

1. Functioning and use of compound microscope
2. Cleaning and sterilization of glassware
3. Preparation and sterilization of nutrient broth
4. Preparation of slant, stab and plates using nutrient agar
5. Cultivation and sub-culturing of microorganisms
6. Morphological study of bacteria and fungi using permanent slides
7. Simple staining
8. Gram's staining
9. Standard Plate Count Method
10. Visits (at least two) to food processing units or any other organization dealing with advanced methods in food microbiology.

References:

1. Frazier William C and Westhoff, Dennis C. Food Microbiology, TMH, New Delhi, 2004
2. Jay, James M. Modern Food Microbiology, CBS Publication, New Delhi, 2000
3. Garbutt, John. Essentials of Food Microbiology, Arnold, London, 1997.
4. Banwartt: Food Microbiology
5. Pelczar MJ, Chan E.C.S and Krieg, Noel R. Microbiology, 5th Ed., TMH, New Delhi, 1993.

Co-Circular Activities:

1. As a group student also spend time discussing some of the lesser-known roles microbes have in food preparation such as the production of food additives or in modifying starting ingredients.
2. This is an excellent opportunity to help students draw connections between their everyday lives and the microbial sciences
3. Visits to food labs and learn the different method
4. Ppt, quiz, seminar need to be presented
5. Food microbiology course to encourage students to learn about fermented foods from around the world and share their discoveries with their colleagues.

SEMESTER-V

COURSE 14: BIOCHEMISTRY

Theory

Credits: 3

3 hrs/week

Objectives: To enable students

1. The knowledge about basic biochemical components of foods and their metabolism.
2. Biological role of vitamins and minerals.

Learning Outcomes:

1. Gaining depth knowledge on human metabolism.
2. Understanding principles of bio-chemical methods.
3. Learning the chemistry of nutrients.
4. Relating bio-chemistry with nutrition for extensive application
5. Knowledge in relation to absorption and digestion of food

UNIT 1: 10 hours

1. **Introduction to Biochemistry:** Definition, objectives, scope and inter-relationship between biochemistry and other biological sciences.
2. **Carbohydrates;** Definition, Structure and general properties of Monosaccharides-glucose, fructose, galactose, ribose. Disaccharides – maltose, lactose, sucrose. Polysaccharides – dextrin, starch, glycogen.

UNIT 2: 10 hours

1. **Lipids:** Definitions and classification of lipids, Types and properties of fatty acids, Composition and properties of fats, Significance of acid value, iodine value and saponification value.
2. **Proteins:** Definition, classification, elementary knowledge of structure of proteins, biomedical importance.
3. **Amino acids;** Definition, classification, Essential and non-essential amino acids, structure of important amino acids.

UNIT 3: 10 hours

1. **Enzymes-** Classification, mechanism of enzyme action, factors affecting enzyme activity, role of enzymes
2. Coenzymes in metabolisms, enzyme inhibition, enzymes in clinical diagnosis.
3. **Vitamins: Structure and biochemical role:** Fat soluble vitamins – A, D,E,K
4. Water soluble vitamins – B1, B2, niacin, pyridoxine, folic acid, B12 and C

UNIT 4: 10 hours

1. Biological role and occurrence of inorganic elements – iron, calcium, phosphorous, iodine, selenium and zinc
2. **Hormone** – Regulation of endocrine system. Mechanism of action of hormones. Biochemical role of hormones.

UNIT 5: 10 hours

1. Energy pathways carbohydrates: Glycolysis, Gluconeogenesis, Krebs Cycle,
2. Protein pathway: Urea Cycle
3. Fatty acid pathway: Fatty acid Synthesis, Biosynthesis of fatty acid

SEMESTER-V

COURSE 14: BIOCHEMISTRY

Practical

Credits: 1

2 hrs/week

Learning outcomes:

1. Gain depth knowledge on human metabolism.
2. Understand and experiment on the principles of bio-chemical methods.
3. Be able to demonstrate through scientific experiments chemistry of nutrients.
4. Be qualified to take up career relating bio-chemistry with nutrition for extensive application

Practical:

1. **Carbohydrates:** Quantitative estimation of glucose, sucrose and lactose by titrimetric method
2. **Fats** Qualitative tests for Fats
3. **Proteins** Qualitative tests for proteins
4. **Minerals** Estimation of calcium using EDTA by titration
5. **Vitamins** Estimation of ascorbic acid by using 2, 6 dichlorophenol indophenols method

References:

1. Lehninger A L, Nelson D L and Cox M M (2009). Principles of Biochemistry, 6th Ed. CBS Publishers and Distributors.
2. Murray R.K, Granner D K, Mayes P A and Rodwell V W (2009). Harper's Biochemistry, 28th Ed, Lange Medical Book.
3. Hawk PB, Oser BL and Summerson WH (1954). Practical Physiological Chemistry, Mcgraw Hill, New York.
4. Sundararaj P and Siddhu A (2006). Qualitative Tests and Quantitative Procedures in Biochemistry. Elite Publishing House Pvt. Ltd., New Delhi.

Co-Circular Activities:

- Preparation of charts, models, posters etc. on topics like structures, tests for identification and metabolic cycles of carbohydrates, proteins and lipids.
- Field survey to collect data on metabolic disorders like diabetes mellitus in the community
- Visit to hospitals/ private laboratories to observe analysis methods
- Seminar presentation, quiz, JAM.

SEMESTER-V

COURSE 14: SPORTS NUTRITION

Theory

Credits: 3

3 hrs/week

Objectives: Enable the students

1. To acquire knowledge of various sports and an fitness tests
2. To develop skills to counsel nutrition to sports persons

Learning objectives:

1. The links between human nutrition and metabolism during exercise
2. The links between nutrition and performance in sport and exercise
3. Dietary practices adopted by athletes in various sports and at different levels of competition
4. The principles that govern the translation of nutritional goals into dietary strategies
5. The links between physical activity, nutrition, and health

Unit-I-10 hours

1. **Scientific basis of sports Nutrition-** Introduction to sports nutrition, evolution and growth of sports nutrition, Understanding of human body and biological basis of movement of human body
2. Anthropometric and Physiological Measurement: Various Techniques for Measuring Body Composition, Work Capacity of sports.

Unit-II-10 hours

1. **Sports and life skills Education:** Sport and socialization. Physical activity and sports. Yoga meditation and Relaxation. Sports in character building.
2. Values in sports. Sports for world peace, integrity and international understanding.
3. National and International sports events.

Unit III-10 hours

1. **Fitness and Weight management:** Definition, Components of physical fitness, health and related terms, Understanding Fitness, Parameters of fitness, Types of fitness, health related physical fitness, performance related physical fitness, activities for developing physical fitness, Fitness Tests, Assessment of fitness
2. Body types and posture, assessment of fitness, Anthropometry, Approaches for keeping fit. Diet and exercise for weight management, Fad diets, Principles of planning weight reducing diets

Unit IV-10 hours

1. **Health and nutrition-** Importance of nutrition, Nutritional guidelines for health and fitness Nutritional supplements, Elements of nutrition, Balanced Diet and malnutrition
2. Energy allowances for different activities in sports, Nutritional Demands of Sports and Dietary Recommendations, Ergogenic Aids for Training and Competition.

Unit V -10 hours

1. **Sports nutrition** –Introduction to kin anthropometry, Requirements during training and performance for athletes and endurance games, aerobic and anaerobic exercise, fuel for exercise, glycogen load. Exercise to maintain fitness.
2. Health club equipment's & activities – Tread mill, hammer strength, steppers, cycles, body sculpting, kick boxing, Reebok ridge rocker, hanging, hand grips, swing, climbing and lifting weight.

SEMESTER-V

COURSE 14: SPORTS NUTRITION

Practical

Credits: 1

2 hrs/week

Learning Outcomes:

1. Knowledge on concept of fitness training
2. Skills to prevent lifestyle disorders
3. Entrepreneur skills of running fitness centers
4. Ability to exercise on different health and stress management
5. Detail knowledge on body composition.

Practical:

1. Energy allowances for various sport events and the tips for pre-event meal.
2. Determining the dietary recommendations for important nutrients for a sports person.
3. Nutritional ergogenic aids in sports nutrition and their limits.
4. Explanation of the principle of 3R's to be followed after the event for recovery process. (Rehydration, refueling and rest).
5. Body composition assessment in athletes.
6. Assessment of work capacity in sports persons.
7. Assessment of fitness any two tests (Cardiovascular endurance and muscular endurance)
8. Visit to a health club / fitness centre.
9. Observation of physical training for sports person.
10. Compulsory and important Yoga exercises for sports persons.

Reference Books:

- 1.Sizer F, Eleanor Whitney - Nutrition concepts and controversies, Eighth Edition (2000).
2. Narayan dash B – Health & physical education, 1st edition, 2003, Neelkamal publications, Hyderabad.
3. Krause"s– Food ,Nutrition and Diet therapy 6th Edition WB Saunders company, London.
4. Wardlaw, Smith. Contemporary Nutrition: A Functional Approach. 2nd ed: 2012.Mc Graw Hill.
5. Williams Melvin. Nutrition for health, fitness and sports. 2004.Mc Graw Hill
6. Joshi AS. Nutrition and Dietetics 2010. Tata Mc Graw Hill.

Co-Circular Activities:

1. Allowing the students to visit the fitness centres and counsel the sports persons
2. Calculation of Nutritional status of the sports people
3. Attending different sports events and encourage the students to be more active
4. Celebration of sports week in the college
5. Rally on importance of fitness in daily life
6. Setting up classes like aerobics and Zumba for college students to bring awareness

SEMESTER-V

COURSE 15: FOOD HYGIENE AND SANITATION

Theory

Credits: 3

3 hrs/week

Objectives:

1. To introduce the concept of food hygiene, and importance of safe food and its storage.
2. To acquaint the students with importance of sanitation and health.
3. Design food hygiene and sanitation measures to control the spread of microorganisms.

Learning Outcomes:

1. List out common food adulterants in foods and understand the need for consumer education
2. Acquire skills in food handling, solid and liquid waste management and disposal.
3. Perform techniques related to food safety and standards.
4. Skills in personal hygiene and environmental hygiene
5. Knowledge on detergents and its usages in different purpose

UNIT-I-10 hours

1. **Food safety and hygiene:** General principle of food hygiene. Factors affecting food safety. National and International standards.
2. Personal hygiene and food handling habits. Sanitation in food plants- Sanitary aspects of building and equipment, Plant layout and design.
3. Special requirements for high-risk foods. Safe food cooking temperature and storage techniques

UNIT-II-10 hours

1. **Safe and effective insect and pest control:** Extraneous materials in foods, Principles of Insects and pest's control. Physical and chemical methods of control.
2. Effective control of micro-organisms: microorganisms important in food sanitation, micro-organisms as indicator of sanitary quality.

UNIT-III -10 hours

1. **Sanitary aspects of water supply:** Source of water, quality of water, water supply and its uses in food industries.
2. Purification and disinfection of water, preventing contamination of potable water supply.

UNIT-IV-10 hours

1. **Cleaning practices:** Effective detergency and cleaning practices: Importance of cleaning technology, physical and chemical factors in cleaning, classification and formulation of detergents and sanitizers, cleaning practices.
2. **Methods of disposal of solid waste, liquid and gaseous waste, wet and dry cleaning-COP, CIP**

UNIT-V -10 hours

1. **Sanitation practices:** Hygiene and Sanitation in Food Service Institutions. Cleaning and disinfection Personal hygiene. Pest control, Waste disposal

2. Sanitary aspects of waste disposal. Establishing and maintaining sanitary practices in food industry, sanitation principle and the requirements for a food sanitation program, role of sanitization, general sanitary consideration and sanitary evaluation of food plants.

SEMESTER-V

COURSE 15: FOOD HYGIENE AND SANITATION

Practical

Credits: 1

2 hrs/week

Learning Outcomes:

1. Assessment of different microorganisms
2. Skills of using different instruments for sensory evaluation
3. Formulation of products and creating of score cards

Practical:

1. Presentation on food hygiene and sanitation practices in any local food outlet.
2. Sensory evaluation tests for processed foods
3. Determination of the quality of an egg (whole and open egg).
4. Determination of the moisture content of various flours
5. Determination of viscosity of various food gruels (porridge, custards, batters etc) using viscometer.
6. Assessing the texture of raw and cooked food using penetrometer.
7. Measurement of the water activity (aw) of raw and cooked food.
8. Detection of pathogens in food using conventional microbiological tests.

RECOMMENDED READINGS:

1. Fellows P et al. Making Safe Food: A Guide to Safe Food Handling and Packaging for Small-scale Producers Practical. Action Publishing, 1998.
2. Frazier WC and West off DC. Food Microbiology, TMH, New Delhi, 2004.
3. IFST. Food Hygiene Training: A Guide to its Responsible Management, UK: Institute of Food Science and Technology 1992.
4. Lawley R, Curtis L and Davis J. The Food Safety Hazard Guidebook, RSC. Publishing, 2004.
5. Manay NS and Shadakshaswamy M. Food Facts and Principles, New Age. International, 2004.
6. Marriott NG and Gravani RB. "Principles of Food Sanitation", New York: Springer, 2006.
7. Gaston and Tiffney, "Guide to Improve Food Hygiene".
8. Sunetra Roday "Hygiene and Sanitation in Food Industry"..

Co-Circular Activities:

1. Prepare a model lesson plan to create awareness among women and children in the community surveyed.
2. Execute the lessons in the community.
3. Prepare a model/ method demonstration to educate the women on hygiene and sanitation in community
4. Plan, organize and execute awareness program in the community at the end of the semester on nutrition and personal hygiene
5. Preparation of posters, charts, ppt and videos of personal, environmental hygiene

SEMESTER-V

COURSE 15: FOOD PACKAGING

Theory

Credits: 3

3 hrs/week

Objectives: enable the student

1. To impart comprehensive overview of the scientific and technical aspects of food packaging.
2. To instill knowledge on packaging machinery, systems, testing and regulations of packaging.
3. To gain knowledge on food packaging and applications during transportation.

Learning Outcomes:

1. Explain the roles of packaging in the food industry and the legislation involve
2. Describe the making process, suitability, and functionality of each type of packaging materials for a specific product.
3. Explain the principles of innovative packaging technologies for use with food products.
4. Evaluate different packaging materials based on various types of analysis in the laboratory.
5. Come out with a critical evaluation of current issues related to quality and safety aspects of food packaging.

UNIT I-8 hours

1. **Food packaging:** Definition, functions of packaging materials for different foods, characteristics of packaging material.
2. Food packages – bags, pouches, wrappers, tetra packs-applications.

UNIT II-10 hours

1. **Packaging materials Packaging materials:** Introduction, purpose, requirements, types of containers.
2. Modern packaging materials and forms-Glass containers, metal cans, composite containers, aerosol containers, rigid plastic packages, semi rigid packaging, flexible packaging.

UNIT – III -10 hours

1. **Packages of radiation stabilized foods:** Introduction, rigid containers, flexible containers, general methods for establishing radiation stabilization. Radiation- measurement of radiations.
2. Biodegradable packaging material – biopolymer based edible firm.

UNIT - IV -10 hours

1. **Packages of dehydrated products:** Orientation, metallization, co-extrusion of multilayer films, stretch, package forms and techniques.
2. Asptic packaging, retortable containers, modified and controlled atmosphere packaging, skin, shrink and cling film packaging, micro-ovenable containers, other package forms and components of plastics.

UNIT - V -10 hours

1. **Packaging of finished goods:** Weighing, filling, scaling, wrapping, cartooning, labeling, marking and trapping.
2. Labelling: Standards, purpose, description types of labels, labeling regulation barcode, nutrition labeling, health claims, and mandatory labeling provision.

SEMESTER-V

COURSE 15: FOOD PACKAGING

Practical

Credits: 1

2 hrs/week

Learning Outcomes:

1. To educate the students about quality of packaging material
2. To learn about the safety of packaging materials
3. Students will be able to know about the Labeling of food packaging which will help in proper transportation, storage, sale and the selection of food items for end user

1. Testing of physical/mechanical properties of food packaging material.
2. Testing of thermal shock resistance of glass.
3. Gas/Vacuum packaging of foods and shelf life studies.
4. Determination of Water Vapor Transmission rate of Packaging Material.
5. Edible packaging of Food Samples.
6. Study of Sorption Isotherm for Food Package Design.
7. Packaged food cut-out analysis.
8. To study the operation of FFS machine.

REFERENCES

1. Vijaya Khader, Text book of food science and technology, Indian council of Agricultural research New Delhi, 2001.
2. Stainley Sacharous. Roger C Griffin. Principles of food packaging 2nd Ed. Avi pub Co. Westport.
3. F.A. & Paine. H.Y. Leonard hill. A hand book of food packaging. Blackie Sons Ltd London.
4. Sacharows. S. Handbook of packaging materials. Avi Pub Co. Westport.
5. Croshy N.T. Food packaging materials. Applied Science pub Ltd. London.
6. Paine F.A. The packaging media. Blackie & Sons Ltd. London.
7. NIIR. Food packaging technology Hand book, Delhi.

Co-Circular Activities

1. Student groups are challenged to create food packages for specific foods.
2. Invited lectures and presentations on related topics by field/industrial experts.
3. Visits to different food packaging units
4. 1-week training of food packaging and labeling
5. Designing labels with nutritional benefits for food prepared by the students

SEMESTER-VII

COURSE 16: FOOD PRODUCT DEVELOPMENT AND MARKETING

Theory

Credits: 3

3 hrs/week

Course Objectives - To enable the students to:

1. Illustrate the new product categories in food market and their characteristics.
2. Elucidate the process of new food product development in food industry.
3. Exemplify various specialty food products and their applications.
4. Acquire the skill to design and development of new food product and analyse the quality of the product.

Course Outcomes - After the completion of the course, the students will be able to:

1. Apply a product development process to generate ideas, develop concept to test Market
2. Understand the latest consumer demand for novel food products.
3. Learn and develop novel technology to develop new products and work collaboratively with a team in food product development.
4. Design food and nutritional label of food products.
5. Demonstrate the skills to conduct the organoleptic evaluation of food product.

UNIT- I: New Food Products

1. New food product: Definition, Characteristics, Need for New food product development.
1. Classification of new food products: Line extensions - Repositioning of existing Products, New form of existing product: Reformulation - New packaging.
2. Innovative products - Creative products and Value added products.

UNIT-II: New Food product development in Food Industry

1. Idea generation, Consumer research, Product design and Formulation.
2. Process development: Prototype development and scale up.
3. Quality assessment of new developed products: Evaluation-Shelf -Life Testing.
4. Packaging and labeling.

UNIT-III: New Food product development in Food ingredient

and service Industry

1. Characteristics, Consumers and Costumers, market places.
2. Development of products for food service and ingredient industries.
3. Types of products and logistics. Processing- primary and secondary, various food ingredients used, use of food additives.
4. Standardization and large scale preparation Safety and regulatory aspects, sanitation and waste disposal

UNIT-IV: Food Product Commercialization and Marketing

1. Costing and Pricing, Test Market, Advertising and promotions, Product launching,
2. Product life cycle.
3. Entrepreneurship: concept, Types, qualities and functions of an entrepreneur.
4. Ethics and Intellectual property/ Patents in food product development.

UNIT-V: Food Products with reference to

1. Health foods, Medical foods, Therapeutic foods, Herbal foods, Fortified foods.
2. Infant foods, Geriatric foods, Sports drink.
3. Functional foods, Designer foods and Nutraceuticals. Probiotics, Prebiotic

SEMESTER-VII

COURSE 16: FOOD PRODUCT DEVELOPMENT AND MARKETING

Practical

Credits: 1

2 hrs/week

1. Ideation, Concept Development for new product development.
2. Market research. Market survey and enlisting various RTE & RTC foods available in the market and their movement.
3. Selection of a target group and development of a food product to fulfill the nutritional needs of the target group.
4. Development of low-cost products by using byproducts of oil industry.
5. Formulation and Standardization of the product.
6. Tests to determine nutritional parameters
7. Overall Acceptability studies.
8. Shelf-life Studies.
9. Determination of Packaging the food product and labelling
10. Estimating cost and market price, storage and transportation considerations
11. Standardization and evaluation for large scale production of the product

REFERENCES

1. Debashri, Ray.(2002). *Nutritional Challenge and Total Quality Management*, 1st edition; Sarup and Sons, New Delhi.
2. Gordon W.Fuller (2011), *New Food Product development*, 3rd edition, CRC press, Newyork.
3. Graf, E. and Saguy, I.S. (1991).*Food Product Development: From Concept to the Market Place*, Van Nostrand Reinhold New York.
4. Howard R. Moskowitz,(2009), *An integrated approach to new product development*, CRC press, Newyork.
5. Man, C.M.D. and Jomes, A.A.(1994).*Shelf life Evaluation of Foods*, Blackie Academic and Professional, London.
6. Mike Stringer and Colin Dennis.(2002). *Chilled foods A comprehensive guide*, 2nd edition ,Woodhead publishing limited, Cambridge, England, 2000.
1. Oickle, J.G. (1990).*New Product Development and Value Added Food*.
7. Breakfast Cereals and How They are Made (1990) by R.B. Fast and E.F.Caldwell. *Food Science* (5th edition) by N. N Potter et al.

SEMESTER-VII

COURSE 16: SENSORY EVALUATION

Theory

Credits: 3

3 hrs/week

Course Objectives - To enable the students to:

1. Provide adequate theoretical background and understanding about sensory evaluation of food.
2. Enable students to use various sensory methods for evaluating variety of foods.
3. Enable students to analyse and interpret sensory evaluation data.

Course Outcomes - After the completion of the course, the students will be able to:

- Demonstrated familiarity and competence with the practical skills and techniques used to analyse the sensory properties of food. This will include experimental planning, the preparation of suitable samples and the use of instruments e.g. viscometers and colour meters, as well as the collection of experimental data and its presentation, statistical analysis and interpretation.
- Ability to use terminology, appropriate to the field of sensory analysis, correctly and contextually.
- Ability to explain the benefits and limitations (scientific and ethical) of the sensory evaluation of food and be able to recommend, justify and critique commonly used methods of sensory analysis.

UNIT - 1

Sensory Evaluation of Foods- Introduction, importance of sensory evaluation in relation: to consumer

acceptability and economic aspects. Physiological basis of sensory evaluation – olfactory receptors, taste receptors, visual receptors. Sensory characteristics of food – appearance, aroma, flavour & texture. Factors affecting acceptance of food.

UNIT – 2

Anatomy and physiology of tongue and nose. Taste organs- tongue, papillae, taste buds, salivary glands.

Chemical dimensions of basic tastes- sweet, salt, sour, bitter and umami. Factors affecting taste quality,

reaction time, taste modification. Mechanism of taste perception. Odour classification, chemical specificity of odour. Mechanism of odour perception. Odour measurement using different techniques – primitive to recent techniques. Gustatory and olfactory abnormalities. Novel technologies in sensory evaluation, e-tongue, e-nose

UNIT - 3

Evaluation of Sensory qualities, Laboratory Set-up and equipment. Types of sensory panelists.

Screening, tests for selection, training of panelists. Objective evaluation – Physical and chemical methods. Comparison between subjective & objective evaluations.

UNIT – 4

Sensory evaluation tests - Threshold and dilution test for trained/untrained panelists; Difference (Qualitative)

test - paired comparison test for trained panelists and untrained panelists, duo-trio test for trained panelists and triangle (triad) test for trained panelists. Rating (Quantitative differences) test - ranking test, single sample (monadic) test, two sample difference test, multiple sample and quality difference test, hedonic test,

numerical scoring test and composite test for trained/semi-trained/untrained panelists. Descriptive Tests: Rating for sensory profile, consensus profiling, conventional profiling, free choice profiling.

UNIT – 5

Measurement of texture- Mechanical and geometrical characteristics of texture. Texture analysis - TPA test - parameters measured by texture profile analysis test (Hardness, Elasticity, Adhesiveness, Cohesiveness, Brittleness, Chewiness and Gumminess). Instrumental measure of viscosity, Rheology and texture of various

foods- dough, pastry, baked products, fruits, vegetables, dairy products, meat and meat products.

Recommended References

1. Ranganna S. 2001. Handbook of Analysis and Quality Control for Fruit and Vegetable Products. 2nd Ed. Tata-McGraw-Hill.
2. Amerine MA, Pangborn RM & Rossles EB. 1965. Principles of Sensory Evaluation /of Food. Academic Press.
3. Lawless HT & Klein BP. 1991. Sensory Science: Theory and Applications in Foods. Marcel Dekker.
4. Maslowitz H. 2000. Applied Sensory Analysis of Foods. Vols. I, II. CRC Press.
5. Rai SC & Bhatia VK. 1988. Sensory Evaluation of Agricultural Products.

SEMESTER-VII

COURSE 16: SENSORY EVALUATION

Practical

Credits: 1

2 hrs/week

1. General Introduction to sensory analyses

Sensory terminology, general testing conditions, selection of test subjects, planning the experiment.

2. Recognition tests for aroma odour, taste, flavor and other senses

Individual tests for sensory evaluation.

3. Threshold tests for the four basic tastes, difference tests, ranking tests, scoring tests, descriptive tests, single quality and multiple quality.

4. Design of experiments .

5. Training of panel, types of panels, organizing sensory evaluation, development of score cards, data analysis, and interpretation of

SEMESTER-VII

COURSE 17: FOOD COST AND QUALITY CONTROL

Theory

Credits: 3

3 hrs/week

Course Objectives - To enable the students to:

- Know the importance of cost control and quality control
- Be familiar with costing and pricing of recipes. |
- Be familiar with cost reporting systems.
- Be aware of the Government regulations and Standards of food quality.

Course Outcomes - After the completion of the course, the students will be able to:

1. Explain the application of food quality and food safety system
2. Identify the hazard of the food chain to ensure food safety
3. Detect the adulteration in food samples
4. Illustrate the importance of food quality standards
5. Be familiar with the testing of various quality parameters.

Unit1:

1. Importance of costing and cost control, methods of costing and costing methodology in Catering business, emphasis on batch costing.
2. Cost classification into materials, labour and overheads and their percentage analysis on net sales for clear understanding of their relative importance.
3. Material costing, use of standardised recipes, material's cost control through Basic operating activities like purchasing, receiving issue production, sales and accounting; yield analysis from time to time.

Unit II:

1. Materials costing as an aid to pricing by a suitable mark up policy
2. Control of labour costs and Overheads, periodical percentage analysis, calculation of Overhead allocation rates.
3. Cost behavior into variable, fixed and semi variable and its impact on Unit cost. Cost reporting system -daily, monthly and for special managerial

Unit III:

1. Break-even analysis with simple workouts.
2. Internal check and Internal control.
3. Meaning and advantages - factors to be borne in mind while developing internal check/control procedure.

Unit-IV:

1. Introduction to Quality Control, Evaluation and Assurance.
2. Responsibilities and Organization of the Quality Control Department
3. Samples, Inspection Sampling and Interpretation of data.

Unit-V:

1. Evaluation of raw materials and finished products for Specific gravity - Size, shape, symmetry, style. Texture-Tenderness, Crispness, Firmness.
2. Rheology - Viscosity, consistency. Enzyme Activity, total acidity, PH, Water.
3. Waste Control and Sanitation.
4. Government Regulations Standards of Quality. Recording and Reporting Control Charts.
Production Control

SEMESTER-VII

COURSE 17: FOOD COST AND QUALITY CONTROL

Practical

Credits: 1

2 hrs/week

Practical

1. Standard portion costs, Costing Individual Items on a Plate, Yield Testing, Using Yield to Calculate Food Costs, Yield Tests and Percentages, Cooking Loss Test, Calculating quantities to purchase
2. Calculating menu items costs, using food cost percentage to set a menu price, Calculating and using a mark-up factor, Calculating menu prices, Contribution margins
3. Introduction to menu analysis, calculating average contribution margin, Profitability of menu item, calculating average popularity, Menu revisions, using specials and feature items, Arranging items on the menu

References

1. Bhar, B.K. (1977): Cost Accounting, Academic publishers, Calcutta.
2. Matz, A., Curry, O. and Frank, G.W. Prasad, N.K. (1970): Cost Accounting, Taraporewala Sons & Co. Pvt. Ltd., Bombay.
3. Prasad.N.K (1979): Principles and Practice of Cost Accounting, Book Syndicate Pvt. Ltd., Calcutta.
4. Keister, D.C. (1977): Food and Beverage Control, Prentice Hall Inc., New Jersey.
5. Coltman, M.M. (1977): Food and Beverage cost control, Prentice Hall Inc., New Jersey.
6. Kotas, R. An approach to food costing, Berried Rockliff Ltd. London.
7. <https://psu.pb.unizin.org/hmd329/chapter/ch9/>

SEMESTER-VII

COURSE 17: CLINICAL NUTRITION

Theory

Credits: 3

3 hrs/week

Course Objectives - To enable the students to:

1. Understand the biochemical and physiological impairments of diseases.
2. Develop capacity and attitude for taking up dietetics as a profession.
3. Understand the role of nutrients for good health.
4. Design disease specific diets.

Course Outcomes - After the completion of the course, the students will be able to:

- To acquire a basic understanding of the various clinical changes related to nutrition, which are seen in different diseases, both **deficiency** and otherwise.
- To understand the **etiology**, prevalence, clinical signs and **symptoms** of nutritional **deficiency** diseases (**Vitamin A deficiency**, anemia, IDD, PEM etc).
- To gain understanding of physiology in health and pathophysiology in disease.
- Complications occurring in various conditions and the inter relationships thereon.

UNIT-I

Role of dietician: The hospital & community. Basic concepts of diet therapy. Principles of diet therapy & therapeutic nutrition for changing needs.

Adaptation of normal diet for changing needs. Routine hospital diets - Regular diet, light diet, full liquid and tube feeding.

UNIT II

Modification of diet - Febrile conditions, infections and surgical conditions.

Nutrition in burns and surgery.

Nutrition - Addictive behaviour in anorexia nervosa, bulimia & alcoholism.

UNIT III

Diet in lifestyle diseases -Diet for obesity, Diabetes mellitus and cardiovascular disorders.

Nutrition in cancer- types, pathophysiology, symptoms and diet management.

UNIT IV

Diets for gastro - intestinal disorders, constipation, diarrhoea, peptic ulcer.

Diet for renal diseases - Nephritis, Nephrotic syndrome and renal failure.

Diet for liver diseases – Fatty liver, hepatitis, jaundice, cirrhosis.

UNIT V

Nutrition in Immune system dysfunction, AIDS & Allergy.

Nutrient drug interaction

Feeding the patients - Psychology of feeding the patient, assessment of patient needs.

REFERENCES:-

- Sri Lakshmi .B, Dietetics , New Age publication, New Delhi , 2007.
- David. A. Bender, Introduction to nutrition and metabolism, 4th Edition.
- Shills, M.E., Olson, J.A., (1999); Modern Nutrition in Health and disease , 9th edition, Williams and Wilkins.
- Gibney MJ, Elia M, Ljungqvist O and Dowsett J. Clinical Nutrition, Blackwell Publishing, UK, 2005. 5.
- Park K. Text Book of Preventive and Social Medicine. 21st edn, Banarsidas Bhanot Publishers, Jabalpur, India, 2011.
- . Davidson S, Passmore R, Breck JFT. Human Nutrition and Dietetics, The English Language Book Society and Churchill Livingstone, 1975.
- Kathleen ML and Escott S. Krause's Food, Nutrition and Diet Therapy, 9th edn, W.B. Saunders Company Pennsylvania, 2000. Applicable from 1st June 2019 Page 43 of 95 3.
- Thomas B. Manual of Dietetic Practice. Blackwell Scientific Publications, Oxford, London, 1988. 4. Robinson CH. Normal and Therapeutic Nutrition. Oxford Publishing Co, Bombay, 1972

SEMESTER-VII

COURSE 17: CLINICAL NUTRITION

Practical

Credits: 1

2 hrs/week

1. Standardization of common food preparations.
2. Planning, preparation and calculation of following diets:
 - a. Normal diet.
 - b. Liquid diet c) Soft diet
 - c. High and low caloric diet
 - d. Bland diet for peptic ulcer
 - e. Diet for Viral hepatitis and cirrhosis g) Diet for Diabetes mellitus
 - f. Diet for Hypertension and Atherosclerosis
 - g. Diet for Nephritis and Nephrotic syndrome

SEMESTER-VII

COURSE 18: RESEARCH METHODOLOGY

Theory

Credits: 3

3 hrs/week

Course Objectives - To enable the students to:

- Understand the significance of statistics and research methodology in Home Science research.
- Identify the types, tools and methods of research and develop the ability to construct data gathering instruments appropriate to the research design.
- Apply the appropriate statistical technique for the measurement of scale and design.

Course Outcomes - After the completion of the course, the students will be able to:

1. Application statistics in the field of home science research.
2. Learning identifies problems and compare variables
3. Able enough to develop research design.
4. Acquiring skills on data collection and interpretation
5. Gaining knowledge on basic concepts of theories of probability

Unit-I

1. Research-Introduction, purpose of research, significance, research ethics
2. Science and Scientific methods to develop new knowledge.
3. Types of Research: Historical, Survey, experimental, case study, social research, participative research, quantitative and qualitative, descriptive and analytical research.

Unit-II

1. Research Problem -Definition and Identification of a research Problem
2. Selection of research problem, Techniques involved in defining a problem,
3. Hypothesis-definition, characteristics, form of hypothesis, test for hypothesis

Unit-III

1. Research design – Definition, need for research design, characteristics of research design.
2. Research design types-Qualitative and quantitative research design
3. Formulation of a research design
4. Types of variables

Unit-IV

1. Theory of probability- Population and sample - Probability sampling: systematic random sampling, two stages and multistage sampling, cluster sampling.
2. Non – Probability sampling: purposive, quota and volunteer sampling/snowball sampling
3. Collection of data-primary and secondary data- Observation, questionnaire, interview, scaling methods, case study, home visits, reliability and validity of measuring instruments

Unit-V

1. Measurement of Central tendency and Variation- Arithmetic mean, median, mode.
2. Range, quartile deviation, mean deviation and standard deviation
3. Testing of Hypothesis - Parametric & non-parametric tests, chi-square test, correlation, ANOVA.

SEMESTER-VII

COURSE 18: RESEARCH METHODOLOGY

Practical

Credits: 1

2 hrs/week

Content:

1. Developing Research Design
2. Observation, questionnaire, interview, scaling methods, case study, home visits, reliability and validity of measuring instruments
3. Computation of mean, median and mode for ungrouped and grouped frequency distribution
4. Computation of variance, standard deviation, mean deviation
5. Moments, quartiles, skewness and kurtosis of frequency distribution
6. Parametric & Non- parametric tests, chi-square test, t test, correlation ANOVA. Calculating correlation coefficient from ungrouped and grouped data

References:

1. Bandarkar, P.L. and Wilkinson T.S. (2000): Methodology and Techniques of social Research, Himalaya Publishing House, Mumbai.
2. Bhatnagar, G.L. (1990): Research Methods and Measurements in Behavioural and Social Sciences, Agri. Cole Publishing academy, New Delhi.
3. Dooley, D. (1995): Strategies for Interpreting Qualitative Data; Sage Publications, California.
4. Gay, L.R. (1981): Educational Research, proper Solutions: Avoiding Errors in Quantitative Research. II Edn. Sage Publications: Beverly Hills, California.
5. Long; J.S. (Ed) (1988): Common Problems Proper Solutions: Avoiding Errors in Quantitative Research, Beverly Hills, Sage Publications, California.
6. Mukherjee, R. (1989): The Quality of Life: Valuation in Social Research, Sage Publications, New Delhi.
7. Stranss, A. and Corbin, J. (1990); Basis of Qualitative Research: Grounded Theory Procedures and Techniques, Sage Publications, California.

SEMESTER-VII

COURSE 18: NUTRITION MANAGEMENT IN DISASTERS

Theory

Credits: 3

3 hrs/week

LEARNING OBJECTIVES

- Familiarize the students with various natural and manmade emergencies and disasters having an impact on nutrition and health status.
- Enumerate the special nutritional concerns arising out of these situations.
- Gain knowledge on the strategies for nutritional rehabilitation management of the health of Emergency affected populations.
- Understand about the Assessment and surveillance of Nutritional status in emergency affected populations.
- Explain the methods for the Assessment of food needs in emergency situations

LEARNING OUTCOMES

After the successful completion of the course, students will be able to

- Discuss on the various natural and manmade emergencies and disasters having an impact on nutrition and health status.
- Recall the special nutritional concerns arising out of the emergency situations.
- Identify the strategies for nutritional rehabilitation management of the health of Emergency affected populations
- Classify the Assessment and surveillance of Nutritional status in emergency affected populations
- Prioritize the Assessment of food needs in emergency situations

THEORY

Unit-I

Natural/Manmade disasters resulting in emergency situations:

- Famine, drought, flood, earthquake, cyclone, war, civil and political emergencies.
- Factors giving rise to emergency situation in these disasters.

Illustration using case studies from Indian subcontinent

Unit-II

Nutritional problems in emergencies in vulnerable groups

- Causes of malnutrition in emergency situations.

- Major deficiency diseases in emergencies
- Protein – Energy Malnutrition
- Specific deficiencies

Management of Nutrition problems, selection of wholesome nutritious local recipes for Mass preparation.

Unit-III

Communicable diseases: Surveillance and treatment Control of communicable diseases in emergencies – Role of immunization and sanitation.

Unit-IV

Assessment and surveillance of Nutritional status in emergency affected populations

- Scope of assessment of malnutrition in emergencies
- Nutritional Status Assessment – a review.
- Organization of nutritional surveillance and individual screening.

Unit-V

Assessment of food needs in emergency situations.

- Food distribution strategy – Identifying and reaching the vulnerable group Targeting Food Aid.
- Mass and Supplementary Feeding
- Therapeutic Feeding
- Special foods/rations for nutritional relief
- Local production of special foods
- Local foods in rehabilitation
- Organization of mass feeding/general food distribution
- Feeding center
- Transportation and food storage
- Sanitation and hygiene,
- Evaluation of feeding programmes
- Household food security and nutrition in emergencies

REFERENCES

1. Bradley, A. Woodruff and Arabella Duffield 2000 Assessment of Nutritional Status in
2. Emergency affected populations – Adolescents, Special Supplement, UN ACCSCN Sub-
3. Committee on nutrition.
4. Steve Collins, Arabella Duffield and Mark Myatt 2000 Assessment of Nutritional Status in Emergency affected populations – Adults, Special Supplement, UN ACCSCN Sub-Committee on nutrition.

5. Disasters. 1999. International Public Nutrition and Emergencies: The Potential for Improving Practice. Special Issue Vol. 23/4.
6. USCR 1999 World Refugee Survey 1999 Washington EC. USCR.
7. WFP 1999 World Food Programme. Food and Nutrition Handbook Draft. Rome. WFP.

SEMESTER-VII

COURSE 18: NUTRITION MANAGEMENT IN DISASTERS

Practical

Credits: 1

2 hrs/week

1. Selection of local recipes suitable for Mass and supplementary feeding
2. Planning recipes for Mass and supplementary feeding.
3. Visit to Mass feeding centre – Experiences of frontline personnel working in Mass feeding center example Tsunami affected area.
4. Visit to Drought prone area and assessment of food needs and nutritional status.
5. Studying local responding systems to meet emergencies – Focus group discussions in urban and rural area.

SEMESTER-VII

COURSE 19: TRADITIONAL FOODS

Theory

Credits: 4

5 hrs/week

OBJECTIVES:

- To understand the historical and traditional perspective of foods and food habits.
- To understand the wide diversity and common features of traditional Indian foods and meal patterns.
- To help students understand the diversity of foods, food habits and patterns in India with focus on traditional foods.

Course Outcomes - After the completion of the course, the students will be able to:

1. Gaining knowledge about existing Indian traditional foods.
2. Understand the importance and production of common Indian traditional foods.
3. Apply the knowledge for mass production of fermented and traditional products.
4. Do food preservation in traditional methods

UNIT-I

1. Food production and accessibility - subsistence foraging, horticulture, agriculture, origin of agriculture, earliest crops grown.
2. Food as source of physical sustenance, food as religious and cultural symbols; importance of food in understanding human culture - variability, diversity, from basic ingredients to food preparation.
3. Impact of customs and traditions on food habits, heterogeneity within cultures (social groups) and specific social contexts - festive occasions, specific religious festivals, mourning etc. Kosher, Halal foods; foods for religious and other factors

UNIT-II

1. Traditional methods of milling grains – rice, wheat and corn – equipment and processes as compared to modern methods.
2. Equipment and processes for edible oil extraction, paneer, butter and ghee manufacture – comparison of traditional and modern methods.
3. Energy costs, efficiency, yield, shelf life and nutrient content comparisons. Traditional methods of food preservation – sun-drying, osmotic drying, brining, pickling and smoking.

UNIT-III

1. Typical breakfast, meal and snack foods of different regions of India. Regional foods that have gone Pan Indian / Global.
2. Popular regional foods; Traditional fermented foods, pickles and preserve, beverages, snacks, desserts and sweets, street foods; IPR issues in traditional foods.

UNIT-IV

1. Role of SHGs, SMES industries, national and multinational companies; commercial production and packaging of traditional beverages such as tender coconut water, neera, lassi, buttermilk, dahi.
2. Commercial production of intermediate foods – ginger and garlic pastes, tamarind pastes, masalas (spice mixes), idli and dosa batters.

UNIT-V

1. Comparison of traditional foods with typical fast foods / junk foods – cost, food safety, nutrient composition, bioactive components.
2. Energy and environmental costs of traditional foods; traditional foods used for specific ailments /illnesses.

CO-CIRCULAR ACTIVITIES

- Conducting traditional recipe making competition.
- conducting surveys based on popularity and marketing of traditional foods.
- reporting recent trends in traditional foods recipes.

REFERENCE:

1. Sen, Colleen Taylor “Food Culture in India” Greenwood Press, 2005.
2. Davidar, Ruth N. “Indian Food Science: A Health and Nutrition Guide to Traditional Recipes: East West Books, 2001.

SEMESTER-VII

COURSE 19: TRADITIONAL FOODS

Practical

Credits: 1

2 hrs/week

- Developing recipes for traditional breads, snacks, ready-to-eat foods and instant mixes, frozen foods.
- Processing of ghee, butter and paneer- modern and traditional methods.
- Cost calculation of traditional foods.
- Shelf life studies on intermediate foods- ginger garlic foods, masalas , gravies and idly- dosa batter.

SEMESTER-VII

COURSE 19: PRINCIPLES OF CULINARY SCIENCE

Theory

Credits: 3

3 hrs/week

OBJECTIVES

- Understand the scientific principles and the aesthetic art involved in cuisine preparation.
- Develop culinary vocabulary and skill sets related to culinary science and art
- Learn the methods and importance of sanitation and safety in food preparation
- Obtain knowledge regarding basic concepts of ayurvedic cuisine and nutrition.
- Familiarize students to the diversity in Indian cuisine

Course outcomes:

The students will be able to:

- Use appropriate culinary terminology to describe food products and processes.
- Employ standard measurement techniques in food preparation.
- Demonstrate proficiency when using culinary techniques, culinary equipment and tools during food preparation.
- Apply basic principles and practices of cleaning and sanitation during food preparation.
- Demonstrate skills in plating and presentation of foods.
- Identify traditional regional cuisines of India and explain the basic principles of Ayurvedic cuisine.

Unit I

Introduction Cuisine: Meaning, Course Objectives of food preparation - palatability, variety, safety, digestibility and nutrient retention. Cuisine as a science and art: Food components and their interaction, influence of temperature, light and air, aesthetic and cultural aspects. Culinary terminologies of Indian and modern cuisines.

Unit II

Culinary methods and techniques-Review of cooking methods - roasting, broiling, steaming, boiling, pressure cooking, poaching, frying, stewing, braising, pot roasting, baking.

Basic computation, weighing and measuring of foods . Anatomy of kitchen knife, types of kitchen knives and other cutting tools. Cutting techniques and types of cut: Julienne, Brunoise, Mirepoix, Fermier, Paysanne, Chiffonade, roll cutting, slicing, crushing, parallel cutting. Special techniques used in Indian cuisines.

Unit III

Safety and sanitation-Principles of sanitation (preventive cleaning process; sterilization process), personal hygiene; principles of safe storage: safe holding temperature for foods; sanitary refrigeration, safe cooling and reheating of foods; safe techniques for knife skills and hand tools. Equipment use and care (heating equipments, refrigerator, juicers, mixing and grinding devices, gas range, steamers; water filters); Basic safety measures for safe working.

Unit IV

Food presentation styles Basic elements of presentation (colour, texture, shape, simplicity, balance). Garnishes- meaning; steps in garnishing; types and tips of garnishing; tools for garnishing and decoration. Examples of garnishes and decoration used in Indian cuisine. Plating and food layout.

Unit V

Specialty ingredients in regional cuisines – herbs, spices, masala powders and cooking oils of different regions.

Ayurvedic cuisine. Basic tenets of Ayurveda: Five elements, tridhatu, relationship between tridosha and five elements, saptadhatu.

Principles of ayurvedic cuisine: Qualities of food- rasa, guna, virya, vipaka and prabhava. Balanced diet- ayurvedic perspective.

Food and the cycles of nature; Viruddhaahara - imbalance in food composition.

CO-CIRCULAR ACTIVITIES

- Conducting culinary based cooking competitions.
- developing fusion dishes and recipes.
- Participation and organizing food melas exhibiting global cuisine

REFERENCES

1. Wayne Gisslen. Professional Cooking. John Wiley & Sons, New Jersey. 2015. 8th edn.
2. Jagmohan Negi. Fundamentals of Culinary Art. S. Chand and Company Pvt. Ltd., New Delhi. 2013.
3. Jagmohan Negi. Food Presentation Techniques (Garnishing and Decoration). S. Chand and Company Pvt. Ltd., New Delhi. 2013.

4. Eva Medved. Food Preparation and Theory. Prentice-Hall Inc., Englewood Clifff, New Jersey. 1986.
5. Vaidya Atreya Smith. Ayurvedic Nutrition. MotilalBanarsiDass Publishers Pvt. Ltd, Delhi. 2011.
5. Vanaja Ramaprasad and Vaidya S.R. Sudarshan. Aharatattwa.
6. SibelÖzilgen. Cooking as a chemical reaction – Culinary Science with experiments. CRC Press, Boca Raton, Florida. 2015.

SEMESTER-VII

COURSE 19: PRINCIPLES OF CULINARY SCIENCE

Practical

Credits: 1

2 hrs/week

I. Culinary techniques

- 1) Familiarization with different types of cutting and paring tools and their safe handling
- 2) Demonstration and practice of:
 - a) Shredding of fruits and vegetables using chef's knife/French Knife
 - b) Peeling fruits/vegetables with paring knife and vegetable peelers
 - c) Slicing with slicing knives/serrated slicer d) Chopping coriander leaves/cabbage with chef's knife
 - e) Mincing of onions by professional style.
 - f) Crushing of ginger and Garlic
 - g) Types of cuts: Julienne, dicing, roll-cutting, scooping, shredding, parallel cutting.
- 3) Garnishes and decorations:-
 - a) Familiarization of garnishing tools: Apple cutter/corer, brushes, butter curler and paddles, candy molds, citrus stripper, decorating bags and tips, grapefruit knife, hand grater, small cookie cutter, melon baller, scissors, skewers and toothpicks and wire strainers.
 - b) Common garnishes used in Indian cuisine: Chopped coriander leaves, coriander sprigs, tomato julienne, onion rings, tomato rose, ginger julienne, cream swirl/ dollops, rogan, slit green chili, sprinkling masala/chilli powders, fried chilli and curry leaves, sauted and roasted seeds (cumin), saffron threads.
 - c) Demonstration/practice of citrus garnishes and decoration (Grooved lemon slices, lemon butterflies, orange julienne, candied citrus peel, citrus knots and loops), strawberry fans and flowers, bell pepper rings, cups and baskets, carrot curls and flowers, cucumber ribbons and watermelon bowl/basket.

II. Demonstration and presentation of various traditional cuisines

1. Cuisine of South India, North India, East India and Western parts of India using special techniques used in Indian cuisine: Adding yoghurt, browning of onions, preparation of curry base, cooking spice paste, natural colourings, dry roasting, spices in oil, ground spices, tempering, thickening agents, uses of herbs and extracts.
2. Traditional and modern meal layout and plating styles.

SEMESTER-VII

COURSE 20: NUTRITION AND DIET COUNSELLING

Theory

Credits: 3

3 hrs/week

Objectives:

To enable the students to:

- Understand the psychology of the patient
- Develop diet counselling skills
- Prepare the patients for food acceptability
- Create awareness among the communities about the importance of diet and good health
- Develop humanistic approach towards patients

Course Outcomes - After the completion of the course, the students will be able to:

- Understand psychology , goals and response of patients..
- Learn and develop data collecting tools .
- Design food and nutrition education audio visual aids and materials like pamphlets.
- Demonstrate the skills to conduct group counselling.

UNIT I

Counselling – Definition, Expectations, goals, scope and limits. Counsellor – Characteristics of an effective counsellor. The Client – Characteristics, expectations

The Counselling Process: Techniques for obtaining relevant information 1. Clinical Information 2. Medical History and General Profile 3. Dietary Diagnosis - Assessing food and nutrient intakes , Lifestyles, physical activity, stress 4. Nutritional Status.

UNIT II

Correlating relevant information and identifying areas of need Stage I: Problem exploration and clarification Stage II: Developing new perspectives and setting goals Stage III: Implementation follow up and evaluation.

Counselling Theories and Approaches: Key Concepts and Techniques Counselling techniques, strategies and communication skills Rapport building and opening techniques Questioning, listening, reflecting, acceptance, silence, leading reassurance, non-verbal behaviour, terminating skills.

UNIT III

Developing resources and aids for education and counselling, accurate measuring equipment- cups, bowls, spoons.

Designing of

- Traditional audio visual aids- charts, posters, pamphlets, interactive aids.
- Digital aids- canva, flip book , posters.

UNIT IV

Hospitalised patients (adults, pediatric, elderly, handicapped), adjusting and adopting to individual needs.

Outpatients (adults, pediatric, elderly, handicapped), patients education, techniques and modes.

UNIT V

Therapeutic relationships: psychology of feeding the patients- Assessment of needs, education of the patient and follow up and establishing rapport with the patient and the family member, facilitative condition and counselling relationships- Empathic understanding, unconditional positive regard.

Health Psychology and behavior medicine- approach to prevention and treatment, Mind- body medicine.

CO-CIRCULAR ACTIVITIES

- Setting up of diet counselling centres in department
- Doing street plays and puppet shows for various diets in diseases .

REFERENCE

- 1) Gelso Charles, J. and Fretz Bruce, R. Counselling Psychology, a PRISM Indian edition Harcourt Brace College Publishers, 1995
- 2) Srilakshmi, B. Dietetics New Age International (P) Ltd, 1997
- 3) Gable, J. (1997): Counselling Skills for Dietitians, Blackwell Science.
- 4) Holli, B.B. and Calabrese, R.J. (1998): Communication and Education Skills for Dietetics Professionals. Lippin Cott Williams & Wilkins, New York.

SEMESTER-VII

COURSE 20: NUTRITION AND DIET COUNSELLING

Practical

Credits: 1

2 hrs/week

1. Development of counselling tools – questionnaire, charts, posters, interview schedule, dietary guidelines pamphlets- for different diseases.
2. Conducting mock counselling sessions – group and individual counselling for:-
 - a) Obesity
 - b) Diabetes
 - c) Gastric disorders
 - d) Allergies
 - e) Cardiac disorders
3. Visit Hospital, Clinics and community counselling centres.

SEMESTER-VII

COURSE 20: COMPUTER APPLICATIONS IN NUTRITION

Theory

Credits: 3

3 hrs/week

Course Objectives - To enable the students to:

- Acquire knowledge about computer fundamentals.
- Learn and use the applications of MS office
- Apply the skills learnt to situations in Home Science.

Course Outcomes - After the completion of the course, the students will be able to:

- Demonstrate a basic understanding of computer hardware and software.
- Demonstrate problem-solving skills.
- Apply logical skills to programming in a variety of languages.
- Utilize web technologies.
- Present conclusions effectively, orally, and in writing.

Unit-I

Review Windows:

Desktop settings and creating shortcuts. Start menu, How to launch programs using start menu. Recycle bin, task bar, Windows accessories

Microsoft Word

Microsoft Excel

Microsoft PowerPoint

Unit-II

Page Maker: PageMaker Basics, Working with a publication, The Drawing tools, The text tools, Importing Graphics, Transformations, Utilities, working with large amounts of text, The story editor.

CorelDraw: CorelDraw Concepts, Exploring the work area , drawing & shaping , working with text, using writing tools blending, exporting, distorting, importing, exporting

Unit-III

Illustrator: Using the Illustrator tools, using selection tools, Gradients, Brushes. Applying transformations over objects, using layers, applying filters.

Photoshop: Tools – Painting, Editing, Selection, Filters, Layers, Working with type – paths

Uni-IV

HTML: Understanding HTML, Creating a web page, publishing HTML, Pages, Text alignment & lists, text formatting & font control, Creating HTML forms, creating web page graphics, putting graphics on a web page, custom background & color.

Introduction to multimedia, Basic elements, Applications of multimedia

Unit-V

Application of computers in Food Science and Nutrition

Nutrient calculation and diet calculation

Nutrition education and counselling

Nutrition software and websites

E-Journal in food science and nutrition

CO-CIRCULAR ACTIVITIES:

- Preparing digital audio visual aids for nutrition education like flip books, posters, flash cards, pamphlets etc.

References:

1. Peter Norton, Introduction to Computers, Sixth edition, Tata McGraw Hill (2007)
2. Fundamentals of Computers, IV Edn V Rajaraman Prentice – Hall of Indias Limited, New Delhi.
3. Computer fundamentals by A Lexix Leon and Mathews Leon, Leon – Tech World , New York 1999
4. Ron Mansfield, Workin in Microsoft Office Tata McGraw Hill (2008)
5. Adobe Pagemaker (Training Guide) – By Shashank Jain and satish Jain, BPB Publications, 2001
6. CorelDraw 9 (Training Guide) – By Manohar Lotia & Shailesh Tank, BPB Publications, 2001
7. Adobe Illustrator in 24 hours Mordy Golding (Tech Media)
8. Photoshop 7.0 in easy steps – Robert Shuffle Botham, Dream Tech, 2003

SEMESTER-VII

COURSE 20: COMPUTER APPLICATIONS IN NUTRITION

Practical

Credits: 1

2 hrs/week

1. Creating a Word document on Home science topic, MS EXCEL-tabulating data and graphs
2. MS POWERPOINT
3. Page Maker and CorelDraw
4. ILLUSTRATOR and Photoshop
5. HTML - Creating a web page
6. Developing Mini Projects in Food Science and Nutrition

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SEMESTER-VIII

COURSE 21: FOOD ANALYSIS

Theory

Credits: 3

3 hrs/week

Course Objectives - To enable the students to:

- To obtain knowledge and hands on experience in various aspects of food analysis.
- To gain knowledge about usage and working principles of instruments.
- To obtain knowledge on application of various instruments in analysis of food.

Course Outcomes - After the completion of the course, the students will be able to:

- Acquiring skill and knowledge on different analysis procedures.
- Understanding standard operation procedure for various instruments.
- Learn the analytical techniques for quantitative and qualitative estimation of different food groups.

Content

Unit I

Methods in sampling of foods for analysis

Sample preparation, Determination of moisture and Ash content by different methods

Estimation of minerals by ashing. Determination of Dietary and crude fibre.

Measuring acid content of food by titration.

Unit II

Need for food analysis, Different food analysis technique

Chromatography- Gas Chromatography, Detectors for Gas Chromatography, sampling and application of Gas Chromatography

Liquid Chromatography- Characteristic Features of HPLC, A Typical Modern Liquid Chromatograph, Detectors for HPLC, Applications of HPLC, HPTLC, TLC

Unit III

Hyphenated techniques- Gas chromatography- mass spectrometry (GC-MS), Liquid Chromatography- mass spectrophotometry (LC-MS).

Electrophoresis in food analysis, Determination of solids in juices and honey.

Thermal methods of food analysis- Thermogravimetry, DTA, DSC.

Spectroscopy- Techniques and Instruments- UV, AAS, NMR, analysis of food additives by spectrophotometry.

Unit IV

General physical properties of food, Quantitative analysis of foods – protein by Direct method, Indirect method

Formal titration, Fat-Direct solvent extraction method, Solubilization extraction method, Volumetric method.

Other estimations- iodine number, saponification, acid number.

Determination of lipid constituents in food.

Unit V

Carbohydrates- qualitative and quantitative estimation of sugars, estimation of carbohydrates from starch

Analysis of fibres present in food – TDF, IDF, SDF.

Vitamin estimation- Vitamin A, Vitamin C, Thiamine, Riboflavin.

References

1. Seemayadav (1997) Food Chemistry S, Author publication of Anmol Pvt. Ltd., 437/4B Ansari Road, Daryaganj, New Delhi..
2. Sathe (1999) A First Course In food Analysis
3. David & Robinson, Food biochemistry & nutritional value.
4. Dennis D. Meller Awiley , Food chemistry, A Laboratory manual by– Inter science publication John Wiley & Sons, INC.
5. Owen R. Fennema, Food chemistry 2nd edition Revised & Expanded.
7. Meloan , Food Analysis-Theory & Practice Sathe (1999) A First Course In food Analysis
8. Yeshajahu P, Clifton E & Meloan , Food Analysis-Theory & Practice

SEMESTER-VIII

COURSE 21: FOOD ANALYSIS

Practical

Credits: 1

2 hrs/week

1. Different methods of sampling of foods for food analysis.
2. Determination of moisture content in different foods
3. Estimation of Ash value in different foods and preparation of Ash solution
4. Estimation of different types of Fiber in foods
5. Estimation of Fat content in foods by Soxhlet method
6. Estimation of total sugars and reducing sugars
7. Estimation thiamine and riboflavin content of foods
8. Estimation of Vitamin C in foods
9. Determination Saponification value, Iodine value, Free fatty acid value and Peroxide value of fats and oils
10. Determination of plant pigments using spectrophotometer.
11. In collaboration with local labs/organization/HEI (Higher Educational Institutes)

SEMESTER-VIII

COURSE 21: FOOD LAWS AND REGULATIONS

Theory

Credits: 3

3 hrs/week

Course Objectives - To enable the students to:

- Know and understand the various national and international standards for different food articles in detail.
- Understand the food regulatory mechanism in our country.

Course Outcomes - After the completion of the course, the students will be able to:

- Discuss the major food law legislation and its importance to current regulations.
- Discuss the role of regulatory agencies in enforcing current food laws.
- Understand the principles of risk/benefit.
- Improve written communication skills.

Unit-I

Indian Food Regulatory Regime- Introduction - What is the need for food standards and their enforcement?

Introduction to various Mandatory/Regulatory and Voluntary/Optional Food Laws –PFA Act and Rules, Food Safety and Standards Act, 2006, Essential Commodities Act, 195

Global Scenario-Codex Alimentarius Commission (CAC)

Unit-II

Food Safety Regulations and Rules: Sanitary and Hygienic requirements; Safety and Quality requirements for specific Products (Milk and Milk products/ Meat and Meat products); Packaging and Labelling

Food Safety and Quality Requirements: ISO and BRC

Voluntary National Standards: BIS and AGMARK

Unit-III

Export and Import Laws and Regulations- Foreign Trade Policy, Export (Quality Control and Inspection) Act, 1963, Promotion Bodies, Plant and Animal Quarantine, Customs Act and Import Control Regulations

WTO Implications: SPS and TBT agreement

Other International Standard Setting Bodies: ISO, OIE,

Unit-IV

National Agencies for Implementation of International Food Laws and Standards

Accreditation System for Conformity Assessment Bodies

Global Gap and India Gap

Unit-V

Food Audits - HACCP principles, steps for its adoption and implementation, Techniques for carrying out an audit, Plan, conduct and report an audit, Techniques for continuous improvement.

Total Quality Management

Standards, principles, definitions: national/international food safety legislation

References:

1. Patricia and Curtis A, An operational Text Book, Guide to Food Laws and Regulations.
2. Marth, E.H. (1978): Standard Methods for the Examination of Dairy Products 14th ed or edition. Interdisciplinary Books and Periodicals, Washington, D.C.
3. Ranganna, S. (1986): Handbook of Analysis and Quality Control for Fruit and Vegetable Products, 2nd edition, Tata Mc Graw Hill Publishing Co. Ltd., New Delhi.
4. Early, R. (1995): Guide to Quality Management Systems for the Food Industry, Blackie, Academic and Professional, London.
5. Gould, W.A. and Gould, R.W. (1988): Total Quality Assurance for the Food Industries, CTI Publications Inc. Baltimore.
6. Prevention of Food Adulteration Act, 1954, Professional Book Pub.
7. Food Safety and Standards Act 2006, Rules 2011, Regulations 2011, International Law Book Company.

SEMESTER-VIII

COURSE 21: FOOD LAWS AND REGULATIONS

Practical

Credits: 1

2 hrs/week

1. Market survey of preserved fruits and vegetable products.
2. Visit to food testing lab or any agency of food standards.
3. Nutrition labelling requirements and developments.
4. Simple tests for food adulteration.
5. Market survey of foods on food safety

SEMESTER-VIII

COURSE 22: FOOD ADDITIVES, CONTAMINANTS AND TOXICOLOGY

Theory

Credits: 3

3 hrs/week

Objectives of the Course: To enable the students to:

1. To understand different type of preservative and their class.
2. To understand different type of flavor and its extraction technique.
3. To understand general principles of food toxicology.
4. To understand different type toxicants and allergens.

Course Outcomes: After the completion of the course, the students will be able to:

1. Assess different type of preservative in food preservation at industrial as well as in daily life
2. Utilization of various techniques of flavour extraction for social as well as industrial welfare
3. Assess different type of nutraceuticals for betterment of health
4. Utilization of information regarding food toxins and their sources and use for betterment of society and to process toxin free food in industry.
5. Know about lethal concentrations of contaminant and toxicants.

UNITS - I

Food additives- definitions, classification and functions, Preservatives, antioxidants, colors and flavors (synthetic and natural), emulsifiers, sequesterants, humectants, hydrocolloids, sweeteners, acidulants, buffering salts, anti caking agents, etc.

UNIT- II

Colors, flavors, sweeteners, acidulants with respect to chemistry, food uses and functions in formulations, Definition and basic tastes, Chemical structure and taste, Description of food flavors, Flavor enhancers. Food additives uses and functions in formulations; indirect food additives; **UNIT-**

III

Safety and quality evaluation of additives. Toxicants and allergens in foods derived from plants, animals, marine, algae & mushroom; Microbial toxins; Food Poisoning; Food borne infections and disease.

UNIT-IV

Food Contaminants-physical, chemical, microbial and other contaminants. Derived Food toxicants-Processing & Packaging; Toxicants generated during food processing such as nitrosamines, acryl amide, benzene, dioxins and furans; persistent organic pollutants.

UNIT-V

(12 hrs)

Definition scope and general principles of food toxicology; manifestation of toxic effects; classification of food toxicants; factors affecting toxicity of compounds; methods used in safety evaluation-risk assessments. Methods of toxic determinations, Acute and chronic studies. LD50.

References:

1. Fennema, O.R. Ed. 1976. Principles of Food Science: Part-I Food Chemistry. Marcel Dekker, New York.
2. Potter, N.N. 1978. Food Science. 3rd Ed. AVI, Westport.
3. Branen A.L. and Davidson, P.M. 1983. Antimicrobials in Foods. Marcel Dekker, New York.
4. Furia, T.E. 1980, Handbook of food additives, Vol I and Vol II.
5. Bamji MS, Krishnaswamy K, Brahmam GNV (2009). Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd.

SEMESTER-VIII

COURSE 22: FOOD ADDITIVES, CONTAMINANTS AND TOXICOLOGY

Practical

Credits: 1

2 hrs/week

PRACTICALS (Total Topics- 10 and Hrs- 30)

1. Study the food additives
2. Detection and estimation of food additives and adulterants
3. Qualitative determination of Benzoic acid in given food sample
4. Applications of additives and ingredients in foods
5. Estimation of preservatives
6. Estimation of fibers
7. Estimation of antioxidants
8. Detection of pesticide residues
9. Detection of antibiotic residues
10. Protocol for detection & quantification of toxins in food

SEMESTER-VIII

COURSE 22: MATERNAL AND CHILD NUTRITION

Theory

Credits: 3

3 hrs/week

Course Objectives - To enable the students to:

- Understand physiological changes in pregnancy and lactation.
- Get acquainted with growth and development changes from conception till adolescence.
- Understand the inter-relationship between nutrition and growth and development during life cycle.

Course Outcomes - After the completion of the course, the students will be able to:

Gaining sufficient foundation in maternal and child nutrition to better understand the relevant scientific literature.

Lectures and guest presentations accompanied by class discussions will provide a breadth of maternal and child nutrition knowledge.

Content:

Unit-I

Importance of Maternal Nutrition:

Importance of nutrition prior to and during pregnancy.

Physiology and endocrinology of pregnancy and embryonic and fetal growth and development

Nutritional requirements during pregnancy

Adolescent Pregnancy

Intra-uterine growth retardation

Complications of pregnancy and management and importance of antenatal care.

Congenital malformation, fetal alcohol syndrome and gestational diabetes mellitus.

Unit-II

Lactation

Development of mammary tissue and role of hormones

Physiology and endocrinology of lactation – Synthesis of milk components, let down reflex, role of hormones, lactational amenorrhea, effect of breast feeding on maternal health

Human milk composition and factors affecting breastfeeding and fertility

Management of lactation – Prenatal breastfeeding skill education. Rooming in, problems – sore nipples, engorged breast, inverted nipples etc.

Exclusive breastfeeding

Baby friendly hospitals initiative

Breast feeding in the age of AIDS

Unit-III

Infant physiology and the preterm and LBW infants

Implications for feeding and management.

Growth and development during infancy, childhood

Feeding practices in special conditions-cleft palate, lactose intolerance, infant formula

Nutrient needs during infancy

Unit-IV

Malnutrition in mothers and children: etiology and management

Consequence of malnutrition on children-physical, mental, cognitive development

Assessment of anthropometric measurements and growth charts-Percentile & Z score

Concept of small family-Definition, nature, merits and Barriers of small family norms

Family planning-Methods, Purpose, merits and demerits.

Unit-V

Policies and programmes for promoting maternal and child nutrition and health.

Current Nutrition and Health Status of Women and Children in India.

Changing concepts and controversies in Maternal and Child Nutrition.

Reference:

1. International Food Policy Research Institute (1997). Care and Nutrition: Concepts and Measurement. International Food Policy Research Institute Washington D.C., USA.
2. International Child Health: A Digest of Current Information.

3. Barker, D.J.P. (1998). Mothers, Babies and Health in Later Life. Edinburgh, Churchill Livingstone.
4. Ward R.H.T; Smith, S.K.; Donnai, D. (Eds) (1994) Early Fetal Growth and Development. London, RCOG Press.
5. Sachdev, H.P.S. and Choudhary, P. (1995). Nutrition in Children – Developing Country Concerns. Cambridge Press. New Delhi.
6. King, F.S. (1992). Helping Mothers to Breastfeed. Association for Consumers Action on Safety and Health, Mumbai.
7. Wallace, H.M. and Giri, K. (1990) Health Care of Women and Children in Developing Countries. Third Party Publishing Co., Oakland.
8. Tanner, J.M. (1988) Foetus into Man : Physical Growth from Conception to Maturity. Wheaton and Co. Ltd. Great Britain.
9. Luke, B. Johnson, T.R.B.; Petrie, R.H. (1993). Clinical Maternal – Fetal Nutrition, Little Brown and Co, Boston.
10. ACC/SCN Reports
11. WHO (1999) Nutrition for Health and Development: Progress and Prospects on the Eve of the 21st Century. WHO/NHD/99.9. Geneva
12. Alderman, H.; Behrman, J; Lavy, V; Menon, R. (1997) Child Nutrition, Child Health and School Enrollment. Policy Research Working Paper 1700. Washington DC. World Bank.

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SEMESTER-VIII

COURSE 22: MATERNAL AND CHILD NUTRITION

Practical

Credits: 1

2 hrs/week

CONTENTS:

1. Planning and preparation of diets for pregnant women belonging to different income groups.
2. Planning and preparation of diets for lactating women belonging to different income groups.
3. Choosing a formula – Sterilizing the bottle and nipples – preparation of formula – Powdered and liquid.
4. Study and critical analysis of food & nutrition related practices related to pregnancy and lactation in the local area.
5. Study of the existing breast feeding and complementary feeding practices
6. Planning and preparation of foods for weaning children. Cost and nutrient analysis of homemade and commercial weaning foods.
7. Study of commercial feeding foods available in local market.
8. Assessment of Growth – use of anthropometric measurements. Use of growth chart to measure growth chart.

SEMESTER-VIII

COURSE 23: FOOD & NUTRITION SECURITY

Theory

Credits: 3

3 hrs/week

Course Objectives - To enable the students to:

- The food and nutrition situation in India.
- The strategies to develop food and nutrition security in the country.

Course Outcomes - After the completion of the course, the students will be able to:

- Apply knowledge of the physical and biological sciences to the function (role) of nutrients in metabolic processes
- Determine the rationale for dietary recommendations within the contexts of nutrition policy and research. Outcome
- Predict how nutrition affects disease risk and processes.

Unit-I

The Evolution of Food and Nutrition Security Concerns

Introduction, Definition, aspects of food and nutrition security,

The Conceptual Framework of the Nutritional Status at Household Level

Food and Nutritional Security at the different social/administrative levels

Most common Food and Nutrition Security indicators at different social and administrative levels

Current food and nutritional situation in India – food availability, purchasing power

Unit-II

Food and Nutrition Security and Gender

Gender and Food and Nutrition Security, Access to and control over resources, Capacity development

Food and Nutrition Security and Gender

Food and nutrition insecurity endanger the attainment of the MDGs

Indicators for food and nutrition security at national and regional level

Targeted food and nutrition security interventions, Actions to improve availability of food

Unit-III

Current Diet and Nutrition Scenario –

Classification of foods based on function, Handling perishable foods

Best practices of storage, Unsafe foods, Foods consumed should be safe and clean

Personal hygiene, common adulterants

How to minimize effects of pesticide residues, Indian food beliefs, fads and taboos, Effects of the precooking process

Unit-IV

Government systems in existence to maintain food and nutrition security in the country.

- Mid-Day Meal Programme
- National Food Security Act
- Mahatma Gandhi National Rural Employment Guarantee Act
- Public Distribution System
- Antyodaya Anna Yojana

Unit-V

Role of agriculture in Food security

Nutrition Insecurity in India, Food quality and safety

Nutrition-Oriented Agriculture and Food Diversification

Focus on agriculture, Improving access, Biofortification of staple crops,

Leveraging agriculture to empower women

Food security indicators in India compared to similar countries

Food security indicators in India compared to similar countries

REFERENCES:

1. Gopalan C and Vijayaraghavan K (1971) Nutrition Atlas of India, NIN, Hyderabad.
2. Park J.E. and Park K.(1986) Text book of preventive and social medicine, BanarasidasBhanot, Jabalpur.
3. Combating Under nutrition – Basic issues and practical approach. Special Publication series Np.3 (1987) NFI, New Delhi
4. <https://vikaspedia.in/social-welfare/social-security/right-to-food>
5. <https://www.manage.gov.in/studymaterial/FNS-E.pdf>

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SEMESTER-VIII

COURSE 23: FOOD & NUTRITION SECURITY

Practical

Credits: 1

2 hrs/week

COURSE:

1. Study the current models in existence for maintaining food and nutrition security.
2. Review the literature to study the food and nutrition situation in India.
3. Conduct nutrition survey to assess the situation in rural and urban areas.
4. Prepare a report summarizing the student's knowledge.

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SEMESTER-VIII

COURSE 23: ADVANCES IN HUMAN NUTRITION

Theory

Credits: 3

3 hrs/week

Course Objectives - To enable the students to:

- Provide in-depth knowledge of the physiological and metabolic role of macro and micro nutrients and their importance in human nutrition.
- Familiarize with the recent advances in nutrition and apply this knowledge in planning for public health programme.
- To enable the students to translate the knowledge into practical guidelines for dietary needs of human nutrition at different stages of life.

Course Outcomes - After the completion of the course, the students will be able to:

- Critique and effectively communicate nutrition information.
- Describe methods used in assessing the nutritional status.
- Understand adult human body composition and demonstrate the techniques for the measurement of body compositions.
- Apply knowledge in the assessment of energy expenditure for various activities.

Unit I:

Body composition

Significance of body composition and changes through the life cycle.

Methods used for measurement of body components.-Body fat, Fat Free Mass (FFM), Factors affecting and Influence of Energy Excess and Energy deficit in body composition

Unit II:

Energy

Energy intake versus Energy Expenditure, Energy Balance.

Components of energy expenditure: RMR, BMR, PAL, PAR, Thermic effect — of food.

Control of food intake — Role of leptin and other hormones.

Latest concepts in energy requirements and recommendation for different age groups. Energy imbalance: An overview

Unit III

Carbohydrates

Glycemic Index of food and its uses. Glycemic load.

Dietary fibre — Components, Sources, Role of dietary fibre in human nutrition

Resistant starch and fructo oligosaccharides-Physiological effects.

Modification of carbohydrate intake for specific disorders — Lactose Intolerance, Diabetic mellitus and Dental caries Artificial sweeteners

Unit-IV

Proteins

Methods of estimation of Dietary proteins.

Therapeutic application of amino es Protein quality, Methods of evaluating protein quality

Protein and amino acid requirements throughout life cycle & Protein deficiency

Kwashiorkor and Marasmus — clinical features and biochemical changes

Unit-V

Lipids

Physiological functions, Nutritional significance of fatty _ SFA, MUFA, PUFA.

Role of n3 and n6 fatty acids. Role of lipoprotein and cholesterol, triglycerides

Requirements of total fats and fatty

Deficiency of Essential Fatty acids

Reference

1. Groff JL and Gropper SS. Advanced Nutrition and Human Metabolism, Wadsworth Thompson Learning, USA. 2000.
2. Mc Clements DJ and Decker EA. Designing Functional Foods. Woodhead Publishing, USA 2009.
3. Shills ME, Olson JA, Shike M and Ross CA (Eds). Modern Nutrition in Health and Disease, Lippincott Williams and Wilkins, London. 1999.
4. Gibney MJ, Macdonald IA and Roche HM. Nutrition and Metabolism, Blackwell Publishing, UK. 2003.

SEMESTER-VIII

COURSE 23: ADVANCES IN HUMAN NUTRITION

Practical

Credits: 1

2 hrs/week

Practical

1. Demonstration of blood glucose monitoring using glucometer.
2. Body composition analysis: Anthropometric and bioelectrical impedance methods.
3. Physical activity measurement using standard questionnaire.
4. Computation of total energy expenditure using factorial method.
5. Development of low-cost protein food supplements and protein quality evaluation by
6. computational method (PDCAAS).

SEMESTER-VIII

COURSE 24: MINI PROJECT

Theory

Credits: 4

5 hrs/week

Course Objectives - To enable the students to:

- The major project is intended to arouse a genuine interest in research and present the student with an opportunity to express her individual skill and ability

Course Outcomes - After the completion of the course, the students will be able to:

- It is expected to train the student in the process of methodical scientific research.
- To strengthen the scientific temper in the student.

Content:

The student shall undertake a MINI project from a relevant area in the field and collect data and present a project report under the supervision of competent faculty.

1. Introduction (stating objectives of study)
2. Review of literature
3. Research design
4. Results and discussion
5. Summary and conclusion

The mini project shall be valued as under:

I Seminar – after objectives and area of study are finalized – 10m

II Seminar – after tool of study is finalised and pilot study is completed – 10m

III Seminar – after data collection – 15m

IV Seminar – after statistical analysis is completed – 15m

External Evaluation – 100m

SEMESTER-VIII

COURSE 24: ENTREPRENEURSHIP IN FOOD INDUSTRY

Theory

Credits: 3

3 hrs/week

OBJECTIVES

- To develop Entrepreneurial culture and encourage the students to become entrepreneurs.
- To know about the various procedures for starting a small scale Module of production.
- To have a basic idea about how to prepare a project to start a small scale industry.
- To know about various agencies that can provide assistance for starting a new project.

UNIT-I

1.Introduction to Entrepreneurship. Meaning, definition and concepts, characteristics, functions, entrepreneurial traits and motivation, role of entrepreneur in economic development, factors affecting entrepreneurial growth.

2.Types of entrepreneurs - Entrepreneurship, Women entrepreneurship, significance, problems, solutions to the problems

UNIT II

1.Government policies and scheme for entrepreneurship- policies for promoting small business, Benefits for women entrepreneurs.

2.Preparation of business plan, components of business plan- Revenue, production, expenses , cash and staff. Uses and benefits of business plan.

UNIT III:

1.SWOT analysis – strength, weakness, opportunity and threat.

2. Usefulness of swot analysis. Case study applying SWOT.

UNIT IV

1. Policy measures for promoting micro, small and medium enterprise. Setting up of micro, small and medium enterprise.

2. Major components of marketing, packaging and trade mark. Types of promotions and advertisement.

UNIT V

1.Role of institutions/schemes in entrepreneurial development -SIDCO, SIDBI, NIESBUD, EDII, SISI, NREG Scheme- SWARNA JAYANTHI, Rozgar Yojana Schemes.

2. Case studies of successful food entrepreneurs.

CO-CIRCULAR ACTIVITIES

- developing a mock food business model.
- Interviewing food entrepreneurs.
- organizing guest lecture - a) successful food entrepreneurs
- financial institute officials - financial assistance.

Reference Books

- 1 Philip Kotler, 1997 Marketing Management 9th Edition. Prentice- Hall of India, New Delhi.
2. Abraham M.M, (2010), “Entrepreneurship Development and Project Management”, Prakash Publications and Printers.
3. Desai, Vasant (2001), “Dynamics of entrepreneurial development and management”. Himalaya Publishing House.

SEMESTER-VIII

COURSE 24: ENTREPRENEURSHIP IN FOOD INDUSTRY

Practical

Credits: 1

2 hrs/week

1. Conduct market survey – pricing of packaged food items.
2. Design food packaging and labelling for- chips , biscuits, snacks , chocolates etc.
3. Develop a business plan and costing for a food start up.
4. Educational visits to local food start ups, eateries and restaurants.

SEMESTER-VIII

COURSE 25: NUTRITION ASSESSMENT TECHNIQUES

Theory

Credits: 3

3 hrs/week

Course Objectives - To enable the students to:

1. Understand the methods of nutritional status assessment.
2. Apply knowledge on assessment techniques of protein quality in diets
3. Plan nutrition research using animal models.
4. Design nutrition research using Human models.

Course Outcome - After the completion of the course students will be able to:

1. Can know about various nutrition monitoring agencies and their role
2. . Assess nutritional status using ABCD techniques.
3. Apply advance research techniques in dietary assessment.
4. Can carryout nutrition research using animal models.
5. Design nutrition research using human models.

UNIT-I:

Nutritional status: Meaning, indicators, Nutritional surveillance: Need, overviews of the nutritional surveillance, determinants

Need of nutrition and health status. Role of National Nutrition Monitoring Bureau (NNMB), National Nutrition Mission (NNM), National Institution of Nutrition (NIN).

UNIT-II: Assessments of Nutritional Status

Direct methods: Anthropometric, Biochemical, Clinical, Dietary assessments.

Anthropometric assessment: Introduction, Definition, Methods of measurements,

Standardizations Classification of Nutritional status.

Biochemical assessment: Need for Biochemical test, Different types of biochemical tests ,Interpretation of biochemical tests .

Clinical assessments: Assessment of clinical signs in various disorders.

Dietary Assessments: Types of Diet surveys, methods of Diet surveys, analysis and interpretation, problems in Diet surveys and solutions.

Indirect method: Vital statistics and other Records

UNIT-III: Methods of Estimation of Protein Quality

Protein efficiency ratio (PER), Digestibility coefficient, Biological value (BV), Net Protein Utilization (NPU), Net protein Ratio (NPR), Chemical score, protein Digestibility corrected Amino Acid Score (PDCAAS), Net Dietary Protein Calories Percent (NDPCP).

UNIT-IV: Growth studies: Animal Models

Role of animal models in nutrition research; need for extrapolation of animal research results to human populations; Maintenance of animal laboratory; maintenance of records; Principles of formulation of diets- classification and composition.

Growth and development of rats- role of different protein levels of the diet protein sources of the diet- body weight changes- feeding techniques- calculation of PER.

Biological Assays with animal models: metabolic and balance studies: (for protein quality): Biological value- formulation of objectives, composition of diets- collections of urine and fecal, food intake assessment, determination of food and urine and fecal nitrogen – calculations of endogenous nitrogen – digestibility coefficient (DC) and Biological value (BV).

UNIT-V: Growth and Metabolic Studies with Human Subjects

Principles, objectives.

Growth studies with infants on feeding different protein sources. (case study experiences and report of research studies)

Growth studies with preschool children, school children and adolescents: Effect of supplementation

Nitrogen balance studies, in growing children, adolescents and adults- Procedure for conducting metabolic and balance studies and interpretation of results.

CO-CIRCULAR ACTIVITIES

- organizing health assessment camps for students and faculty.
- Visiting diagnostic laboratory.

REFERENCE

1. Mahatab.S. Bamiji, N. PrahladRao and VinodiniReddy . (2001). Text Book of Human Nutrition" Oxford and IBFI Publishing Co. Pvt. Ltd., New Delhi.
2. Swaminathan M. (1995).Advanced Text book on "Food and Nutrition" (Applied aspects) Vol. II BAPPCO, The Bangalore Printing and Publishing Co. Ltd., (Chapters 21, 24) Bangalore.
3. Tara Gopaldas and SubhadraSeshadri.(1997). Nutrition, Monitoring and assessment, Oxford University Press, New Delhi .
4. Whitney. E.N, and S.R.Rolfes. (1999). `Understanding Nutrition', (8th edition) Chap. 6 and Appendix `J'.Measures of Protein Quality - West/Wadsworth.
5. Ruth .L. Pyke and Myrtle .L. Brown. (1997). Nutrition an Integrated approach, Chapter 15, Wiley eastern Publications, New Yark.
6. Mayanard, L.A and J.K. Loosli. (1992). Animal Nutrition, 5th edition McGraw Hill book company, New York.

SEMESTER-VIII

COURSE 25: NUTRITION ASSESSMENT TECHNIQUES

Practical

Credits: 1

2 hrs/week

1. Visit to a needed community in the society and assessing their socio economic and nutritional status by questionnaire method.
2. Assessment of Nutritional status by direct methods- Height, weight, Head circumference, chest mid arm circumference.
3. Assessment of Nutritional status by indirect methods- clinical and biochemical methods.
4. Assessment of nutritional status of the target group by dietary recall method.
5. Nitrogen and mineral nutrition supplementation studies on human subjects (children, school going and adolescents)

SEMESTER-VIII

COURSE 25: CASE STUDIES

Theory

Credits: 3

3 hrs/week

OBJECTIVES:-

- To gain knowledge regarding different medical conditions.
- To able to read and comprehend biochemical parameters and clinical symptoms.

NOTE-

Student is expected to collect 5 case studies each for each unit. Assess the medical condition. Design condition specific diets and justify the same. Presentations to be done post submission of the report.

UNIT I

Heart Diseases- Types, Etiology, Symptoms, biochemical changes, diet planning and justification.

UNIT II

Renal Diseases- Types, Etiology, Symptoms, biochemical changes, diet planning and justification.

UNIT III

Liver Diseases- Types, Etiology, Symptoms, biochemical changes, diet planning and justification.

UNIT IV

Lifestyle Diseases ; Diabetes and obesity - Types, Etiology, Symptoms, biochemical changes, diet planning and justification.

UNIT V

Deficiency Disorders and Critical cases- Types, Etiology, Symptoms, biochemical changes, diet planning and justification.