ಮಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ
MANGALORE UNIVERSITY

ಕುಲಸಚಿವರ ಕಛೇರಿ
ಮಂಗಳಗಂಗೋತ್ರಿ – 574 199
Office of the Registrar
Mangalagangothri – 574 199

ಕ್ರಮಾಂಕ/ No. : MU/ACC/CR.21/2022-23/A8

ದಿನಾಂಕ/Date: 30/11/2022

NOTIFICATION

Sub:Revised Syllabus of B.Sc(FND) Degree Programme under NEP 2020-reg.

Ref: Vice Chacellors approval Dtd:29.11.2022

Pursuant to the above, the Revised syllabus of I-IV semesters B.Sc(FND) Degree Programme under NEP 2020 is hereby notified for implementation with effect from the Academic year 2022-23 Onwards subject to the pending approval of the Academic council.

Copy of the Syllabus should be downloaded from the Mangalore University website. www.mangaloreuniversity.ac.in

30/11/22

FOR REGISTRAR.

To:

1) The Principals of all the colleges offering B.Sc(FND) degree programmes.
2) The Registrar (Evaluation), Mangalore University.
3) Dr.Monika Sadananda , Chairman, Combined BOS in U.G .Food Nutrition & Dietetics & P.G. Food Science And Nutrition, Professor, Dept. of Biosciences, Mangalore University.
4) The Assistant Registrar/The Superintendent, Academic Section, O/o the Registrar, Mangalore University.
5) The Director, DUIMS, Mangalore University – with a request to publish in the Website.
6) Guard File

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Government of Karnataka

Structure of B.Sc. (Hons.) with Food Nutrition and Dietetics as a Subject (Model C4)

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Model Curriculum

Name of the Degree Program: B.Sc.(Basic / Hons)
Discipline Core: Food Nutrition and Dietetics
Total Credits for the Program:
Starting year of implementation:

Program Outcomes (POs)

After successful completion of this program, graduates of Food Nutrition and Dietetics will have the following attributes:

1. Scientific Knowledge: Apply the knowledge of food science, chemistry, nutrition, physiology and dietetics in a competent manner to innovate in the field of nutrition and dietetics.
2. Design and Development of Solutions: Design nutrition and dietetics strategies as per the specified requirements of regulatory bodies related to food, health, environment, hospitals, families and communities.
3. Problem Analysis: Identify, formulate, rationalise, and analyse nutrition-related problems in the community and hospitals so as to reach substantiated diet-based conclusions using the principles of food nutrition and dietetics.
4. Modern Tool usage: Create, select, and apply modern nutrition and dietetics tools, techniques, and resources of relevance in nutrition and dietetics.
5. Environment and Sustainability: Evolve nutrition and dietetics approaches in the context of food security and environmentally sustainable development goals.
6. Teamwork: Function objectively as an individual and as a member in diverse teams.
7. Communication: Effectively document and communicate nutrition and dietetics approaches and plans with individuals, patients and communities.
8. Lifelong learning: Independently engage in continuous learning to adapt to newer concepts in nutrition and dietetics.

Program Specific Outcomes (PSOs):

After successful completion of this program, graduates of Food Nutrition and Dietetics will have the following specific attributes:

- Utilize the knowledge from the physical and biological sciences as a basis for understanding the role of food and nutrients in health and disease processes
- Evaluate the food product and the application of necessary preservation techniques to increase the shelf life of the product and also be a part in the auditing industry
- Work in Research laboratories on the fortification and enrichment of existing product as well as the development of new product
- Apply the nutrition and dietetics-based knowledge and skills in the planning and assessment of suitable diets for individuals of every age, patients and the community in a sustainable manner.
- Provide nutrition counselling and education to individuals, groups, and communities throughout the lifespan using a variety of communication strategies

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- Apply technical skills, knowledge of health behaviour, clinical judgment, and decision-making skills when assessing and evaluating the nutritional status of individuals and communities and their response to nutrition intervention.
- Implement strategies for food access, procurement, preparation, and security for individuals, families, and communities.
- Apply food science knowledge to describe functional properties of food ingredients.
- Apply the knowledge of principles and techniques of nutrition and dietetics for research-based approaches.
- Apply skills gained in nutrition and dietetics for research, development, and entrepreneurship.

Assessment:

Weightage for assessments (in percentage)

Type of Course	Weightage in Marks	Summative Assessment
Theory	40	60
Practical	25	25
Projects	40	60
Experiential Learning (Internships etc.)	40	60

Content of Courses for B.Sc. Degree/Honours in Food Nutrition and Dietetics
Model C4

Semester	Course Code	Category of Course	Theory/ Practicals	Credits	Course/Paper Titles	Marks	
						IA	SA
I		DSC- C1	Theory	3	Human Nutrition I	40	60
		DSC-C2	Practical	2		25	25
		DSC-C3	Theory	3	Human Physiology - I	40	60
		DSC-C4	Practical	2		25	25
		DSC-C5	Theory	3	Food Science I	40	60
		OE-1	Theory	3	Fundamentals of Food and Health	40	60
II		DSC-C6	Theory	3	Food Science II	40	60
		DSC-C7	Practical	2		25	25
		DSC-C8	Theory	3	Dietetics - I	40	60
		DSC-C9	Practical	2		25	25
		DSC-C10	Theory	3	Human Physiology - II	40	60
		OE-2	Theory	3	Food safety and hygiene	40	60
Exit option with Undergraduate Certificate in Food Nutrition and Dietetics with completion of courses equivalent to a minimum of 48 credits, followed by 10-12 credit bridge course(s) for two months, including at-least 6-credit job-specific internship/apprenticeship to acquire job-ready competencies							

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required to enter the job							
III		DSC-C11	Theory	3	Lifespan Nutrition – I	40	60
		DSC-C12	Practical	2		25	25
		DSC-C13	Theory	3	Nutritional Biochemistry I	40	60
		DSC-C14	Practical	2		25	25
		DSC-C15	Theory	3	Human Nutrition - II	40	60
		OE-3	Theory	3	Nutritional Assessment / Traditional foods and health	40	60
IV		DSC-C16	Theory	3	Dietetics – II	40	60
		DSC-C17	Practical	2		25	25
		DSC-C18	Theory	3	Lifespan Nutrition II	40	60
		DSC-C19	Practical	2		25	25
		DSC-C20	Theory	3	Quality Control I	40	60
		OE-4	Theory	3	Nutrition in weight management / Diet in life style disorder	40	60
Exit option with Undergraduate Diploma in Food Nutrition and Dietetics (with completion of courses equal to a minimum of 96 credits), followed by 10-12 credit bridge course(s) for two months, including at-least 6-credit job-specific internship/apprenticeship to acquire job-ready competencies required to enter a job							
V		DSC-C21	Theory	3	Quality Control - II	40	60
		DSC-C22	Practical	2		25	25
		DSC-C23	Theory	3	Therapeutic Nutrition - I	40	60
		DSC-C24	Practical	2		25	25
		DSC-C25	Theory	3	Food Microbiology - I	40	60
		DSC-C26	Practical	2		25	25
		VOC-1	Theory	3	Community Nutrition / Diet Counselling	40	60
		VOC-2	Theory	3	Food product development and sensory analysis	40	60
VI		DSC-C27	Theory	3	Nutritional Biochemistry II	40	60
		DSC-C28	Practical	2		25	25
		DSC-C29	Theory	3	Therapeutic Nutrition II	40	60
		DSC-C30	Practical	2		25	25
		DSC-C31	Theory	3	Food Preservation I	40	60
		DSC-C32	Practical	2		25	25
		VOC-3	Theory	3	Functional Foods and Nutraceuticals	40	60

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			Theory		Res. Methodology		
Exit option with Bachelor of Science Degree, B.Sc. in a Food Nutrition and Dietetics (with completion of courses equal to 132-140 credits), followed by 10-12 credit bridge course(s) for two months, including at-least 6-credit job-specific internship/apprenticeship to acquire job-ready competencies required to enter a job							
VII		DSE-E1	Theory	3	Food Microbiology II	40	60
		DSE-E2	Theory	2	Food Service Management	40	60
		DSE-E3	Theory	3	Food Preservation II	40	60
		DSE-E4	Theory	2	Foods in Indian Tradition	40	60
		VOC-4	Theory		Diet Counselling	40	60
					Research Methodology		
			Theory		Research Proposal*		
VIII		DSE-E5	Theory	3	Public Health Nutrition	40	60
		DSE-E6	Theory	3	Food packaging	40	60
		DSE-E7	Theory	3	Food Additives and Adulterants	40	60
		DSE-E8	Theory	3	Therapeutic Food Product Development	40	60
					Research Internship		
					Research Project*		
Award of Bachelor of Science Degree with Honours, B.Sc. (Hons.) in Food Nutrition and Dietetics (with completion of courses equal to 176-180 credits) *In lieu of the Research Proposal and Project, three additional elective papers/ Internship/Apprenticeship may be offered.							

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Program Name	**B Sc Food Nutrition and Dietetics**	Semester	**First Semester**
Course Title	**Human Nutrition I (Theory + Practical)**		
Course Code:	**DSC**	No. of Theory +Practical Credits	**3+2**
Contact hours	**45 hrs**	Duration of ESA/Exam	**2 Hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%

Course Outcomes (COs): After the successful completion of the course, the student will be able to:

CO 1. Comprehend nutritional classification of food and methods of assessing nutritional status and energy requirements

CO 2. Understand the functions and sources of nutrients

CO 3. Apply the knowledge of human nutrition in maintenance of good health for the individual and the community

CO 4. Assess the factors affecting availability and requirements of nutrients

Content of Theory	**45 Hrs**
Unit–1	15

Nutritional Status: The relation of good nutrition to normal physical development and sound health. Definitions of the terms – Nutrition, Health, Nutrients, Nutritional status, Malnutrition, RDA. Methods of assessing nutritional status – Population sampling, collection of data on the nutritional adequacy of diet consumes, anthropometric measurements, clinical examination, biochemical assessment. Diet surveys – methods. Energy - Definition of health and nutrition, Definition of calorie and joule, Measurement of calorific values of foods. Basal Metabolic Rate (BMR) - Factors affecting. Specific Dynamic Action (SDA) of foods.

Unit -2	15

Energy needs of the body. Measurement of energy balance of the body. Direct and indirect calorimetry Calculation of energy requirements. The ideal proportion of calories from protein, carbohydrates and fats Carbohydrates: Classification, Basic structure, chemistry, digestion, absorption, Transport, brief overview of metabolism, functions, sources and requirements

Unit -3	15

Proteins: Classification, Structure, chemistry, digestion, absorption, brief overview of metabolism, functions, sources and requirements. Essential amino acids, evaluation of protein quality, Factors affecting bio-availability, supplementation and deficiency state.

Lipids / Fats: Classification, chemistry, digestion, absorption, brief overview of metabolism, functions, sources and requirements. Saturated and unsaturated fatty acids and effects of deficiency. Nutritional significance of SFA, MUFA, PUFA, Omega-3

Pedagogy

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10

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Assignment / Seminar	5+5
Project	10
Total	**40 Marks**

Course Title	**Human Nutrition I (Practical)**	Practical Credits	**2**

Content of Practical

1. Weights and measures –Household measures
2. Weights and standard measures used in food science laboratory.
3. Calculation of mean nutritive value of food
4. Methods of cooking
   a. Water – boiling, steaming, pressure cooking
   b. Oil- Shallow frying, deep frying
5. Qualitative tests for proteins
6. Quantitative estimation of glucose
7. Estimation of total lipid in egg yolk
8. Recommended Dietary Allowances/Nutritive values

Pedagogy

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	05
Test 2	05
Practical Record	10
Participation and Involvement	05
Total	**25 Marks**

References

- WTO Technical Reports Series for Different Nutrients.
- Roday S. (2018), Food Science and Nutrition, Oxford University Press
- Srilakshmi B (2015) Nutrition science - 4th Ed., New age international Publ., New Delhi
- Agarwal A, Udipi SA (2014) Text book of human nutrition, Jaypee Bros. Medical Publ., New Delhi
- Raheena Begum., (2009), A Text book of Food, Nutrition & Dietetics, Sterling Publications, New Delhi.
- Srilakshmi. B., (2009), Human Nutrition, New Age International Publishers

- Mudambi S R and Rajagopal M V., (2008), Fundamentals of Food, Nutrition and Diet Therapy by New Age International Publishers, New Delhi
- Shills ME, Shike M, Ross AC, Caballero B, Cousins RJ (2005) Modern Nutrition in health and disease – 10th Ed., Lippincott Williams and Wilkins
- Bamji M, Rao NP, Reddy V (1996) Text book of Human Nutrition, Oxford and IBH Publ. Co. Pvt Ltd, New Delhi
- Gopalan C (1991) Nutrition value of Indian foods, ICMR
- Guthrie AH (1986) Introductory Nutrition, 6th Ed., The CV Mosby Company
- Robinson CH, Lawler MR, Chenoweth WL, Garwick AE (1986) Normal and therapeutic nutrition, 17th Ed., Macmillan Publ. Co.
- Swaminathan M (1985) Essentials of food and nutrition, Vol I and II, Ganesh and Co, Madras

Program Name	**B Sc Food Nutrition and Dietetics**	Semester	**First Semester**
Course Title	**Human Physiology - I (Theory + Practical)**		
Course Code:	**DSC**	No. of Theory +Practical Credits	**3+2**
Contact hours	**45 hrs**	Duration of ESA/Exam	**2 Hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%

Course Outcomes (COs): After the successful completion of the course, the student will be able to:

CO 1. Understand the homoeostatic status of the human body

CO 2. Comprehend the physiological processes and functions of various vital organs as applicable to human nutrition

CO 3. Apply the knowledge of physiological states to therapeutic diets

CO 4. Assess malfunctioning of vital organs or systems

Content of Theory	**45 Hrs**
Unit–1	15

Introduction: Cell – structure and function of organelles, nucleus, chromosomes, genes, homoeostasis and body fluids. Blood: Red blood cells – Erythropoiesis, stages of differentiation, function, counts, physiological variation. Hemoglobin – structure, function, concentration, physiological variation. White blood cells – production, function, life span, counts, differential counts. Platelets – origin, normal count, morphology, functions. Plasma proteins – production, concentration, types, albumin, globulin, fibrinogen. Haemostasis and blood coagulation. Haemostasis – definition, normal haemostasis, clotting factors, mechanism of clotting, disorders of clotting factors. Blood Bank - Blood groups – ABO system, Blood grouping and typing, cross matching. Rh system – Rh factor, Rh incompatibility. Blood transfusion – Indication, universal donor and recipient concept. Complications of blood transfusion and cross matching. Selection criteria of a blood donor, transfusion reactions. Anticoagulants – examples and uses. Anaemia – classification – morphological and etiological effects of anaemia on body. Blood indices – colour index, MCH, MCV, MCHC. Erythrocyte sedimentation rate (ESR) and packed cell volume. Blood volume – normal value, determination of blood volume and regulation of blood volume. Lymph – composition and function.

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Unit -2	15
Cardiovascular system: Heart – physiological anatomy, nerve supply, properties of cardiac muscle, cardiac cycle – systole, diastole, conduction system. Cardiac output. Heart sounds: Normal heart sounds, areas of auscultation. Blood pressure – Definition, normal value, clinical measurement of blood pressure. Physiological variations, regulation of heart rate, cardiac shock, hypotension, hypertension. Electrocardiogram (ECG) – significance, coronary, cerebral circulation and capillary circulation. Respiratory System: Function of respiratory system - physiological anatomy of respiratory system, respiratory tract, respiratory muscles, respiratory organs – lungs, alveoli, respiratory membrane, stages of respiration. Mechanism of normal and rigorous respiration, intra pulmonary pleural pressure, surface tension. Transportation of respiratory gases: Transportation of O_2: direction, pressure gradient, forms of transportation, oxygenation of haemoglobin, quantity of O_2 transported. Lung volumes and capacities. Regulation of respiration, mechanisms of regulation, nervous and chemical regulation, respiratory centre. Hypoxia, cyanosis, asphyxia, dyspnoea, dysbarism, artificial respiration, apnoea	
Unit -3	15
Digestive System: Physiological anatomy of gastro-intestinal tract, functions of digestive system. Salivary glands – structure and functions, deglutition, mastication – stages and regulation of saliva, functions of saliva. Stomach – structure and functions. Gastric secretion – composition, function, regulation of gastric juice secretion. Pancreas – structure, function, composition and regulation of pancreatic juice. Liver – functions of liver. Bile secretion - composition, function, regulation of bile secretion, bilirubin metabolism, types of bilirubin, jaundice – types, significance. Gall bladder – functions. Intestine – small intestine and large intestine. Small intestine - functions, digestion, absorption, movements. Large intestine – functions, digestion and absorption of carbohydrates, proteins, fats, lipids. Defecation	

Pedagogy

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	**40 Marks**

Course Title	**Human Physiology I (Practical)**	Practical Credits	**2**
Content of Practical			
1. Record of blood pressure – Sphygmomanometer, palpatory method, auscultatory method, variation of BP 2. Haemoglobin estimation by Sahli's method 3. Blood grouping by agglutination method			

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4. Histology of Cartilage, bone, adipose tissue, skin, muscle
5. Microscope and its uses
6. Histology of epithelial, connective, muscular and nervous tissues.
7. Enumeration of RBC and WBC count by hemocytometry/Neubauer's counting chamber
8. Determination of Bleeding Time (BT) by Duke's method
9. Determination of Coagulation Time (CT) by Wright's method
10. Urine Analysis – Albumin
11. Urine Analysis - Glucose Test
12. Instruments used in haematology

Pedagogy

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	05
Test 2	05
Practical Record	10
Participation and Involvement	05
Total	**25 Marks**

References

- Jain NA (2022) CC Chatterjee's Human Physiology, 24th Ed., CBS Publishers, New Delhi
- Stuart IF, Rompolski K. (2018) Human Physiology, 15th Ed., McGraw Hill
- Marieb E, Hoehn K. (2018) Human Anatomy and Physiology, Pearson
- Chatterjee CC (2016), Human Physiology Volume I, Medical Allied Agency, Kolkata
- Jain A K (2012) Text Book of Physiology volume 1 and Vol.2, APC publications New Delhi
- Sembulingam K, Sembulingam P (2012) Essentials of medical physiology, Jaypee Bros. Medical Publ., New Delhi
- Chatterjee CC (1988) Human Physiology, Calcutta, WB
- Guyton AC, Hall JE (1996): Textbook of Medical Physiology, 9th Ed., Prism Books Pvt Ltd., Bangalore
- Wilson (1989) Anatomy and Physiology in Health and Illness, Edinburgh Churchill Livingstone

Program Name	**B Sc Food Nutrition and Dietetics**	Semester	**First Semester**
Course Title	**Food Science I (Theory)**		
Course Code:	**DSC**	No. of Credits	**3**
Contact hours	**45 hrs**	Duration of ESA/Exam	**2 Hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

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Course Pre-requisite(s): Certificate with minimum 45%

Course Outcomes:

After the successful completion of the course, the student will be able to:

CO 1. Understand factors to be considered during selection of basic commodities, raw andprocessed and various aspects of their products and distribution

CO 2. Comprehend the principles underlying changes in overall quality of food characteristics during cooking.

CO 3. Evaluate food products based on their quality characteristics

CO 4. Assess methods and media of cooking, nutritive value and processing, storage, preservation of both plant and animal-based food

Content of Theory	45 Hrs
Unit–1	15

Introduction to food science. Definition of food science. Food as a source of nutrients. Food groups: ICMR Five Food Group System. Eleven Food Group System. Nutritional Classification of foods. Cooking advantages of cooking. Methods of cooking: Moist heat methods – Water/steam as a media of cooking Boiling, simmering, poaching, stewing, steaming and pressure cooking – definition, advantages and disadvantages of each method. Dry heat method. Air as a media of cooking - grilling, roasting and baking Fat as media of cooking – stir frying, sautéing, shallow and deep fat frying. Definition, advantages and disadvantages of each method. Combination of cooking methods – braising. Microwave cooking – mechanism of microwave cooking, construction of a microwave oven, advantages and disadvantages

Unit -2	15

Cereals: Structure of a cereal grain. Composition and nutritive value of cereal grain. Specific cereals – nutritive value, composition and milling of rice and wheat. Parboiling – processes for parboiling, its advantages and disadvantages. Cereal protein gluten – process of gluten formation, factors that affect gluten formation. Characteristics of cereal starch – Amylose and Amylopectin. Effect of moist heat Gelatinization of starch – process of gelatinisation, gelatinisation temperature, factors affecting gelatinisation. Changes in cooked starches – gel formation, retrogradation, syneresis. Modified starch

Pulses, nuts, oilseeds and oils: Nutritive value and composition of pulses, nuts, oil seeds, fats and oils Processing of pulses – effects of decortication, soaking, germination, fermentation, parching and puffing extrusion. Toxic constituents of pulses. Pulse cookery – effect of cooking, factors that affect cooking quality

Unit -3	15

. Processing of nuts and oil seeds. Specific nuts and oilseeds – groundnuts, coconut. Types of fats and oils Vegetable oil – coconut, groundnut, sunflower and soybean. Animal fats – lard, margarine and butter Processing of fats and oils – rendering, pressing, solvent extraction, hydrogenation and refining. Changes during cooking – effect of heating, changes in fat on heating. Storage, spoilage, rancidity. Role of fats and oils in cookery

Fruits: Classification of fruits and nutritive value. Post harvest changes and storage. Pectin substances Ripening of fruits. Enzymatic and non-enzymatic browning, prevention of enzymatic browning. Vegetables Classification, nutritive value and composition. Pigments – water insoluble and soluble. Organic acids, enzymes, flavour compounds, bitter compounds. Vegetable cookery: Preliminary preparation – washing peeling and blanching. Changes during cooking – oxidation, chemical composition, water content and cellulose. Role of nutrients – mechanical losses, solvent action of water, oxidation and chemical composition. Enzymes and non-enzymatic browning, its prevention. Flavor compounds

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Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	**40 Marks**

References

- Apenten R, Vieira E. (2022) Elementary food science, Springer.
- Srilakshmi B. (2020) Food Science, New Age International Publishers.
- Sharma A. (2017) Food Science and Technology, CBS Publishers and Distributors
- Ward DJ. (2013) Principles of food science, Goodheart-Wilcox.
- Manay NS, Shadaksharaswamy M (2010) Foods - Facts and principles, New Age International Publ., New Delhi
- Roseville LJ, Viera ER (1992) Elementary food science, 3rd Ed., Chapman and Hall, New York
- Potter NN, Hotchkiss JH (1988) Food Science, 5th Ed, CBS Publisher and Distributors, Delhi
- Levies (1988) Food commodities, Heinemann Ltd., London
- Charley H (1982) Food Science, 2nd Ed., John Wiley and Sons.
- Dowell P, Bailey A (1980) The Book of ingredients, Dorling Kindersley Ltd., London
- Hughes and Benniion M (1970) Introductory Foods, Macmillan and Co, New York

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Program Name	**B Sc Food Nutrition and Dietetics**	Semester	**Second Semester**
Course Title	**Food Science II (Theory + Practical)**		
Course Code:	**DSC**	No. of Credits	**3+2**
Contact hours	**45 hrs**	Duration of ESA/Exam	**2 Hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%

Course Outcomes:

After the successful completion of the course, the student will be able to:

CO 1. Understand methods used in processing of milk and milk products

CO 2. Assess the nutritional qualities of egg and changes in characteristics during cooking.

CO 3. Evaluate composition of meat, processing and storage

CO 4. Enumerate the nutritive value of eggs, fish and the use of major spices in processing

Content of Theory	**45 Hrs**
Unit–1	15

Milk and milk products: Composition and nutritive value. Physical properties of milk. Effect of heat on milk constituents – nutrients, colour, flavour, digestibility, microorganisms, scum formation, scorching of milk. Processing of milk – clarification, pasteurization and homogenization. Preparation of cheese, butter, curd and ice cream. Problems encountered in cooking milk. Milk products – Vitamin D milk, skim milk, concentrated milk and cream

Unit -2	15

Egg: Structure and nutritive value. Composition – egg white and egg yolk proteins. Pigments in egg shell, white and yolk. Vegetarian egg. Egg quality – evaluation of egg quality, egg grading and deterioration of egg quality. Egg beating and factors affecting foaming. Egg cookery – Effects of heat and coagulation of egg proteins, microorganisms, effect of ingredients on egg protein. Egg prepared in the shell – boiled eggs – hard and soft. Egg prepared out of the shell – poached egg, fried egg, scrambled egg and omelette. Products based on egg as thickening agent – Custard. Products based on egg as emulsifying agent – Meringues. Preservation – freezing, cold storage, drying. Storage of egg

Unit -3	15

Meat: Structure, composition and nutritive value of meat. Classes of meat. Gelatin. Cuts and grades of meat and their selection. Post mortem changes, storage and changes during cooking. Ageing of meat and curing of meat. Factors affecting tenderness of meat. Meat cookery and changes during cooking, methods of cooking – dry heat and moist heat.

Poultry, fish and spices: Classification and nutritive value. Processing and preservation. Selection and storage. Methods of cooking poultry and fish cookery. Spoilage of fish.

Spices and condiments – Composition, flavouring extracts, adulteration and medicinal values. Processing and uses of major spices – Pepper (white and green), cardamom, ginger and turmeric

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Formative Assessment:

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Assessment Occasion/ type	Weightage in Marks
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	**40 Marks**

Course Title	**Food Science II (Practical)**	Practical Credits	**2**

Content of Practical

1. Food groups - Methods of measuring ingredients
2. Determination of the percentage of edible portion
3. Cereal cookery: Methods of cooking fine and coarse cereals, Preparation of selected Indian cereal recipes,
4. Pulses cookery: Cooking of soaked and raw pulses - Effects of adding salt, acid and alkali on cooking. Preparation of selected common recipes.
5. Vegetables and fruits: Browning reaction, Effect of acid and alkali, Preparation of selected common recipe
6. Fats and oils - Smoking point, Preparation of common recipes
7. Milk cookery - Experimental cookery on milk, Common preparations with milk, cheeseand curds
8. Egg cookery - Evaluation of fresh egg.
9. Experimental cookery – boiled egg, poached egg,omelette and custard. Preparation of selected common recipes with milk

Pedagogy

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	05
Test 2	05
Practical Record	10
Participation and Involvement	05
Total	**25 Marks**

References

- Manay NS, Shadaksharaswamy M (2010) Foods - Facts and principles, New Age International Publ.,New Delhi
- Roseville LJ,

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- Viera ER (1992) Elementary food science, 3rd Ed., Chapman and Hall, New York
- Potter NN, Hotchkiss JH (1988) Food Science, 5th Ed., CBS Publisher and Distributors, Delhi
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- Levies (1988) Food commodities, Heinemann Ltd., London
- Hughes and Benniion M (1970) Introductory Foods, Macmillan and Co, New York
- Dowell P, Bailey A (1980) The Book of ingredients, Dorling Kindersley Ltd., London

Program Name	**B Sc Food Nutrition and Dietetics**	Semester	**Second Semester**
Course Title	**Dietetics - I (Theory + Practical)**		
Course Code:	**DSC**	No. of Theory +Practical Credits	**3+2**
Contact hours	**45 hrs**	Duration of ESA/Exam	**2 Hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%

Course Outcomes (COs): After the successful completion of the course, the student will be able to:

CO 1. Know the principles of diet therapy
CO 2. Understand the modifications of normal diet for therapeutic purposes
CO 3. Learn the role of a registered dietician
CO 4. Identify the roles of others who collaborate in delivery of food and nutrition services

Content of Theory	**45 Hrs**
Unit–1	15
Definition of dietetics, clinical dietetics, objectives of dietetics, Growth and scope of dietetics, Characteristics and role of dietician in health care, classification of dietitian, characteristics of a dietitian, objectives of diet therapy. Hospital Dietary services- role and functions. Routine hospital diets: Liquid diet, semi-solid, regular and bland diet. Modification of normaldiets. Types of feeding - oral feeding and tube feeding - enteral and parental	
Unit -2	15
Diets in obesity and underweight: Obesity - Etiology, assessment, types. Regional distribution of fat in the body. Metabolic changes in obesity. Modification, dietary treatment. Nutritional requirements. Diet management – objectives, macronutrients, micronutrients, general considerations, foods allowed/not allowed. Under weight - Aetiology, Symptoms and complications, Dietary management - objectives, macronutrients, micronutrients, general considerations, foods allowed/not allowed	
Unit -3	15
Diet in infections and febrile conditions: Fever: Development, types and metabolic changes. Acute and chronic fevers. Causes and dietary management of typhoid, influenza, malaria, tuberculosis. Dietary management of all fevers - objectives, macronutrients, micronutrients, general considerations, foods allowed/ not allowed. Chronic infection- HIV (Human Immunodeficiency Virus) infection and AIDS (Acquired Immune Deficiency Syndrome). Stages of HIV infection. Aetiology, diagnosis. Malnutrition and	

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AIDS: Dietary management -objectives, macronutrients, micronutrients, general considerations

Pedagogy

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	**40 Marks**

Course Title	**Dietetics - I (Practical)**	Practical Credits	**2**

Content of Practical

Planning, preparing and calculating the following diets (Two case studies)

1. Fluid diets
   a. Clear fluid
   b. Full fluid
   c. Tube feeding
2. Obesity
   a. Childhood obesity/overweight
   b. Adulthood obesity/overweight
3. Underweight.
   a. Childhood
   b. Adulthood
4. Febrile conditions
   a. General fevers
   b. Typhoid
   c. Tuberculosis

Pedagogy

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	05
Test 2	05

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Practical Record	10
Participation and Involvement	05
Total	**25 Marks**

References

- Srilakshmi B (2011) Dietetics, 6th Ed., New Age International Publ., New Delhi
- Joshi SA, (1992) Nutrition and dietetics, Tata McGraw Hill Publications, New Delhi
- Raheen Begum (1989) A textbook of foods, nutrition and dietetics, Sterling Publ., Delhi
- Anderson L, Dibble MV, Turkki PR, Mitchall HS, Rynbergin HJ (1982) Nutrition in health and disease, 17th Ed., JB Lippincott and Co., Philadelphia
- Antia FP (1973) Clinical dietetics and nutrition, 2nd Ed, Oxford Univ. Press, Delhi Williams SR (1989) Nutrition and diet therapy, 6th Ed, Time, Mirror, Mosby College Publ.

Program Name	**B Sc Food Nutrition and Dietetics**	Semester	**Second Semester**
Course Title	**Human Physiology - II**		
Course Code:	**DSC**	No. of Credits	**3**
Contact hours	**45 hrs**	Duration of ESA/Exam	**2 Hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%

Course Outcomes:

After the successful completion of the course, the student will be able to:

CO 1. Understand the role played by hormones in metabolism and associated disorders.

CO 2. Comprehend the structure and function of neuromuscular systems and disorders

CO 3. Understand excretory physiology and its importance in nutrient retention

CO 4. Differentiate between male and female reproductive physiology and changes due to pregnancy and lactation

Content of Theory	**45 Hrs**
Unit–1	15

Endocrine System: Definition, classification of endocrine glands and their hormones, properties of hormones. Thyroid gland hormones – regulation of secretion. Disorders – hypo and hypersecretion of hormone. Adrenal gland - physiological anatomy. Adrenal cortex, cortical hormones – functions and regulation. Adrenal medulla – hormones, regulation and secretion. Functions of adrenaline and nor-adrenalin. Pituitary hormones – anterior and posterior pituitary hormones, secretion, function. Pancreas – hormones of pancreas. Insulin – secretion, regulation, function and action. Diabetes mellitus – regulation of blood glucose level. Parathyroid gland – function, action, regulation of secretion of parathyroid hormone. Calcitonin – function, action, Ca metabolism and hormone regulating Ca metabolism.

Reproductive system and puberty. Male reproductive system - functions of testis, spermatogenesis, spermiogenesis - stages, factors influencing semen, endocrine functions of testis. Androgens - Testosterone - structure and functions. Female reproductive system - ovulation, menstrual cycle, physiological changes during pregnancy, pregnancy test. Lactation: Composition of milk factors

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controlling lactation. Contraception	
Unit -2	15
Neuro-muscular system: Vision – function of different parts of eye, light reflex, refractive errors, colour blindness, night blindness, accommodation. Hearing –function of ear, deafness, vestibular apparatus. Taste buds – functions, smell physiology, receptors. Nervous system: Functions of nervous system, neuron structure, classification and properties, neuroglia. Nerve fibre, classification, conduction of impulses, factors affecting conduction. Synapse - structure, types, properties. Receptors - definition, classification, properties. Reflex action - reflex arc, properties of reflex action. Spinal cord nerve tracts - function. Functions of medulla, pons, hypothalamus. Cerebral cortex, lobes and functions, sensory cortex, motor cortex. Cerebellum - functions. Basal ganglia - functions, EEG, Parkinson's disease. Cerebro Spinal Fluid (CSF) - formation, circulation, properties, composition and functions, lumbar puncture, sleep, types of sleep. Muscle nerve physiology: Classification of muscle, structure of skeletal muscle, sarcomere, contractile proteins. Neuromuscular junction, transmission across neuromuscular junction, excitation contraction coupling. Mechanism of muscle contraction muscle tone, fatigue. Rigor mortis, isometric and isotonic concentration. Autonomic nervous system: Sympathetic and parasympathetic distribution and functions.	
Unit -3	15
Excretory system: Excertory organs - Kidney: function, structural and functional unit - nephrons, vasarecta, cortical and juxtamedullary nephrons - comparison, juxtaglomerular apparatus - structure and function. Renal circulation peculiarities. Mechanism of urine formation – ultrafiltration, criteria for filtration, GFR, plasma fraction, determination of GFR. Selective reabsorption - sites of reabsorption, substance reabsorbed, mechanisms of reabsorption. Tubular secretion, properties and composition of normal urine output. Abnormal constituents of urine. Counter-current mechanisms: micturition, innervations of bladder, cystourethrogram. Diuretics: water, diuretics, osmotic diuretics, artificial kidney, renal function tests Skin - function. Body temperature measurement, physiological variation, regulation of body temperature by physical, chemical and nervous mechanisms. Hypothermia and fever.	

Pedagogy

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	**40 Marks**

References

- Jain NA (2022) CC Chatterjee's Human Physiology, 24th Ed., CBS Publishers, New Delhi
- Chatterjee CC (2016), Human Physiology Volume I, Medical Allied Agency, Kolkata

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- Jain A K (2012) Text Book of Physiology volume 1 and Vol.2, APC publications New Delhi
- Sembulingam K, Sembulingam P (2012) Essentials of medical physiology, Jaypee Publ
- Guyton AC, Hall JE (1996) Textbook of Medical Physiology, 9th Ed., Prism Books Pvt Ltd.,Bangalore
- Wilson (1989) Anatomy and Physiology in Health and Illness, Edinburgh Churchill Livingstone
- Chatterjee CC (1988) Human Physiology, Calcutta, WB

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Program Name	**B Sc Food Nutrition and Dietetics**	Semester	**Third Semester**
Course Title	**Life Span Nutrition I (Theory + Practical)**		
Course Code:	**DSC**	No. of Theory +Practical Credits	**3+2**
Contact hours	**45 hrs**	Duration of ESA/Exam	**2 Hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%

Course Outcomes (COs): After the successful completion of the course, the student will be able to:

CO 1. Comprehend the concept of a balanced diet
CO 2. Understand the role of nutrition in growth and development processes from birth till adolescence
CO 3. Formulate nutritional needs of people at different stages of growth
CO 4. Formulate diets for various nutrition-related health conditions

Content of Theory	**45 Hrs**
Unit–1	15
Basic principles of meal planning: Explanation of terms: Health, RDA, Adequate intake, Balanced diet. Food exchange list, food guide pyramid. Vegetarian diets - classification of vegetarianism. Quality of various nutrients - proteins, fats, minerals, vitamins, fibres and antioxidants. Principles of planning meals. Factors affecting meal planning	
Unit -2	15
Nutrition during infancy: Growth and development. Use of growth chart to monitor development Advantages of breast feeding. Nutrition factors of human milk. Difference between human and animal milk. Artificial feeding. Factors to be considered in bottle feeding. Feeding problems. Nutritional requirements. Weaning: Need and use. Points to be considered in introducing weaning foods. Problems in weaning. Types of supplementary foods	
Unit -3	15
Nutritional needs for children: Pre School - Factors to be considered in planning meals for preschool children. Factors affecting nutritional status. Pica. Dietary guidelines. Nutritional requirements. Diet planning School children - Meal planning for school children. Feeding problems. School lunch programmes. Factors affecting feeding programmes. Nutritional requirements. Nutritional needs for adolescents: Special needs for girls during menarche - Food habits. Dietary guidelines Nutritional problems- obesity, eating disorder, osteoporosis, anaemia, under nutrition, premenstrual syndrome, PCOD. Nutritional requirements.	

Pedagogy

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**

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Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	**40 Marks**

Course Title	**Life Span Nutrition I (Practical)**	Practical Credits	**2**

Content of Practical

Planning, preparing and calculating the major nutrients of the following (Two planned diets with different age groups)

1. Nutritive Recipes for weaning
2. Diet planning for Infancy- 6-8 months and 9-12 months
3. Use and interpretation of Growth Charts- WHO Growth Charts
4. Diet planning for Toddlers- (1-3 years)
5. Diet planning for Preschool Child- (4-6 years)
6. Diet planning for School going Child-(7-9 years and 10-12 years)
7. Nutritive Recipes for snacks and packed lunches
8. Diet planning for Adolescents (13-15 years and 16-18 years)

Pedagogy

Formative Assessment

Assessment Occasion/ type	**Weightage in Marks**
Test 1	05
Test 2	05
Practical Record	10
Participation and Involvement	05
Total	**25 Marks**

References

- Elizabeth, K. E. (2022). Nutrition and child development,6th Ed., Paras Medical Publisher, Hyderabad.
- Joshi AS. (2021). Nutrition and Dietetics, 5th Ed. McGraw Hill, Noida
- Srilashmi B. (2019). Dietetics, 8th Ed., New Age International Publishers., New Delhi
- Mudambi SR, Rajgopal MV. (2020). Fundamentals Of Foods, Nutrition And Diet Therapy, 6th Ed.,New Age International Publishers., New Delhi
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Missouri

- Mclaren DS, Meguid MM (1998) Nutrition and its disorders, Churchill Livingstone
- Gopalan C (1993) Recent trends in nutrition, 9th Ed., Oxford Univ. Press
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- Swaminathan M (1985) Essentials of food and nutrition, Vol I and II, Ganesh and Co, Madras
- WHO (1978) A growth chart for international use in maternal and child health care, Geneva

Program Name	**B Sc Food Nutrition and Dietetics**	Semester	**Third Semester**
Course Title	**Nutritional Biochemistry I (Theory + Practical)**		
Course Code:	**DSC**	No. of Theory +Practical Credits	**3+2**
Contact hours	**45 hrs**	Duration of ESA/Exam	**2 Hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%

Course Outcomes (COs): After the successful completion of the course, the student will be able to:

CO 1. Understand the principles of biochemistry (as applicable to human nutrition).
CO 2. Obtain an insight into the chemistry of major nutrients and physiologically important compounds.
CO 3. Comprehend the biological processes and systems as applicable to human nutrition.
CO 4. Apply the knowledge acquired to human nutrition and dietetics

Content of Theory	**45 Hrs**
Unit–1	15
Carbohydrates: Nomenclature, Classification of carbohydrates – monosaccharides, oligosaccharides, polysaccharides – examples and structure. Metabolism – Glycolysis, TCA cycle, HMP Shunt, Glycogenesis, Glycogenolysis. Carbohydrate digestion and absorption. Importance of carbohydrates. Biological oxidation and enzymes: Compounds of ETC, mechanism, oxidative phosphorylation, high energy phosphate – ATP-ADP cycle and energy conservation.	
Unit -2	15
Lipids: Nomenclature, Classification of simple lipids – fats, oils, waxes. Complex lipids – phospholipids, glycolipids. Derived lipids – steroids, terpenes, carotenoids with examples, structure and function. Digestion and absorption. Fatty acids – classification – essential and non-essential fatty acids, examples, properties, functions. Metabolism – β-oxidation of saturated fatty acids. Biosynthesis and catabolism of cholesterol	
Unit -3	15

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Enzymes: Definition, nomenclature, types and classification of enzymes. Active site. Definition, types of coenzymes, specificity of enzymes. Isoenzymes, enzyme kinetics, factors affecting velocity of enzymes catalysed reactions. Regulation of enzyme activity, enzyme inhibition

Pedagogy

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	**40 Marks**

Course Title	**Nutritional Biochemistry - I (Practical)**	Practical Credits	**2**

Content of Practical

1. Qualitative analysis for carbohydrates - Glucose, Fructose, Maltose, Lactose, Sucrose,Starch and Galactose
2. Quantitative analysis in blood and serum - Blood glucose
3. Quantitative analysis in blood and serum - Cholesterol
4. Quantitative analysis in blood and serum - Urea
5. Enzymes – effect of pH on human salivary α-amylase activity
6. Qualitative test for minerals
7. Quantitative estimation of Ascorbic acid using any two different samples
8. Preparation of ash solution
9. Quantitative estimation of Calcium using any two different samples
10. Quantitative estimation of Phosphorus using any two different samples
11. Quantitative estimation of Iron using any two different samples
12. Estimation of Calcium from types of milk

Pedagogy

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	05
Test 2	05
Practical Record	10

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Participation and Involvement	05
Total	**25 Marks**

References

- Sathyanarayana U, Chakrapani U. (2021) Biochemistry, Elsevier, Gurgaon
- Jain JL (2012), Fundamentals of Biochemistry, S. Chand and Company Ltd.
- Das, D (2005) Biochemistry, 12th Ed., Academic Publishers, Kolkata
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- Lehninger AL, Nelson DL, Cox MM (1993) Principles of Bio Chemistry, 2nd Ed., CBS Publ., anddistributors.
- Devlin TM (1986) Textbook of Biochemistry with clinical correlations, 2nd Ed., John Wiley & Sons.

Program Name	**B Sc Food Nutrition and Dietetics**	Semester	**Third Semester**
Course Title	**Human Nutrition – II (Theory)**		
Course Code:	**DSC**	No. of Theory Credits	**3**
Contact hours	**45 hrs**	Duration of ESA/Exam	**2 Hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%

Course Outcomes (COs): After the successful completion of the course, the student will be able to:

CO 1. Understand the functions and sources of nutrients
CO 2. Apply the knowledge in maintenance of good health for individual and the community.
CO 3. Evaluate factors affecting availability and requirements of minerals and vitamins
CO 4. Assess the role of water and fibre in nutrition

Content of Theory	**45 Hrs**
Unit–1	15
Macro minerals: Calcium, Phosphorus, Magnesium, Sodium, Potassium, Chlorine and Sulphur-functions, sources, requirements and effects of deficiency, Bioavailability	
Unit -2	15
Micro minerals: Copper, Cobalt, Zinc, Iodine, Manganese, Fluorine, Molybdenum, Selenium, Chromium, Iron-functions, sources, requirements and effects of deficiency, Bioavailability	

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Unit -3	15
Vitamins: Classification on the basis of solubility, Vitamin A, D, E, K, Ascorbic acid, Thiamine, Riboflavin Niacin, Folic acid, Vitamin B12, Pantothenic acid, Pyridoxine- functions, sources, absorption, requirements and deficiency Water: Importance, distribution in the body, functions, oedema, dehydration, sources, water balance and requirements. Fibre: Definition, classification, sources and role of fibre in humannutrition	

Pedagogy

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	**40 Marks**

References

- WTO Technical Reports Series for Different Nutrients.
- Srilakshmi B (2015) Nutrition science - 4th Ed., New Age International Publ., New Delhi
- Agarwal A, Udipi SA (2014) Text book of human nutrition, Jaypee Bros Medical Publ., New Delhi
- Bamji M, Rao NP, Reddy V. (2007) Text book of Human Nutrition, Oxford and IBH Publ. Co. Pvt Ltd, New Delhi
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- Gopalan C (1991) Nutrition value of Indian foods, ICMR
- Guthrie AH (1986): Introductory Nutrition, 6th Ed., The CV Mosby Co.
- Robinson CH, Lawler MR, Chenoweth WL, Garwick AE (1986) Normal and therapeutic nutrition, 17th Ed., Macmillan Publ. Co.
- Swaminathan M (1985) Essentials of food and nutrition, Vol I and II, Ganesh and Co, Madras.

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Program Name	**B Sc Food Nutrition and Dietetics**	Semester	**Fourth Semester**
Course Title	**Dietetics II (Theory + Practical)**		
Course Code:	**DSC**	No. of Theory +Practical Credits	**3+2**
Contact hours	**45 hrs**	Duration of ESA/Exam	**2 Hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%

Course Outcomes (COs): After successful completion of this course, students will be able to:

CO 1. Understand the principles of diet therapy for various ailments and diseases

CO 2. Work out the modifications of normal diet for therapeutic purposes

CO 3. Assess food allergies, intolerance and nutrient-drug interactions for appropriate dietetics approaches

CO 4. Evaluate nutritional requirements for deficiencies and develop suitable dietary treatments

Content of Theory	**45 Hrs**
Unit–1	15

Diet in burns injury and surgery conditions: Burns- definition, classification, complications: Dietary management - objectives, macronutrients, micronutrients, general considerations. Injury/ Trauma- definition. Metabolic, physiological and hormonal response to Injury: Dietary management - objectives, macronutrients, micronutrients, general considerations. Surgery- definition. Metabolic, physiological and hormonal response to surgery: Dietary management - objectives, preoperative and postoperative nutritional care, macronutrients, micronutrients, general considerations

Unit -2	15

Gastro-intestinal tract ailments: Diarrhoea- definition, classification, consequences. Treatment of diarrhoea- Fluid management- Oral Rehydration Therapy (ORT). Dietary management - objectives, macronutrients, micronutrients, general considerations, low residue and low fiber foods. Definition, symptoms, classification, complications and dietary management - objectives, macronutrients, micronutrients, general considerations, foods allowed and not allowed for the following: Constipation, Gastro Oesophageal Reflux Disease (GERD), Gastritis- acute and chronic, Peptic ulcer, Irritable bowel syndrome, Steatorrhoea, Ulcerative colitis, Diverticulosis.

Food intolerance: Definition, causative factors, diagnosis, treatment – elimination diet. Lactose intolerance symptoms, causative foods and stages according to severity, foods included and excluded, nutritional treatment. Gluten intolerance – symptoms, dietary treatment, foods included and excluded, nutritional treatment. Nutrient- drug interaction

Unit -3	15

Food Allergy: Definition, types of allergy, common food as allergens. Signs and Symptoms, tests for allergy. Dietetic treatment.

Nutritional deficiency: Protein – energy malnutrition- aetiology, types, symptoms, dietary treatment and prevention, hospital treatment, domiciliary rehabilitation. Aetiology, clinical features, dietary treatment and prevention, prophylaxis programmes of the following: Iodine Deficiency disease and Vitamin A deficiency. Nutritional Anaemia - Aetiology, clinical features, types, dietary treatment and prevention of the following: Iron deficiency Anaemia / Disorder (IDD), Megaloblastic Anaemia, Folate Deficiency,

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Pernicious Anaemia

Pedagogy

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	**40 Marks**

Course Title	**Dietetics II (Practical)**	Practical Credits	**2**
Content of Practical			
Planning, preparing and serving the following diets (two case studies) 1. Bu rns 2. Co nstipation 3. Pe ptic ulcer 4. Pr otein deficiency 5. Iro n deficiency 6. Vit amin A deficiency			

Pedagogy

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	05
Test 2	05
Practical Record	10
Participation and Involvement	05
Total	**25 Marks**

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References

- Srilakshmi B (2011) Dietetics, 6th Ed, New Age International Publ., New Delhi
- Joshi SA, (1992) Nutrition and dietetics, Tata McGraw Hill Publications, New Delhi
- Mahan LK, Arlin MT (1992) Krause's Food, Nutrition and Diet Therapy, 8th Ed., W.B Saunders Company, London
- Williams SR (1989) Nutrition and diet therapy, 6th Ed., Time, Mirror, Mosby College Publ.St Louis
- Raheen Begun (1989) A textbook of foods, nutrition and dietetics, Sterling Publ., New Delhi
- Robinson CH, Lawler MR, Chenoweth WL, Garwick AE (1986) Normal and therapeutic nutrition, 17th Ed, Macmillan Publ and Co.
- Anderson L, Dibble MV, Turkki PR, Mitchall HS, Rynbergin HJ (1982): Nutrition in health and disease, 17th Ed., JB Lippincott and Co., Philadelphia
- Antia FP (1973) Clinical dietetics and nutrition, 2nd Ed., Oxford Univ. Press, Delhi

Program Name	**B Sc Food Nutrition and Dietetics**	Semester	**Fourth Semester**
Course Title	**Life Span Nutrition II (Theory + Practical)**		
Course Code:	**DSC**	No. of Theory +Practical Credits	**3+2**
Contact hours	**45 hrs**	Duration of ESA/Exam	**2 Hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%

Course Outcomes (COs): After successful completion of this course, students will be able to:

CO 1. Understand the process of growth and development and the concept of growth promotion

CO 2. Comprehend nutritional needs at different stages of growth.

CO 3. Evaluate nutritional needs during pregnancy and lactation

CO 4. Apply nutritional requirements for the aged taking their physiology into account

Content of Theory	**45 Hrs**
Unit–1	15
Nutritional needs of adults: Reference man and reference woman in relation to occupation. Dietary guidelines to reduce the cost of a meal. Nutritional requirements.	
Unit -2	15
Nutrition during pregnancy: Normal growth and weight gain. Physiological changes. Dietary modifications. General dietary problems. Complications during various stages of pregnancy. Nutritional requirements. Diet planning Nutritional needs during lactation: Physiology of lactation. Milk output and factors affecting it. Dietary guidelines. Nutritional requirements. Diet planning	
Unit -3	15

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Nutritional needs during old age: Physiological changes, RDA, Nutritional guidelines, nutritional, health concerns & complications and their management. Dietary modifications. Factors contributing to longevity

Pedagogy

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	**40 Marks**

Course Title	**Life span Nutrition - II (Practical)**	Practical Credits	**2**
Content of Practical			
Planning, preparing diets and calculating the major nutrients of following (Standard with two planned diets of different calories and activities) 1. Adult 2. Pregnancy 3. Lactation 4. Old age			

Pedagogy

Formative Assessment	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	05
Test 2	05
Practical Record	10
Participation and Involvement	05
Total	**25 Marks**

References

- Elizabeth, K. E. (2022). Nutrition and child development,6th Ed., Paras Medical Publisher, Hyderabad.
- Joshi AS. (2021). Nutrition and Dietetics, 5th Ed. McGraw Hill, Noida
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Publishers, New Delhi
- Srilakshmi B (2011) Dietetics, 6th Ed., New Age International Publ., New Delhi
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- Ghosh (1992) The feeding and care of infants and young children, VHAI, 6th Ed., New Delhi
- Swaminathan M (1985) Essentials of food and nutrition, Vol I and II, Ganesh and Co, Madras
- WHO (1978) A growth chart for international use in maternal and child health care, Geneva

Program Name	**B Sc Food Nutrition and Dietetics**	Semester	**Fourth Semester**
Course Title	**Quality Control I (Theory)**		
Course Code:	**DSC**	No. of Theory Credits	**3**
Contact hours	**45 hrs**	Duration of ESA/Exam	**2 Hours**
Formative Assessment Marks	**40**	Summative Assessment Marks	**60**

Course Pre-requisite(s): Certificate with minimum 45%

Course Outcomes (COs): After the successful completion of the course, the student will be able to:

CO 1. Understand international and national food laws, regulations and standards governing the safety of the food from field to fork

CO 2. Able to locate and interpret government regulations regarding the manufacture and sale of food products.

CO 3. Describe the use of adulterants added to foods

CO 4. Discuss the application of biotechnological techniques and evaluate packaging requirements of diverse foods

Content of Theory	**45 Hrs**
Unit–1	15
Food Laws: PFA - Mode of work and duties of food inspectors. Essential commodities act: fruit product order, milk and milk product order, meat product order, cold storage order, the vegetable oil product order, standard and weight measurement act, the infant milk substitute, feeding bottles and infant food act.	
Unit -2	15
Food standards: ISI, AGMARK, Export inspection council, consumer protection act, CODEX Alimentarius, FSSAI. HACCP - Importance. Principles. Determination of CCP. Problems in implementing HACCP. Importance of TQM, GMP and GLP Adulteration of food: Definition. Types. Contamination of food by incidental adulteration by microorganisms, packing materials and other sources. Tests to detect common adulterants	
Unit -3	15
Food technology: Biotechnology in food: Application, GM foods. Nutraceuticals. Organic foods. Packaging of foods: Classification, types of packaging materials – paper, plastics, glass, tins and metals, packaging of different food products – bakery, dairy, dehydrated, fresh fruits and vegetables, fats and oils, frozen food products	

Pedagogy

Formative Assessment:	
Assessment Occasion/ type	**Weightage in Marks**
Test 1	10
Test 2	10
Assignment / Seminar	5+5
Project	10
Total	**40 Marks**

References

- Food Safety and Standards Authority of India, Ministry of Health and Family Welfare, Government of India
- Manay SN, Shadaksharaswamy M. (2001), Eds. Foods, Facts and Principles. 3rd edition, New Age International. New Delhi.
- Martin EH (1986) Standard methods for the examination of dairy products
- Ranjanna S (1985) Handbook of analysis and quality control for fruit and vegetable products
- Lees R (1978) Food analysis, analytical and quality control methods for food manufacturers and buyers
- Keister DC (1977) Food and beverage control, Prentice Hall Inc, New Jersey
- Coltman MM (1977) Food and beverage cost control, Prentice Hall Inc, New Jersey
- Kotas R (1973) An approach to food costing, Nelson Thornes, London

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