Marudhar Kesari Jain College for Women (Autonomous)

Vaniyambadi – 635 751

PG & Research Department of Foods and Nutrition

For

Undergraduate Programme

Bachelor of Science in Nutrition Food Service Management & Dietetics

Regulations 2024 - 2025

LEARNINGOUTCOMES BASED CURRICULUM FRAME WORK FOR UNDERGRADUATE AND POSTGRADUATE EDUCATION

1. Preamble

Nutrition plays a major role in fostering optimal health and well-being of an individual, and provides an absolute understanding of the intricate interplay between food, nourishment and human physiology. The Department of Nutrition, FSM & Dietetics of Marudhar Kesari Jain College for Women, Vaniyambadi strives to produce young budding nutritionists and dietitians who through rigorous research, education and outreach empower individuals to make informed choices about their diet and lifestyles, promoting longevity, vitality and resilience.

Nutrition is not only a cornerstone of preventive healthcare but also a catalyst for social change and sustainable development. We, the Department of Nutrition, Food Service Management& Dietetics engage with communities, policymakers and industry partners to address predominant nutritional challenges, foster food security and promote environmental stewardship.

The programme is aimed at training undergraduate graduate students who would have adequate background knowledge and practical skills for application in postgraduate research, teaching, industrial production, medical, hospital and environmental management

The Department aims to equip the undergraduate students with a sound knowledge of the fundamental principles involved in the study of Nutrition, FSM and Dietetics, to produce graduates who would create an impact in the diverse fields of human endeavors, considering the ubiquitous nature of food and the wide – ranging applications of the knowledge of Nutrition.

The main objective of the Department is to provide focus for a career in various fields of applied science including Food Industries, Medical Coding, Research Institution, Hospital Administration, Food Service Sectors, Free Lancing, Health Sectors, Quality Control, Biotechnology, Government and Non-Government agencies.

LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK FOR UNDER GRADUATE EDUCATION	
Programme	**B.Sc., Nutrition Food Service Management & Dietetics**
Programme Code	**US07**
Duration	**3years [UG]**
Programme Outcomes	**PO1: Disciplinary Knowledge:** Demonstrate comprehensive knowledge and understanding of one or more disciplines that form part of an undergraduate programme of study**.** **PO2: Communication Skills:** Express thoughts and ideas effectively in both written and oral forms; communicate using appropriate media; confidently present views; listen attentively; read and write analytically; and present complex information clearly and concisely to different groups. **PO3: Critical thinking:** Capability to apply analytic thought to a body of knowledge; analyze and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development. **PO4: Problem solving: Capacity** to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real life situations. **PO5:Analytical reasoning**: Ability to evaluate there liability and relevance of evidence ;identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples and addressing opposing viewpoints. **PO6:Research-related skills**: A sense of inquiry and capability for asking relevant/appropriate questions, problem arising, synthesizing and articulating; Ability to recognize cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the result so fan experiment or investigation. **PO7: Cooperation / Teamwork:** Ability to work effectively and respect

	fully with diverse teams; facilitate cooperative or coordinate effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team. **PO8:Scientific reasoning** :Ability to analyse, interpret and raw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence, and experiences from an open-minded and reasoned perspective.

PROGRAM OUTCOMES

PO1	Acquire knowledge in Nutrition and Dietetics and trade to apply the knowledge in their day- to- day life for betterment of self and society.
PO2	Develop critical, analytical thinking and problem-solving skills.
PO3	Develop research related skills in defining the problem, formulate and test the hypothesis, analyze ,interpret, and draw conclusion from data.
PO4	Address and develop solutions for societal and environmental needs of local, regional and national development.
PO5	Workindependentlyandengageinlifelonglearningandenduringproficientprogress.
PO6	Provokeemployabilityandentrepreneurshipamongstudentsalongwithethicsandcommunicationskills.
PO7	Understand the importance of ethical behavior in business contexts and be able to recognize and address ethical counter in their professional careers.
PO8	Prepared for lifelong learning and professional development, including the ability to adapt to changes in technology, business practices, and economic conditions throughout their careers.

PROGRAM SPECIFIC OUTCOMES

PSO1	This program provides comprehensive knowledge and nutritional practical skills in the area of Food Microbiology, Food Science, Menu Planning, Human Physiology and Nutritional Biochemistry
PSO2	Students will be able to show case their expertise on food standards and quality control, Formulation of novel food products and sensory evaluation.
PSO3	Students will be able to demonstrate their practical skills by analyzing disease condition and prescribed diet for necessary conditions.

Eligibility for Admission:

Candidate for admission to the first year of (B.Sc., Nutrition, Food Service Management & Dietetics) Department of Foods & Nutrition shall be required to have passed the Higher Secondary Examination with Biology, Chemistry, Pure Science and Home Science as major subjects of any other Board accepted as equivalent there to by Thiruvalluvar University

Methods of Evaluation and Assessment

Methods of evaluation		
Internal Evaluation		25Marks
External Evaluation	End Semester Examination	75Marks
	Total	**100 Marks**
Methods of Assessment		
Recall(K1)	Simple definitions, MCQ, Recall steps, Concept definitions	
Understand/ Comprehend (K2)	MCQ, True/False, Short essays, Concept explanations, short summary or overview	
Application(K3)	Suggest idea/concept with examples, suggest formulae, solve problems, Observe, Explain	
Analyze(K4)	Problem-solving questions, finish a procedure in many steps, Differentiate Between various ideas, Map knowledge	
Evaluate(K5)	Longer essay/Evaluation essay, Critique or justify with pros and cons	
Create(K6)	Check knowledge in specific or of beat situations, Discussion, Debating or Presentations	

Semester–I							Semester–II						
Code	Course Title	Hours Distribution				C	Code	Course Title	Hours Distribution				C
		L	T	P	S				L	T	P	S	
24UFTA11	Tamil -1	4	1	0	0	3	24UFTA12	Tamil –2	4	1	0	0	3
24UFEN11	English-1	4	1	0	0	3	24UFEN12	English–2	4	1	0	0	3
24UNDC11	CC1 Basics in Food Microbiology	3	1	2	0	5	24UNDC21	CC – 3 Human Physiology	3	1	2	0	5
24UNDP102	CC - 2 (Practical) Basics in Food Microbiology	0	0	4	0	3	24UNDC22P	CC - 4 (Practical) Human Physiology	0	0	4	0	2
24UCHA11	EC-1AL Chemistry-I	3	1	0	0	3	24UCHA21	EC-2AL Chemistry-II	3	1	0	0	4
24UNDS11	SEC – 1 NM Women's Health and Wellness	1	0	1	0	2	24UCHA21P	EC - 3 Practical Chemistry-II	0	0	2	0	2
24UCHP103	SEC –2 Practical Chemistry-I	1	0	1	0	2	24UNDS21	SEC – 3 Life skill strategies and Techniques	1	0	1	0	2
24UNDF11	FC- Foundation in Home Science	1	1	0	0	2		AEC– 1 Life skills through Yoga	1	1	0	0	2
					30	**23**						**30**	**23**

Semester–III							Semester–IV						
24UFTA31	Tamil -3	4	1	0	0	3	24UFTA41	Tamil –4	4	1	0	0	3
24UFEN31	English-3	4	1	0	0	3	24UFEN41	English–4	4	1	0	0	3
24UNDC31	CC–5 Food Science	3	1	2	0	5	24UNDC41	CC-7 Human Nutrition	3	1	2	0	5
24UNDC32P	CC - 6 (Practical) Food Science Practical	0	0	4	0	2	24UNDC42P	CC - 8 (Practical) Human Nutrition Practical	0	0	4	0	2
24UNDA31 24UNDA32	EC - 4 AL Metabolism of Nutrients/ Food Product Development	3	1	0	0	4	24UNDA41 24UNDA42	EC - 6 AL Foundation of Baking and Confectionary/Principles of Food Analysis	3	1	0	0	4
24UNDA32P 24UNDA33P	EC - 5 AL (Practical) Metabolism of Nutrients/ (Practical) Food Product Development	0	0	2	0	2	24UNDA42P 24UNDA43P	EC-7AL(Practical) Foundation of Baking and Confectionary/ (Practical) Principles of Food Analysis	0	0	2	0	2
24UNDS31	SEC – 4 Basics of Interior Design and Décor	1	0	1	0	2	24UNDS41	SEC5Pre school and Creche Management	1	0	1	0	2
24UAEC31	AEC – 2 Human values and Ethics	1	1	0	0	2	24UAEC41	AEC–3 Environmental studies	1	1	0	0	2
					30	**23**						**30**	**23**

Semester–V							Semester-VI						
24UNDC51	CC -9 Nutrition through Lifecycle	4	1	0	0	4	24UNDC61	CC – 13 Food service Management	4	1	0	0	4
24UNDC52P	CC- 10 (Practical)Nutrition through Lifecycle	0	0	4	0	4	24UNDC62P	CC - 14 Practical – Food service Management	0	0	5	0	3
24UNDC53	CC-11 Dietetics	2	1	1	0	4	24UNDC63P	CC-15-Project	0	0	0	5	4
24UNDC54P	CC - 12 (Practical)Dietetics	0	0	3	0	2	24UNDA61/ 24UNDA62	EC– 10 Human Development and Counselling/ Hospital Food Service Administration	4	1	0	0	4
24UNDA51/ 24UNDA52	EC – 8 Community Nutrition / Food preservation and Processing	4	1	0	0	4	24UNDA63/ 24UNDA64	EC – 11 Food Standard and Quality Control/ Nutraceuticals and Nutrigenomics	4	1	0	0	4
24UNDA53/	EC – 9 Foundation in Research Methodology/	4	1	0	0	4	24UNDP61	PEC–1 Nutritional Assessment and	1	1	0	0	2

24UNDA54	Perspectives of Home Science							Diet Counselling						
24UAEC51	AEC– 4 Gender Equality and Social Inclusion	2	0	0	0	2	24UNDL61	SLC–1 Sports Nutrition				3	2	
24UNDIK51	IKS-Introduction to Indian Science and Technology	0	0	0	2							**30**	**23**	
24UNDIN51	Internship					2								
					30	**26**								

Part – 1 & 2	Tamil & English	8	SEC	Skill Elective Course	5
CC	Core Course	15	FC	Foundation Course	1
EC-AL	Elective Course–Applied	7	AEC	Ability Enhancement Course	4
EC	Elective Course–Major	4	SLC	Self-Learning Course	1
PEC	Professional Elective Course				

1ST YEAR: FIRST SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDC11	**CC -1 BASICS IN FOOD MICROBIOLOGY**	Core	3	1	2	0	5	6	25	75	100
Learning Objectives											
LO1	Understand the interaction between micro-organisms and food.										
LO2	Discuss the factors that favor or inhibit the growth of microbes.										
LO3	Understand the role of microbes in fermentation, spoilage and foodborne diseases.										
LO4	Describe the microorganisms found in food, including bacteria, fungi, viruses, and Parasites										
LO5	Recognize the signs of food spoilage caused by microbial activity and understand the mechanisms involved.										
Unit	**Content**										**Hours**
1	**History and Development Of Food Microbiology** History and Development of Food Microbiology. Definition and Scope of food microbiology. Inter-relationship of microbiology with other sciences. **Characteristics of Microorganisms in Food**. - Types of micro-organisms (Bacteria, Molds, and Yeast) associated with food their morphology and structure.										**18**
2	**Microbial Growth In Food** Bacterial growth curve and microbial growth in food. Factors affecting the growth of microorganisms in food. Methods for the Destruction of bacteria. Cultivation of Micro- organisms.										**18**
3	**Microbial Food Spoilage** Spoilage of specific food groups-Milk and dairy products, Meat, poultry and sea foods, Cereal and cereal products, Pulses and pulses products, Fruits and vegetables and Canned products.										**18**
4	**Food Fermentation** Fermentation- Definition and Benefits of fermentation and types of Microorganisms used in food fermentations. **Dairy Fermentations**-starter cultures and their types, concept of probiotics, **Fermented Foods**- types, methods of manufacture of vinegar, sauerkraut, tempeh, miso, soya sauce, beer, wine.										**18**
5	**Food Borne Illness** Types–food borne infections (Salmonellosis, Shigellosis, Vibriopara haemoliticus, Enteropathogenic Escherichia coli, Hepatitis A) Foodborne bacterial intoxications (Staphylococcal, Bacillus cereus, Botulism). **Trends in Food Microbiology**- Rapid methods for detection of microorganisms in food.										**18**

CO	Course Outcomes
CO1	To understand the structure and functions of microbes (Bacteria, Molds, Yeast)
CO2	To Gain knowledge on Microbial Growth, Destruction of Bacteria
CO3	To gain knowledge on the microbes related to food spoilage
CO4	To study the importance of fermented foods and methods of manufacture
CO5	To gain Knowledge on food Borne illness

Textbooks:	
1	Aneja R.K "Modern Food Microbiology" (1st Edition) Division of scientific International Tech (2018)
2	Adams M.R "Food Microbiology" (6th edition) New age International Publisher (2001)
3	George. Ban ward "Basic Food Microbiology" (2nd edition) CBS publisher pvt. Ltd(2001)
4	Ramanathan. N"Food Microbiology"(2nd edition)New Age International Publisher(2010)
5	Samtson "Modern Food Microbiology" CBS exclusive Publisher (2011)
Reference Books:	
1	Banwart, G.J. "Basic Food Microbiology" 2nd Edition.CBSPublishers,1998.
2	Vijaya Ramesh. "FoodMicrobiology".MJPPublishers,Chennai,2007
3	William Cand Westh of f,Dennis C. Food Microbiology,TMH,NewDelhi,2004
4	Khetarpaul, Neelam. "FoodMicrobiology" DayaPublishingHouse,2006
5	Adams, M.R. and M. O. Moss." Food Microbiology". New Age International,2002

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	2	3	3	2	3	2	2	3	3	3	3
CO2	3	3	3	2	3	2	2	3	3	3	3
CO3	3	3	3	3	2	2	2	3	3	3	3
CO4	3	2	3	3	3	2	2	3	3	3	2
CO5	2	3	3	3	3	2	3	2	3	2	3
Total	**13**	**14**	**15**	**13**	**14**	**10**	**11**	**14**	**15**	**14**	**14**
Average	**2.6**	**2.8**	**3**	**2.6**	**2.8**	**2.2**	**2.2**	**2.8**	**3**	**2.8**	**2.8**

3 – Strong, 2- Medium, 1- Low

1ST YEAR: FIRST SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDC12P	**CC 2- Basics in Food Microbiology practical**	Core	**0**	**0**	4	0	3	4	25	75	100

Learning Objectives	
LO1	Understand and demonstrate proficiency in Basic Microbial Culyural Techniques
LO2	Learn How to Prepare and Examine Food Samples Under a Microscope
LO3	Study the Effects of Different Environmental Conditions (pH Temperature)
LO4	Understand Different Preparation Methods
LO5	Understands the concepts of Microbial Growth and Factors Influencing Microbial Growth

Unit	Content	Hours
1	Laboratory safety rules and precautions. Familiarization with Instruments used in Microbiological Lab-Microscope, Autoclave, and Hot air Oven, Incubator, Centrifuge, pH meter.	12
2	Sterilization Methods-Autoclave, Hot air Oven, UV Lamp and Laminar Airflow	12
3	Examination of Yeast, Molds, protozoa and Bacteria	12
4	Examination of Wet Methods and Hanging Drop preparations	12
5	Examination of Stained Organisms- Simple staining and Gram Staining Method	12
	TOTAL	

CO	Course Outcomes
CO1	To Understand The Knowledge About Safety Precautions and Lab Instruments
CO2	To Gain Knowledge About the Preparation of Culture Media – Microbes
CO3	To Examine the Microbes Characteristics and Evaluating With Microscope
CO4	To Gain Knowledge about the Different Kinds of Chemical Preservation Methods
CO5	To Analyses Various Staining Methods

Textbooks:	
1	Diane Robert "Practical Food Microbiology (3rdedition
2	K.L. Garg "Laboratory manual of Food Microbiology" (2ndedition)
3	Subhash Chandraprakash"Text Book of Practical Microbiology"(1stedition)
4	Rump as Aha "Microbiology Practical Manual" (2ndedition)
5	Mukesh Kumar "competency based practical microbiology manual"(1stedition)
Reference Books:	
1	Gunejavk.sofosJ.N 2007 control of Food borne Microorganism CR Cpress
2	Jaya J M. Loessner M. Jand Golden DA 2005 "Modern Food Microbiology" springer
3	Doores.S2017"Microbiological analysis of food" CR C press-Publisher
4	Foresythe.S.J2012"The microbiology of safe food"
5	Farver J.Mandpeterkin 2016"Microbiological Safety and quality of food" ASM press

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	2	2	3	3	2	3
CO2	3	3	3	2	2	2	2	3	2	2	3
CO3	3	3	3	2	2	2	2	2	3	2	3
CO4	3	3	2	2	3	2	2	3	3	2	2
CO5	3	3	3	2	2	2	2	2	3	2	2
Total	**15**	**15**	**14**	**11**	**12**	**10**	**10**	**13**	**14**	**10**	**13**
Average	**3**	**3**	**2.8**	**2.2**	**2.4**	**2**	**2**	**2.6**	**2.8**	**2**	**2.6**

3 – Strong, 2- Medium, 1- Low

1ST YEAR: FIRST SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UCHA11	**Allied / Generic – 1 ALLIED CHEMISTRY**	Core	**3**	**1**	0	0	3	4	25	75	100

Learning Objectives	
LO1	To understand Chemical Bonding and Nuclear Chemistry.
LO2	To understand the Nuclear Chemistry.
LO3	To understand types of reactions.
LO4	To correlate types of thermodynamics process.
LO5	To understand sseparation and purification techniques.

Unit	Content	Hours
1	**Chemical Bonding and Nuclear Chemistry:** Chemical Bonding**:** Molecular Orbital Theory-bonding, anti-bondingand non-bonding orbitals. Molecular orbital diagrams for Hydrogen, Helium, Nitrogen; discussion of bond order and magnetic properties. Nuclear Chemistry: Fundamental particles - Isotopes, Isobars, Isotones and Isomers.	9
2	**Industrial Chemistry:** Fuels: Fuel gases: Natural gas, water gas, semi water gas, carbureted water gas, producer gas, CNG, LPG and oil gas (manufacturing details not required). Silicones**:** Synthesis, properties and uses of silicones. Fertilizers: Urea, NPK fertilizer, superphosphate, triple superphosphate.	9
3	**Fundamental Concepts in Organic Chemistry:** Hybridization: Orbital overlap, hybridization and geometry ofCH_4, C_2H_4 and C_6H_6. Electronic effects: Inductive effect, electromeric effect, mesomeric effect, hyper conjugation and steric effects - examples.Reaction mechanisms: Types of reactions–aromaticity (Huckel's rule)– aromatic electrophilic substitution: nitration, halogenation, Friedel-Craft's alkylation and acylation.	9
4	**Thermodynamics and Phase Equilibria:** Thermodynamics: Types of systems, reversible and irreversible processes, Statements of first law and second law of thermodynamics. Carnot's cycle and efficiency of heat engine. Entropy and its significance. Relationship between Gibbs free energy and entropy.	9
5	**Analytical Chemistry:** Principles of volumetric analysis. Separation and purification techniques – extraction, distillation and crystallization. Chromatography: principle and application of column, paper and thin layer chromatography.	9

CO	Course Outcomes
CO1	Gain in-depth knowledge about the theories of chemical bonding, nuclear reactions and its applications.
CO2	Evaluate the efficiencies and uses of various fuels and fertilizers.
CO3	Explain the type of hybridization, electronic effect and mechanism involved in the organic reactions.
CO4	Apply various thermodynamic principles, systems and phase rule.
CO5	Explain various methods to identify an appropriate method for the separation of chemical components.

Text books:	
1	Arun Bahl S. and Bahl B. S, "Advanced Organic Chemistry", S.Chandand Company New Delhi, 23rd ed., 2012.
2	Soni P. L. and Chawla H. M, "Text Book of Organic Chemistry", Sultan Chand& Sons, New Delhi, 29thed., 2007.
3	Gopalan R, "Analytical Chemistry", Sultan Chand & Sons, 2017.
4	Puri B. R, Sharma L. R. and Madan S. Pathania, "Principles of Physical Chemistry", Vishal Publishing Co., 48th ed., 2024.
5	Veeraiyan V. and Vaithyanathan S, "Text book of Ancillary Chemistry", Priya Publications, Karur,2006.
Reference Books:	
1	Soni P. L. and Mohan Katyal, "Textbook of Inorganic Chemistry", Sultan Chand& Sons, New Delhi, 20thed., 2006.
2	Sharma B. K, "Industrial Chemistry", GOEL publishing House, Meerut, 16thed., 2014.
3	Puri B. R. and Sharma L. R, "Text book of Physical Chemistry", 47th ed., 2020.
4	Puri, Sharma, Pathania and Kaur, "Textbook of Physical Chemistry",Vishal Publishing Co., New Delhi, 2018.
5	Veeraiyan V,"Text book of Ancillary Chemistry", Priya Publications, Karur, 1st ed., 2009.

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	2	3	3	3
CO2	2	3	3	3	2	3	3	2	3	3	3
CO3	3	3	3	2	3	3	3	2	3	3	3
CO4	3	3	3	3	3	3	3	2	3	3	3
CO5	3	2	3	3	3	3	3	2	3	3	3
Total	14	14	15	14	14	15	15	10	15	15	15
Average	2.8	2.8	3.0	2.8	2.8	3.0	3.0	2.0	3.0	3.0	3.0

3 – Strong, 2- Medium, 1- Low

1ST YEAR: FIRST SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UCHS12P	**ALLIED CHEMISTRY PRACTICAL**	Core	**0**	**0**	**2**	**0**	**2**	2	25	75	100

Learning Objectives	
LO1	Different types of organic compounds with respect to their properties.
LO2	Determination of elements in organic compounds.
LO3	Identification of organic functional groups.
LO4	Identify the components and structure of an unknown organic molecule
LO5	Skills to solve problems related to the identification of organic molecules through a series of tests and observations.

Unit	Content	Hours
1	**Systematic Analysis of Organic Compounds** The analysis must be carried out as follows: (a) Preliminary Tests To distinguish between aliphatic and aromatic compounds.	6
2	To distinguish – Saturated and unsaturated compounds.	6
3	Detection of special elements (N, S, Halogens).	6
4	**Identification of Functional group tests (Absence of special elements)** Phenol, Acids (mono & di), Aldehyde and Glucose.	6
5	**Identification of Functional group tests (Presence of special elements)** Presence aromatic primary amine, Amides (mono & di).	6

CO	Course Outcomes
CO1	Gain an understanding of the use of standard flask and volumetric pipettes, burette.
CO2	Design, carry out, record and interpret the results of volumetric titration.
CO3	Apply their skill in the analysis of water/hardness.
CO4	Analyze the chemical constituents in allied chemical products.
CO5	Describe the measurable skills, abilities, knowledge in qualitative analysis.

Text books:	
1	Venkateswaran V, Veerasamy R and Kulandaivelu A. R, "Basic Principles of Practical Chemistry", Sultan Chand & Sons, 2nd ed., 1997.
2	Vogel A. I, Tatchell A. R, Furnis B. S, Hannaford A. J and Smith P. W. G, "Vogel's Textbook of Practical Organic Chemistry", Prentice Hall, 5th ed., 1989.
3	Donald L. Pavia, Gary M. Lampman, George S. Engel & Roger G. Gries, "Experimental Organic Chemistry", Cengage Learning, 2005.
4	Jerry Mohrig, Craig Hammond & Paul F. Snyder, "Techniques in Organic Chemistry", Macmillan Learning, 4th ed., 2014.
5	Mann F. G and Saunders B. C, "Practical Organic Chemistry", Pearson Education, 4th ed., 1975.
Reference Books:	
1	Ralph J. Fessenden and Joan S. Fessenden, "Organic Chemistry Laboratory Manual", Brooks/Cole, 3rd ed., 1982.
2	Middleton H, "Organic Qualitative Analysis", Longmans, Green and Co., 1st ed., 1951.
3	Bansal R. K, "Laboratory Manual of Organic Chemistry", New Age International Publishers, 5th ed., 2010.
4	John Leonard, Barry Lygo and Garry Procter, "Advanced Practical Organic Chemistry", CRC Press, 3rd ed., 2013.
5	Lisa Nichols, Organic Chemistry Laboratory Techniques", Libre Texts, 1st ed., 2016.

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	2	3	3	3
CO2	2	3	3	3	2	3	3	2	3	3	3
CO3	3	3	3	2	3	3	3	2	3	3	3
CO4	3	3	3	3	3	3	3	2	3	3	3
CO5	3	3	3	3	3	3	3	2	3	3	3
Total	15	15	15	15	15	15	15	15	15	15	15
Average	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

3 – Strong, 2- Medium, 1- Low

1ST YEAR: FIRST SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDS11	**SEC 1 NM WOMEN'S HEALTH AND WELLNESS**	Core	**1**	**0**	1	0	2	2	25	75	100

Learning Objectives	
LO1	Understand the Diverse Factors that has a Bearing on Women's Health
LO2	Highlight the Factors that Contribute to a Healthy Lifestyle among Women Across the Globe
LO3	Describe the anatomy and Physiology of the Female Reproductive System
LO4	Recognize the unique Mental Health Challenges Faced by Women
LO5	Develop Nutrition and Fitness Plans to Women's Health Needs

Unit	**Content**	**Hours**
1	**NUTRITION FOR WOMEN** Dietary Guidelines for a healthy lifestyle, Nutrient requirements for adolescents' girls and adult women with special focus on Protein, Iron, Vitamin C, and Calcium, Factors affecting nutrient intake in women.	6
2	**PHYSICAL HEALTH** Significance of body weight and body composition parameters, Benefits of aerobic, exercises on general health, bone health. Yoga and Fitness -benefits	6
3	**REPRODUCTIVE HEALTH** Menstrual Health-safe and hygienic practices to be followed, Pre- and Post- Menopausal concerns-preventive measures, sexually transmitted diseases-an overview	6
4	**STRESS MANAGEMENT** Common mental health problems - Depression, Anxiety, Stress. Strategies to improve mental health.	6
5	**SOCIAL HEALTH** Balancing home and career, strengthening relationships, enhancing communication skills and leadership skills.	6

CO	Course Outcomes
CO1	Define terms related to nutrition, physical. reproductive, mental and social health
CO2	Discuss the need of Right Nutrition , Exercise and Skills needed for the overall well being of women
CO3	Explaining the Significance of Maintaining Physical , Reproductive ,Mental and social for overall well being of an women
CO4	Devise Strategies to Improve Women's Health in a Holistic Manner
CO5	Recommends Pleasure for a Healthy Life style

Text books:	
1	Linda sparke "Women's Health "Primary care clinical guide(5th edition)-2019
2	Merlene gold man "Women and Health"(2nd edition)-2013
3	M.Susanandkaren "HealthandHormone"Revisededition-2009
4	Judith's "women's health and welfare"(1st edition)-2007
5	Christianenorthrup "PhysicalandemotionalHealthandHealing" Revisededition-2010
Reference Books:	
1	Minkin M.J .and Wright C.V. (2003) The Yale Guide to Women's Reproductive Health from menarche to menopause. Yale University Press, London.
2	Sizer F.S.and Whitney.(2014) B Nutrition: Concepts & Controversies.13th Ed, Wadsworth, Cengage Learning, USA.
3	Sperry L.(2016)Mental Health and Mental Disorders.ABC-Clio,California
4	Williams M.H., Anderson D.E.,Rawson E.S.(2013)Nutrition for Health ,Fitness and Sport. McGraw Hill, New York.
5	Wrzus C, Hänel M, Wagner J, Neyer FJ.(2013)Social network changes and life events across the life span: a meta-analysis. Psychol Bull;139(1):53-80.

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	2	3	3	3	2	3	3	2	3
CO2	3	3	3	3	3	3	2	2	3	2	3
CO3	3	3	2	3	3	3	2	2	3	2	3
CO4	3	3	2	2	3	3	3	3	2	2	2
CO5	3	2	3	2	3	3	2	3	3	3	3
Total	**15**	**14**	**12**	**13**	**15**	**15**	**11**	**13**	**14**	**11**	**14**
Average	**3**	**2.8**	**2.4**	**2.6**	**3**	**3**	**2.2**	**2.6**	**2.8**	**2.2**	**2.8**

3 – Strong, 2- Medium, 1- Low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDF11	**FC – FOUNDATION COURSE IN HOME SCIENCE**	Core	**1**	**1**	0	0	2	2	25	75	100

Learning Objectives

LO1	Understand the basics in Nutrition, Food Service Management & Dietetics
LO2	Gain awareness on the care opportunities in home science.
LO3	Understand the scope, significance, and multi-disciplinary nature of home science
LO4	Acquire skills in home management, organization, budgeting, time management
LO5	Develop critical thinking skills to analyze situations related to home science

Unit	Content	Hours
1	**Introduction To Food Science** Definition, Food groups and their Nutritive aspects of food constituents. Functions of food physiological, psychological and social. Relationship between food, nutrition and health.	6
2	**Introduction to Nutrition And Dietetics** A. Definition of Nutrition, Basic function of Carbohydrates, Lipids, Proteins, Vitamins and Minerals. B. Definition of balanced diet, Importance of menu planning. Difference between normal and therapeutic diets C. Role of diet and life style changes in health promotion and disease prevention	6
3	**Introduction Of Food Service Management** A. Definition of Food Service Management; types of food service establishments- commercial and non-commercial B. Food service-Types C. Introduction to concepts of management, functions of manager in managing sources like manpower, materials, money, time, machinery and methods.	6
4	**Introduction to Electives Under Home Science** A. Human Development Stages of Human Life span B. Interior Decoration – Introduction and concept of interior design, C. Textile and Clothing – Yarn, cotton, Jute, Silk, Manmade Fibers	6
5	**Career Opportunities In Home Science- Nutrition, Food Service Management And Dietetics** A. Seeding importance of higher studies and its role in enhancing job opportunities B. Exposure to Job opportunities-Role and Responsibilities o Nutritionist and Dietitian and Community Nutritionist, CDPO, Foo Safety Officer Registered Dietitian, Lactation Consultant an Manager of Food/Hospitality Service. C. Extension Education	6

CO	Course Outcomes
CO1	Describe basic concepts in Food Science, Nutrition, Dietetics and Food Service Management
CO2	Identify the relationship between food, nutrition, diet and health
CO3	Explain the concept of Food Services and Food Service Management
CO4	Analyze the importance of the study of Food Service Management, Human Development, Interior Decoration and Textiles
CO5	Summarize the career opportunities available in-Home Science, Nutrition, Dietetics and Food Service Management

Text books:	
1	Meenakshi Bala Subramaniam "Foundation of Home Science "New age International Pvt Ltd (1st edition) -2003
2	P.M. Nair" Home science "APH publishing corporation(1st edition)-2011
3	A.P .Pillai "Home science and Techniques" Anmol Publications pvt. Ltd
4	Smukherjee "Foundation of science and Nutrition" New central book Agency Publisher (1st edition) -2005
5	Veerbalarastogi "Foundation of Home Science" New central Publisher Pvt Ltd(1st edition)- 2007
Reference Books:	
1	Anastasia Snelling(2014),Introduction to Health Promotion ,Wiley Publications.
2	Premlata Mullick (2012),Text book of Home science, Kalyani Publishers
3	Emie Cohen (2021),How Food Heals: A Look into Food as Medicine for Our Physical and Mental Health ,New Degree Press
4	Gurie Hughes (2021),Food and Mental Health :A Guide for Health Professionals, Rout ledge Publishers
5	Kaveri Chakra barthy and A.S.Chakra barthy,(2021),Text book of Nutrition in Health and Disease, Springer Publications

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	2	3	3	3	3	3	3	3	3
CO2	3	3	2	2	3	3	2	3	3	3	3
CO3	3	3	3	2	3	3	2	3	3	3	3
CO4	3	3	2	2	3	3	2	3	3	3	3
CO5	3	3	2	2	3	3	3	2	2	2	2
Total	**15**	**15**	**11**	**11**	**15**	**15**	**12**	**15**	**14**	**14**	**14**
Average	**3**	**3**	**2.2**	**2.2**	**3**	**3**	**2.4**	**3**	**2.8**	**2.8**	**2.8**

3 – Strong, 2- Medium, 1- Low

1ST YEAR: SECOND SEMESTER

Subject Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDC21	**Core Course 2- HUMAN PHYSIOLOGY**	**Core**	**3**	**1**	**2**	**0**	**5**	**6**	25	75	100

Learning Objectives	
LO1	To enable the students to know about the cells and tissues
LO2	To gain basic understanding of human anatomy and physiology
LO3	To discuss the fundamental relationship between anatomy and physiology
LO4	Use familiarity with the human body and its functioning to make healthful choices with regard to nutrition and take appropriate action when signs of illness arise
LO5	To Understand about the hormones and its functions.

Unit	Content	Hours
1	**Cells and tissues-** Structure and function of cell and its organelles. Cell Division and Classification. Structure,Types and functions of tissues. **Blood-**Constituents of blood- RBC, WBC and Platelets and its functions, Blood groups **Immune system-** Types of Immunity, Role of Antigen and Antibody.	14
2	**Nervous system** Structure and functions of brain (cerebrum, brainstem, cerebellum), Structure and Functions of Spinal cord; Functions of Autonomic Nerves and Cranial nerves Structure and functions of external organs (Eyes, Ears, Skin, Taste and Smell)	14
3	**Heart and circulation** Anatomy of the heart and blood vessels, origin and conduction of heart beat, cardiac cycle, Blood Pressure Definition and factors affecting blood pressure. **Respiratory system** Anatomy and physiology of respiratory organs. Mechanism of respiration, Gaseous exchange in the lungs and tissues.(Inhalation and Exhalation)	14
4	**Digestive system** Anatomy of Gastro-intestinal tract, Digestion and absorption of carbohydrates, proteins and fats. **Excretory system-** Structure of kidney, structure of nephron, physiology of urine Formation.	14
5	**Endocrine system** Hormones secreted by Pituitary gland, thyroid, parathyroid and adrenal glands and its functions, Menstrual cycle. Sex hormones –Role of hormones in pregnancy and Lactation.	14

CO	Course Outcomes
CO1	Recall the structure and functions of the cell, its organelles and the various tissues
CO2	Describe the structure and functions of the various organs and systems in the body
CO3	Identify the microscopic structure of basic tissues, label the parts of primary physiological systems in the body such as nervous, respiratory, digestive, endocrine and reproductive systems
CO4	Evaluate the role of the nervous and endocrine system in regulating the activities of other systems.
CO5	Perform haematological study on blood such as blood smear, blood count and blood grouping, record pulse, blood pressure and interpretation normal ECG

Text books:	
1	Wilson, K.J.W. (1987) Anatomy and Physiology in Health and Illness.6th ed. ELBS, Chur chill Livingstone, London
2	Waugh A and Grant A. (2012) Ross and Wilson Anatomy and Physiology in Health and Illness.11th ed. Churchill and Livingston, Elsevier
3	Tortora G.J. Anagnostakos N.P.(1984) Principles of Anatomy and Physiology,4th edition, Harpe rand Row Publishers, New York
4	Subramaniam, S and Madhavan Kutty, K.(1971). The Text Book in of Physiology. Orient Longman Ltd., Madras.
Reference Books:	
1	Beck, W.S. (1971) Human Design . Harcourt Brace Jovanovich Inc., New York.
2	CC CHATTERJEE Human Physiology 14th edition Volume -1
3	Creager, J.G. (1992)Human Anatomy and Physiology. 2nd ed. WMC Brown Publishers, England
4	Guyton, A.C.(1979)Physiology of the Human Body.5th ed. Saunders College of Publishing Philadelphia
5	Subramaniam,S .and Madhavan Kutty,K. (1971) The Text Book of Physiology. Orient Longman Ltd., Madras.

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	2	3	3	3	3	3	3
CO3	3	3	3	2	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	2	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3	3
Total	15	15	15	14	14	15	15	14	15	15	15
Average	3.0	3.0	3.0	2.8	2.8	3.0	3.0	2.8	3.0	3.0	3.0

3–Strong, 2-Medium, 1-Low

Subject Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDC22P	**Core Course 2- HUMAN PHYSIOLOGY PRACTICAL**	**Core**	**0**	**0**	**4**	**0**	**2**	**4**	25	75	100

Learning Objectives	
LO1	To learn about the various types of tissues found in the body through microscope
LO2	To understand the haemoglobin present in the blood
LO3	To create the visual effect to identify the blood group
LO4	To determine the blood pressure and pulse rate
LO5	To discuss about the internal organs and Demonstration on blood cells determination

Unit	**Content**	**Hours**
1	Microscopic studies of different tissues epithelial tissue, Connective tissue, muscular tissue and nervous tissue	12
2	Estimation of Haemoglobin.	12
3	Identification of blood groups	12
4	Determination of Blood pressure Respiratory rate and pulse rate	12
5	Demonstration Experiments: Study of structure of brain, heart, kidney, male and female reproductive organs using models/charts/videos. Microscopic study of WBC, RBC estimation	12

CO	**Course Outcomes**
CO1	Recall the structure the various types of tissues through microscopic examination.
CO2	Describe the Haemoglobin present in the blood
CO3	Identify the blood groups of various persons
CO4	Evaluate the blood pressure, Respiratory rate and pulse rate
CO5	Demonstration studies of internal organs ,WBC, RBC estimation

Text books:	
1	"Human Physiology: An Integrated Approach" by Dee Unglaub Silverthorn
2	"Physiology Laboratory Manual" by R. A. McKinley
3	"Laboratory Manual for Human Physiology" by H. W. Wilson
4	"Principles of Physiology" by Michael L. Johnson
5	"Human Physiology: From Cells to Systems" by Lauralee Sherwood
Reference Books:	
1	"Human Physiology Laboratory Manual" by G. A. R. S. (Ravi) Ghosh
2	Laboratory Exercises in Human Physiology" by David M. D. Alworth and L. C. T. Tansley
3	Physiology Laboratory Manual" by R. C. McKinley
4	A Photographic Atlas for the Anatomy and Physiology Laboratory" by Michael J. Arguello
5	"Human Physiology: An Integrated Approach" by Dee Unglaub Silverthorn

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	2	3	3	3	2	3	3	2	3
CO2	3	3	3	3	3	3	2	2	3	2	3
CO3	3	3	2	3	3	3	2	2	3	2	3
CO4	3	3	2	2	3	3	3	3	2	2	2
CO5	3	2	3	2	3	3	2	3	3	3	3
Total	**15**	**14**	**12**	**13**	**15**	**15**	**11**	**13**	**14**	**11**	**14**
Average	**3**	**2.8**	**2.4**	**2.6**	**3**	**3**	**2.2**	**2.6**	**2.8**	**2.2**	**2.8**

3 – Strong, 2- Medium, 1- Low

1ST YEAR: SECOND SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UCHA21	**Elective Course 2 Allied Chemistry - II**	**Core**	**3**	**1**	**0**	**0**	**4**	**6**	**25**	**75**	**100**

Learning Objectives	
LO1	To understand the mechanisms of polymerisation and their impact on polymer properties.
LO2	To analyze real-world problems and apply the fundamental principles of photochemical reactions to identify potential solutions.
LO3	To apply the concepts of electrochemistry to analyze the behavior of batteries and fuel cells.
LO4	To encompass the core concepts of corrosion delves into the application of protective coatings, such as paints, enamels, and lacquers, to safeguard materials from corrosion.
LO5	To assess various pharmaceutical drugs, including sulfa drugs, antibiotics, anesthetics, antiseptics, analgesics, antipyretics, tranquilizers, and sedatives.

Unit	Content	Hours
1	**Polymer Chemistry** - Introduction, classification of polymers, types of polymerisation, addition polymerization - mechanism of free radical polymerization, condensation and copolymerization. Thermoplastic and thermosetting polymers, difference between thermoplastic and thermosetting polymers, preparation, properties and uses of Polythene, PVC, Teflon, Nylon 6,6 and Polyesters	12
2	**Photochemistry** - Grothus-Draper's law and Stark-Einstein's law of photochemical equivalence, Quantum yield - Hydrogen-chloride reaction. Jablonskii diagram - Phosphorescence, fluorescence, chemiluminescence and photosensitization and photosynthesis (definition with examples)..	12
3	**Electrochemistry - Electrolytes** – Definition and Examples – Classification - Specific and Equivalent Conductance – Ostwald's Dilution Law and its Limitations. Batteries - primary and secondary batteries - difference between primary and secondary batteries. Lead storage battery - cell diagram, cell reaction and uses. Fuel cell H2-O2 fuel cell - explanation with diagram.	12
4	**Corrosion and Protective Coatings** - Corrosion - types, corrosion control methods. Electrochemical corrosion and its prevention - Electroplating and Electroless plating - applications. Paints - Components of Paint – Requisites of a Good Paint - Pigments Classification of Pigments based on Colour. Dyes – Definition – Classification based on Constitution and Application – Chromophores and Auxochromes. Enamels and Lacquers - composition and uses.	12

5	**Pharmaceutical Chemistry** - Sulpha Drugs – Preparation and uses of Sulphapyridine and Sulphadiazine - mode of action of Sulpha drugs - Antibiotics - Uses of Penicillin, Chloramphenicol and Streptomycin - Anaesthetics - General and Local Anaesthetics - Antiseptics - Analgesics, Antipyretics, Tranquilizers, Sedatives - Examples and their applications	12

CO	**Course Outcomes**
CO1	Critically evaluate the properties and applications of different types of polymers to select the most suitable materials for specific purposes.
CO2	To explain the laws of photochemistry and calculate quantum yields.
CO3	Construct electrochemical cells, such as batteries and fuel cells, based on theoretical principles
CO4	Ability to design and implement effective corrosion prevention strategies for various materials and environments.
CO5	Develop new pharmaceutical compounds with improved efficacy and reduced toxicity

Textbooks:

1. Fried, J. R, "*Polymer Science and Engineering"*, Prentice Hall, 3rd ed., 2003.
2. Turro, N. J., "Modern Molecular Photochemistry of Organic Molecules", University Science Books, 1991.
3. Newman, J,"*Electro chemical Engineering*. Prentice Hall", 3rd ed., 2004.
4. Fontana, M. G., & Staehle, R. H, "Corrosion Engineering", McGraw-Hill, 4th ed., 2017.
5. Albert, A. A., & Phillips, D. J, "*Medicinal Chemistry: An Introductory Text"*, Wiley, 5th ed., 2002.

Reference Books:

1. Atkins, P. W., & de Paula, J, "*Physical Chemistry"*, Oxford University Press, 10th ed., 2014.
2. Gilbert, A., & Baggott, J., "Essentials of Molecular Photochemistry", Blackwell Scientific Publications, 1991.
3. Shriver, D. F., & Atkins, P. W, "*Inorganic Chemistry"*, W. H. Freeman, 5th ed., 2010.
4. Bardwell, A. J, "Principles of Corrosion Engineering", Butterworth-Heinemann, 2nd ed., 2009.
5. Lehninger, A. L., Nelson, D. L., & Cox, M. M, "*Principles of Biochemistry*", W. H. Freeman, 5th ed., 2013.

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PSO 1**	**PSO 2**	**PSO 3**
CO1	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	2	3	3	3	3	3	3
CO3	3	3	3	2	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	2	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3	3
Total	15	15	15	14	14	15	15	14	15	15	15
Average	3.0	3.0	3.0	2.8	2.8	3.0	3.0	2.8	3.0	3.0	3.0

3Strong, 1- Medium, 1- Low-3

1ST YEAR: SECOND SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UCHA21P	**Elective Course 3 Chemistry Practical for Physical and Biological Sciences - II**	**Core**	**0**	**0**	**2**	**0**	**2**	**30**	**25**	**75**	**100**

Learning Objectives	
LO1	Different types of organic compounds with respect to their properties.
LO2	Determination of elements in organic compounds.
LO3	Identification of organic functional groups.
LO4	Identify the components and structure of an unknown organic molecule.
LO5	Skills to solve problems related to the identification of organic molecules through a series of tests and observations.

Unit	Content	Hours
1	**Systematic Analysis of Organic Compounds** The analysis must be carried out as follows: (b) Preliminary Tests (c) To distinguish between aliphatic and aromatic compounds.	6
2	To distinguish – Saturated and unsaturated compounds.	6
3	Detection of special elements (N, S, Halogens).	6
4	**Identification of Functional group tests (Absence of special elements)** Phenol, Acids (mono & di), Aldehyde and Glucose.	6
5	**Identification of Functional group tests (Presence of special elements)** Presence aromatic primary amine, Amides (mono & di).	6

CO	Course Outcomes
CO1	Gain an understanding of the use of standard flask and volumetric pipettes, burette.
CO2	Design, carry out, record and interpret the results of volumetric titration.
CO3	Apply their skill in the analysis of water/hardness.
CO4	Analyze the chemical constituents in allied chemical products.
CO5	Describe the measurable skills, abilities, knowledge in qualitative analysis.

Textbooks:	
1	Venkateswaran V, Veerasamy R and Kulandaivelu A. R, "Basic Principles of Practical Chemistry", Sultan Chand &Sons, 2nd ed., 1997.
2	Vogel A. I, Tatchell A. R, Furnis B. S, Hannaford A. J and Smith P. W. G, "Vogel's Textbook of Practical Organic Chemistry", Prentice Hall, 5th ed., 1989.
3	Donald L. Pavia, Gary M. Lampman, George S. Engel & Roger G. Gries, "Experimental Organic Chemistry", Cengage Learning, 2005.
4	Jerry Mohrig, Craig Hammond & Paul F. Snyder, "Techniques in Organic Chemistry", Macmillan Learning, 4th ed., 2014.
5	Mann F. G and Saunders B. C, "Practical Organic Chemistry", Pearson Education, 4th ed., 1975.
Reference Books:	
1	Ralph J. Fessenden and Joan S. Fessenden, "Organic Chemistry Laboratory Manual", Brooks/Cole, 3rd ed., 1982.
2	Middleton H, "Organic Qualitative Analysis", Longmans, Green and Co., 1st ed., 1951.
3	Bansal R. K, "Laboratory Manual of Organic Chemistry", New Age International Publishers, 5th ed., 2010.
4	John Leona rd, Barry Lygo and Garry Procter, "Advanced Practical Organic Chemistry", CRC Press, 3rd ed., 2013.
5	Lisa Nichols, Organic Chemistry Laboratory Techniques", Libre Texts, 1st ed., 2016.

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3	3	3	3	2	3	3	3
CO2	2	3	3	3	2	3	3	2	3	3	3
CO3	3	3	3	2	3	3	3	2	3	3	3
CO4	3	3	3	3	3	3	3	2	3	3	3
CO5	3	3	3	3	3	3	3	2	3	3	3
Total	15	15	15	15	15	15	15	15	15	15	15
Average	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

3 – Strong, 2- Medium, 1- Low

1ST YEAR: SECOND SEMESTER

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDS21	**LIFE SKILL STRATEGIES AND TECHNIQUES**	**Core**	**1**	**0**	**1**	**0**	**2**	**2**	**25**	**75**	**100**

Learning Objectives	
LO1	To gain self-competency and confidence
LO2	To practice emotional competency
LO3	To gain an edge through professional competency
LO4	To aim for Holistic Life
LO5	To understand the importance of human value strategies and techniques skills

Unit	Content	Hours
1	**Communication Skills** Developing Listening, Speaking and Reading Skills, An introduction to Scientific Writing, Letter writing, and Usage of Non-verbal Communication	6
2	**Professional Skills** Resume writing Interview Skills. Group Discussions, Presentation Skills. Work-Life Balance- Strategies to achieve them, Time Management.	6
3	**Leadership/Management Skills** Leadership skills, Managerial skills, Team building, Entrepreneurial skills, Ethics and Integrity.	6
4	**Basic Lifestyle-related Skills** Healthy eating using simple cooking practices, Home makeover skills, Basics in Gardening, Stress Management- Yoga and Fitness practices Benefits for a Holistic Life.	6
5	**Human Value Skills** Strategies and techniques to promote Non-Violence, Service to the community, developing skills pertaining to administering First Aid	6

CO	Course Outcome
CO1	Describe different skills and techniques needed to maintain a healthy personal and Professional approach to life.
CO2	Identify skills needed for a healthy lifestyle.
CO3	Explain the need to develop various skill sets for a holistic life.
CO4	Develop confidence with respect to emotional competency, personal and Professional life.
CO5	Recommend life skill strategies for the holistic development of the individual

Text books:	
1	Ashokan M.S.(2015).Karmayogi A biography of Sreedharan. Penguin
2	Hanson C.W. (2021). Resume Writing 2021:The ultimate guide to writing a resume that lands you the job. Independently Published, Kindle.
3	Jane E., Burt S., and Nudelman G. (2018).Professional Communication: Deliver effective written, spoken and visual messages. 4th ed. Juta and Company Pvt. Ltd., Cape Town, South Africa.
4	Kelly T, and Kelly D. (2014). Creative Confidence: Unleashing the Creative Potential Within Us All. William Collins
5	Kumar S ,and LataP.(2015).CommunicationSkills.2nded.Oxford University Press, India.
Reference Books:	
1	Fries, K.(2019). Essential Qualities That Define Great Leadership . Forbes. Retrieved 2019-02-15
2	How to Build Your Creative Confidence ,Ted Talk by David Kelly
3	India's Hidden Hot Beds of Invention Ted Talk by Anil Gupta -
4	Knowledge and What on Interviews Former Indian President APJ Abdul Kalam .& quote; A Leader Should Know How to Manage Failure & quot.
5	Martin, R.(2007).How Successful Leaders Think. Harvard Business Review,85(6): 60.

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	2	3	3	3	3	3	3
CO3	3	3	3	2	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	2	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3	3
Total	**15**	**15**	**15**	**14**	**14**	**15**	**15**	**14**	**15**	**15**	**15**
Average	**3.0**	**3.0**	**3.0**	**2.8**	**2.8**	**3.0**	**3.0**	**2.8**	**3.0**	**3.0**	**3.0**

3- Strong, 2- Medium, 1- Low

2nd YEAR:THIRD SEMESTER

Subject Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDC31	FOOD SCIENCE	Core	3	1	2	0	5	6	25	75	100

Learning Objectives	
LO1	To enable students to obtain knowledge of different food groups and their contribution to nutrition.
LO2	Understand the Source and Nutritional Significance of Pulses, fruits and vegetables.
LO3	Understand the Classification and Nutritional Composition of Fleshy Foods, Eggs, and Milk Products.
LO4	Understand the sources of dietary fats and oils and stages of sugar cookery.
LO5	Recognize the uses of beverages, spices, condiments, food additives and food adulterants. Daily diets and culinary applications.

Unit	Content	Hours
1	**NUTRIENT CONTENT OF FOODS -** Classification of foods according to nutrient content. Food groups for balanced diets - Food in relation to health. **COOKING METHODS –** Objectives, preliminary preparation and Study of the different cooking methods, merits and demerits, Solar cooking and Microwave cooking. **CEREALS AND MILLETS -**Source of manufacture, structure, composition, processing of rice, wheat and millets (Maize, Jowar, Ragi). Fermented Cereal Products.	18
2	**PULSES**- Classification and Nutritive value. Effect of cooking and factors affecting quality**. VEGETABLES**- Classification, Composition and Nutritive value, Effect of cooking on color, texture, flavor, appearance and nutritive value. Vegetable cookery-Changes during cooking. **FRUITS** –Classification, Nutritive value, Enzymatic Browning**.**	18
3	**FLESH FOODS**- Meats - Classification, Composition and Nutritive value, Changes during cooking and Post mortem changes. Poultry-**Types, Nutritive value, selection, changes during cooking** **EGGS**- Structure, Composition and Nutritive value, Quality Evaluation, Egg white foams - factors affecting foam formation **MILK AND MILK PRODUCTS**- Composition and Nutritive value, types of milk, Coagulation of milk, Milk products – Fermented products and non-fermented products; Milk cookery- Effect of heat and enzymes; Milk processing- Pasteurization and Homogenization.	18
4	**NUTS AND OIL SEEDS**: Types, Nutritive value, Health benefits, Uses & toxins. **FATS AND OILS**: Source**,** Processing and refining of fats- Hydrogenation. Emulsification, Rancidity, Smoking point. **SUGAR COOKERY-** Types of sugars available, Stages in sugar cookery, Crystallization. Artificial sweeteners.	18
5	**BEVERAGES-** Sources, Classification/types, Nutritive value, Processing, Uses - Coffee, Tea and Cocoa. Carbonated and Nonalcoholic beverages **SPICES AND CONDIMENTS-**Origin and use in food preparation.	18

	FOOD ADDITIVES: Preservation, colorants, leavening agents, shortenings and stabilizers. **FOOD ADULTERATION:** Types and methods of detection.	

CO	Course Outcomes
CO1	Understand the food groups, cereals and their functions, applying the principles of methods of cooking.
CO2	Analyze the Effect of Cooking on Pulses, Vegetables and fruits.
CO3	Assess the effect of cooking on sensory properties and nutrient composition of various animal-based foods.
CO4	Knowledge of different types of nuts, oilseeds, fats, and sugars, including their nutritional and health benefits
CO5	Students will be able to understand the different types of beverages, spices and condiments, food additives and food adulterants.

Text books:	
1	Srilakshmi, B.C. (2011). *Food Science* (7th ed.). New Delhi, ND: New Age International Publications
2	Potter, N. N. (2013). *Food Science*. Netherlands: Springer Netherlands
3	Manay, S., & Swamy, S. (2001). *Food Facts and Principles.* New Delhi, ND: New Age International Publications
4	Rajagopal, M. V., Mudambi, S. R., Rao, S. M. (2015). *Food Science*. India: New Age International (P) Limited, Publishers
5	Roday, (2007). *Food science and Nutrition.* New Delhi, ND: Oxford university press.
Reference Books:	
1	Parker, R. (2000). *Introduction to Food Science,* Delma: Thomson Learning Co.
2	Paul, P. C. and Palmer, H. H. (2000). *Food Theory and Applications*. (ed.). New York: John Wiley and Sons.
3	Brow, A. (2000). *Understanding Food.* Wadsworth: Thomson Learning Publications.
4	Reddy, S. M. (2015). *Basic Food Science and Technology.* New Delhi, ND: New Age Publishers.
5	Mc Cance & Widdowson. (2004). *Composition Microwave of Food* (6th ed.). Food Standards Agency.
E-LEARNING RESOURCES	
1	https://www.journals.elsevier.com/trends-in-food-science-and-technology
2	https://onlinelibrary.wiley.com/journal/20487177
3	https://www.annualreviews.org/journal/food
4	http://www.fao.org/home/en/
5	https://www.wfp.org/

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	1	3	3	2	2	3	3	2	2
CO2	3	3	1	3	2	3	3	3	3	3	2
CO3	3	2	1	3	2	3	3	3	3	3	3
CO4	3	2	1	3	3	3	3	2	3	3	3
CO5	3	3	1	3	3	3	3	3	3	3	3
Total	15	12	5	15	13	14	14	14	15	14	13
Average	3	2.4	1	3	2.6	2.8	2.8	2.8	3	2.8	2.6

3–Strong, 2-Medium, 1-Low

2nd YEAR:THIRD SEMESTER

Subject Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDC32P	**Practical III - Food Science**	**Core**	**0**	**0**	**4**	**0**	**2**	**4**	25	75	100

Learning Objectives	
LO1	To enable students to obtain knowledge of different food groups and their contribution to nutrition.
LO2	Understand the Source & Nutritional Significance of Pulses, Vegetables, and Fruits:
LO3	Apply the principles of cookery in cooking foods to preserve its nutrient content and minimize cooking time.
LO4	Acquire skills in preparation of foods with good palatability and preservation of nutritive value
LO5	Identify different stages of sugar crystallization and importance smoking temperatures of different fats and oils.

Unit	Content	Hours
1	**Introduction to Basic Cooking Skills - Edible portion** Introduction to different cooking methods, cooking terminology; equipment and techniques used for pre-preparation and for different cooking methods. Methods of measuring and weighing liquids and drying ingredients.	12
2	**Cereals** **Microscopic study of different starches** a. Methods of combining starch and boiling water. b. Study of effects of moist heat on starch. c. Cereal starch- Gelatinization. d. Gluten formation. Pulses - Effect of hard and soft water, alkali and acid. Cooking time of grams and dhals. Different recipes from cereals, Pulses and millets	12
3	**Vegetables -** Effect of acids, alkali, covering, steaming and pressure cooking on the different pigments and acceptability of vegetables. **Fruits** - Study of different methods of preventing enzymatic browning of cut fruits, pectin content of fruits. Different recipes from vegetables, fruits	12
4	**Milk cookery** - Coagulation of milk protein, Paneer, cooking of vegetables in milk. Different recipes from milk and milk products. Beverages - preparation of stimulating, nourishing and refreshing beverages.	12
5.	**Fats and oils -** comparison of smoking temperature of some fats and oils. Preparation of shallow and deep-fried foods. **Sugar and Jaggery** - Different stages of crystallization of sugar. Preparing recipes for different stages of sugar cookery. Visit to food Industry and Factories.	12

CO	Course Outcomes
CO1	Gain knowledge on various food groups, role of food items in Indian cookery.
CO2	Acquire knowledge on the various components of pulses, vegetables and fruits
CO3	Learn the different aspects of meat, milk and their products
CO4	Understand the changes taking place in nutrients while cooking the fleshy food.
CO5	Knowledge on classification and nutritive value of nuts, fats and sugars

Text books:	
1	Krishna Arora (2008) Theory of cookery, Frank Brothers & Co.,
2	Martland,R.E. and Welsby,D.A.(1980)Basic Cookery, Fundamental Recipes and Variations. William Heinemann Ltd., London
3	Negi J (2013). Fundamentals of Culinary Art,S.Chand and Co
4	Peckham,G.C. and Freeland-Graves,J.H.(1987)Foundation of food preparation.4thed. Macmillan Publishing co, New York
5	Penfield MP and Ada MarieC(2012),Experimental Food Science, Academic Press, San Diego
Reference Books:	
1	Parker, R. (2000). *Introduction to Food Science*, Delma: Thomson Learning Co.
2	Paul, P. C. and Palmer, H. H. (2000). *Food Theory and Applications*. (ed.). New York: John Wiley and Sons.
3	Brow, A. (2000). *Understanding Food.* Wadsworth: Thomson Learning Publications.
4	Reddy, S. M. (2015). *Basic Food Science and Technology.* New Delhi, ND: New Age Publishers.
5	Mc Cance & Widdowson. (2004). *Composition Microwave of Food* (6th ed.). Food Standards Agency.
E-LEARNING RESOURCES	
1	https://www.journals.elsevier.com/trends-in-food-science-and-technology
2	https://www.ihmnotes.in/assets/Docs/Books/Theory_of_Cookery.pdf
3	http://staffnew.uny.ac.id/upload/132318572/pendidikan/buku-esp.pdf

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	1	3	3	3	3	3	3	3	3
CO2	3	2	1	3	2	3	3	3	3	3	3
CO3	3	2	1	3	3	3	3	2	3	3	3
CO4	3	2	1	3	3	3	3	2	3	3	3
CO5	3	2	1	3	3	2	3	3	3	3	3
Total	15	10	5	15	14	13	15	13	15	15	15
Average	3	2	1	3	2.8	2.6	3	2.6	3	3	3

3–Strong, 2-Medium, 1-Low

2nd YEAR:THIRD SEMESTER

Subject Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDA31	**Elective-AL METABOLISM OF NUTRIENTS**	**Core**	**2**	**1**	**1**	**0**	**4**	**4**	25	75	100

Learning Objectives	
LO1	To gain knowledge about enzymes and metabolism of Carbohydrates
LO2	Understand the concept of Proteins and their biological activity
LO3	Analyze the lipid metabolism and cholesterol biosynthesis
LO4	To know the significance of recent biochemical concepts namely Nucleic acids and recombinant DNA technology
LO5	To learn about the diseases caused due to metabolic disorder.

Unit	Content	Hours
1	**Enzymes and metabolism of carbohydrates-** Enzymes-classification, Factors affecting Enzyme activity. Carbohydrates classification, metabolism of glucose- Glycolysis, Krebs cycle, Gluconeogenesis, glycogenesis, glycogenolysis,(No structure) blood glucose maintenance and its regulation.	12
2	**Proteins -** classification based on amino acid, primary, secondary and tertiary structure of proteins, hydrolysis of proteins, denaturation, precipitation and coagulation, Metabolism of Amino acids deamination, transamination, decarboxylation- urea cycle	12
3	**Lipids** - chemical composition of fats, classification, metabolism - beta oxidation of fatty acids & bio-synthesis of fatty acids - ketone bodies, Ketogenesis and ketosis, cholesterol- biosynthesis.	12
4	**Metabolism of Nucleotides-** Bio synthesis and degradation of Purine and Pyrimidine Nucleotides. Definition of nucleic acid, Functions and components of nucleic acids. DNA and RNA – Types, Structure and function. Recombinant DNA technology	12
5	**etabolic disorders**-Elementary knowledge on inborn errors of metabolism with reference to carbohydrate- Fructosuria, Pentos Uria, Galactosemia, Protein-albinism, Phenylketonuria, alkaptonuria, maple syrup urine disease, Lipids- Niemann- pick disease, Tay- Sach's disease.	12

CO	Course Outcomes **Students will be able to**
CO1	Describe the role of enzymes and metabolism and regulation of carbohydrates
CO2	Analyze the integration of protein metabolism
CO3	To understand about the metabolism of lipids and their synthesis
CO4	Comprehend the significance of recent biochemical concepts namely Nucleic acids, recombinant DNA Technology
CO5	To understand about the various disease due to metabolic disorders

Text books:	
1	"Lehninger Principles of Biochemistry" by David L. Nelson and Michael M. Cox:Essentials of Bio Chemistry (Satyanarayana and Chakrapani)
2	"Biochemistry" by Jeremy M. Berg, John L. Tymoczko, and Lubert Stryer:
3	"Biochemical Pathways" by Gerhard Michal:
4	"Medical Biochemistry" by John W. Baynes and Marek H. Dominic Zak:
Reference Books:	
1	"Lehninger Principles of Biochemistry" by David L. Nelson and Michael M. Cox
2	"Enzyme Chemistry: Dynamics of Structure and Function" by Peter R. Berget Hon
3	Free Radicals in Biology and Medicine" by Barry Halliwell and John M. C. Gutteridge
4	Human Metabolism: A Regulatory Perspective" by Donald R. Matthews and Donald W. Bryson:
5	"Principles of Nucleic Acid Structure" by B.D. Hames and D. W. Glover

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	2	3	1	3	3	2	2	3	3	3	3
CO2	3	2	2	3	2	3	3	3	3	3	3
CO3	3	2	2	3	3	3	3	2	3	3	3
CO4	3	2	2	3	3	3	3	2	3	3	3
CO5	3	2	2	3	3	2	3	3	3	3	3
Total	15	10	11	15	14	13	14	13	15	15	15
Average	3	2	2.2	3	2.8	2.6	2.8	2.6	3	3	3

3–Strong, 2-Medium, 1-Low

2nd YEAR:THIRD SEMESTER

Subject Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDA32P	**Practical-Metabolism of Nutrients**	**Core**	**0**	**0**	**2**	**0**	**2**	**2**	25	75	100

Learning Objectives	
LO1	Understand the qualitative estimation of Carbohydrates
LO2	Recognize the importance of proteins and qualitative analysis
LO3	Analyze the concept of qualitative analysis of Reducing sugars
LO4	Learn the quantitative estimation in Reducing Sugar
LO5	Develop skills in Iodine estimation in oil/fat.

Unit	Content	Hours
1	Qualitative Analysis of Carbohydrates	6
2	Qualitative Analysis of Proteins	6
3	Qualitative test for Sugars-Glucose, Fructose, Lactose, Maltose, Galactose	6
4	Quantitative Estimation in Reducing Sugar	6
5	Quantitative Estimation of Iodine and Acid value in oil/fat	6

CO	Course Outcomes
CO1	Identify the presence of carbohydrates in biological samples using standard qualitative tests.
CO2	To understand the proteins in biological samples using standard qualitative tests.
CO3	Detect and differentiate various sugars such as glucose, fructose, lactose, maltose, and galactose using specific biochemical test
CO4	Determine the iodine value of oils to assess the degree of unsaturation.
CO5	Gain hands-on experience with biochemical testing and standard laboratory procedures.

Textbooks:

1. **Practical Biochemistry** by Keith Wilson and John Walker
   Bio chemical methods – Sadashiv and A.Manic
2. **Dairy Chemistry and Biochemistry by** P. F. Fox and P. L. H. McSweeney
3. **Clinical Chemistry: Principles, Techniques, and Correlations** by Michael L. Bishop, Edward P. Fody, and Larry E. Schoeff

4	**Practical Clinical Biochemistry** by A. G. G. W. J. McQueen
5	**Fundamentals of Clinical Chemistry"** by Norbert W. Tietz

Reference Books:	
1	**Food Chemistry** by H. D. Belitz, W. Grosch, and P. Schieberle
2	**Analytical Chemistry: A Modern Approach to Analytical Science** by Gary D. Christian
3	**Handbook of Dairy Chemistry** by Richard K. Robinson
4	**Clinical Chemistry: A Laboratory Perspective** by Kenneth D. McCulloch
5	**Textbook of Clinical Chemistry and Molecular Diagnostics** by Nader Rifai

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	1	3	3	2	2	3	3	3	3
CO2	3	2	1	3	2	3	3	3	3	3	3
CO3	3	2	1	3	3	3	3	2	3	3	3
CO4	3	2	1	3	3	3	3	2	3	3	3
CO5	3	2	1	3	3	2	3	3	3	3	3
Total	15	10	5	15	14	13	14	13	15	15	15
Average	3	2	1	3	2.8	2.6	2.8	2.6	3	3	3

3–Strong, 2-Medium, 1-Low

2nd YEAR:THIRD SEMESTER

Subject Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDS31	BASICS OF INTERIOR DESIGN AND DECOR	Core	1	0	1	0	2	2	25	75	100

Learning Objectives	
LO1	Gain knowledge of the basic designing principles and characteristics.
LO2	Develop ability to apply the above knowledge to create interesting and beautiful Interiors for varied purposes
LO3	Identify the impact of design principles on space planning and décor.
LO4	Understanding the Concept and characteristics of Color in Interiors.
LO5	Understand the role of lighting in enhancing mood, functionality, and visual comfort.

Unit	Content	Hours
1	**UNIT – 1-Design**- Meaning and Definition, Types –Structural and Decorative design, their characteristics, classification of decorative design.	6
2	**UNIT –2-Elements of Design** - Meaning, various elements – line, form and shape, size, color, texture, pattern, space, light.	6
3	**UNIT – 3-Principles of Design Harmony**, Balance, Rhythm, Emphasis, proportion. Application of design principles in interiors	6
4	**UNIT – 4-Color harmony** - Concept, qualities – Hue, value, intensity Classification of colors, Prang color system, color harmonies – Relate and contrasting color harmonies, psychology of color. Application of color in interiors.	6
5	**UNIT – 5- Lighting in interiors** - Importance, classification based on sources, uses, illumination, factors to be considered in lighting for different areas of house.	6

CO	Course Outcomes **Students will be able to**
CO1	Learn the basic concepts and classification of interior design.
CO2	Develop the skill of applying the principles of design in decorating the interiors.
CO3	Analyze and implement balance, rhythm, and harmony in different spaces
CO4	Understand the psychological impact of colors on human emotions and behavior.
CO5	Understand the impact of lighting on mood, well-being, and space perception.

Textbooks:	
1	Varghese and ogale, 1994, Home Management, Wiley Eastern, New Delhi
2	Faulkner, S.-and Faulkner,R,(1987), Inside Today's Home, Rine hart Publishing Company, New York
3	Caroline cliften et. al., The complete Home Decorator, Portland House New York.
4	Seetharaman, P and Pannu, P. Interior Design and Decoration, CBS Publishers and Distributors, New Delhi.
5	Pratap R.M (1988), Interior Design Principles and Practice, Standard Publishers Distribution, Delhi.
6	Goldstein, Art in Everyday life, Oxford and IBH Publishing House
Reference Books:	
1	**"Human Physiology Laboratory Manual" by G. A. R. S. (Ravi) Ghosh**
2	Laboratory Exercises in Human Physiology" by David M. D. Alworth and L. C. T. Tansley
3	Physiology Laboratory Manual" by R. C. McKinley
4	A Photographic Atlas for the Anatomy and Physiology Laboratory" by Michael J. Arguello
5	"Human Physiology: An Integrated Approach" by Dee Unglaub Silverthorn

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**
CO1	2	2	3	3	3	2	2	3	1	1	1
CO2	2	2	2	3	2	3	2	3	1	1	1
CO3	2	2	2	3	3	3	2	2	1	1	1
CO4	2	2	2	3	3	3	2	2	1	1	1
CO5	1	2	2	3	3	2	2	3	1	1	1
Total	9	10	11	15	14	13	10	13	5	5	5
Average	1.8	2	2.2	3	2.8	2.6	2	2.6	1	1	1

3–Strong, 2-Medium, 1-Low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDC41	**CC-HUMAN NUTRITION**	**Core**	**3**	**1**	**2**	**0**	**5**	**6**	**25**	**75**	**100**

Learning Objectives	
LO1	Provide the importance of carbohydrates, dietary fiber, and water in maintaining overall health and well-Being.
LO2	Apply their knowledge to calculate energy requirements, understand factors that affect energy Metabolism and dietary recommendations.
LO3	Impart knowledge about protein nutrition and its implications for human health.
LO4	Understand the effect of lipid on health status & Understand the Water-Soluble and fat-soluble Vitamins.
LO5	Understand of minerals, including their roles in maintaining health, preventing disease, and Managing toxicity.

Unit	Content	Hours
1	**Carbohydrates & Water** Basic concepts of Nutrient, Carbohydrates - Definition, Sources, requirements, Digestion and absorption. **Dietary fiber-** definition, Types-soluble and insoluble fiber, sources of fiber, role of fiber in human nutrition. **Water** -functions, water compartment, regulation, water balance and disorders.	18
2	**Energy** Energy units, determination of energy value of foods using Bomb calorimeter, Physiological energy value of foods, determination of energy requirement using direct calorimetry, indirect calorimetry. **BMR** - determination of energy metabolism during work - energy requirements for various types of activities, recommended dietary allowances for energy for various age groups.	18
3	**Proteins-** Classification, Sources, Requirements and functions of protein. **Amino Acids** -Indispensable and dispensable amino acids. **Protein deficiency**-Protein Energy Malnutrition- Kwashiorkor and Marasmus– etiology, clinical features, treatment and prevention. Evaluation of protein quality Protein Efficiency Ratio, Biological Value, Net Protein Utilization and Net Protein Ratio.	18
4	**Lipids** **Lipids** - Definition, sources, requirements and functions. Digestion, absorption and metabolism. **Essential Fatty Acids (EFA)** - definition, functions, sources and effects of deficiency. **Fat soluble vitamins and Water-soluble vitamins** - functions, deficiency, sources and requirements.	18
5	**Minerals** **Macro minerals** -Calcium, Phosphorous, Magnesium, Potassium, Sodium and Chloride Distribution in the body, functions, food sources, requirements, effects of deficiency and toxicity. **Micro/Trace minerals** -Iron, Zinc, Iodine, Fluoride and Copper Distribution in the body; functions, food sources, requirements, effects of deficiency and toxicity.	18

CO	Course Outcomes
CO1	Understanding the basics of carbohydrates and water, optimal health and well-being.
CO2	Understanding of energy metabolism, including determination of energy values and requirements.
CO3	To analyze protein nutrition, protein quality, protein-energy malnutrition, and protein Supplementation.
CO4	To identify the importance of lipids and vitamins, including their functions, deficiency symptoms, sources, and requirements, and will be able to apply this knowledge to promote optimal health and well-being
CO5	Understand of minerals, including their roles in maintaining health, preventing disease, and managing toxicity.

Textbooks:	
1	Shubhangini. A. Joshi; Nutrition and Dietetics III edition, McGraw Hill Education (India) private Limited, 2015.
2	Srilakshmi B; Nutrition Science, 15th edition, New Age International (P) Limited, Publishers, 2016.
3	Swaminathan. M; Advanced Text-Book on Food and Nutrition, Volume I 2nd edition. The Bangalore Printing and Publishing Co., LTD, Reprint 2015.
4	Sunterra Roday; Food Science and Nutrition, 2nd edition, Oxford University Press, 2013
5	Carol Byrd – Bred banner; Wardlaw's perspectives in Nutrition, 9th edition MC Graw – Hill International Edition 201
Reference Books:	
1	1. Anderson J. J.B., Root M.M., Garner S.C.(2015) Human Nutrition: Healthy Options for Life. Jones & Bartlett Learning, Massachusetts, USA.
2	Guthrie, H.A. (1989) Introductory Nutrition. 7thed.TimesMirror/Mos by College Publishing, St. Louis
3	Insel P., Ross D., Mc Mahon K., Bernstein M. (2016) Discovering Nutrition.5th Ed. Jones & Bartlett Learning, Massachusetts, USA.
4	Mahan K and Sylvia E. Stump (2000) Krause's Food Nutrition and Diet Therapy, Saunders, USA 75
5	Medeiros D. M., and Wildman R. E. C. (2019) Advanced Human Nutrition. 4th Ed., Jones & Bartlett Learning, Massachusetts, USA.
E-**Learning Resources:**	
1	https://lifesciencedirect.com/determination-of-energy-value-of-food-using-bomb_calorimeter/
2	https://my.clevelandclinic.org/health/articles/15416-carbohydrates
3	https://basicmedicalkey.com/protein-and-amino-acid-requirements/
4	https://www.brainkart.com/article/Fat_37819/
5	https://www.brainkart.com/article/Minerals_37822/

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	2	3	3	2
CO2	2	3	3	3	3	3	3	3	3	3	2
CO3	3	3	3	2	3	2	2	2	3	3	3
CO4	2	2	3	2	3	2	3	3	2	3	3
CO5	3	3	3	3	3	3	2	3	3	2	3
Total	**13**	**13**	**15**	**13**	**15**	**13**	**13**	**13**	**14**	**14**	**13**
Average	**2.6**	**2.6**	**3.0**	**2.6**	**3**	**2.6**	**2.6**	**2.6**	**2.8**	**2.8**	**2.6**

3 – Strong, 2- Medium, 1- Low

Subject Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDC42P	**CC Practical - Human Nutrition**	Core	**0**	**0**	4	0	2	4	25	75	100

Learning Objectives	
LO1	To learn the Preparation of Ash Solution
LO2	To learn the extraction of Vitamin C
LO3	Analyze the amount of phosphorous, Calcium in a given sample.
LO4	Determine phosphorus content phosphorus in a given sample.
LO5	To understand the Principles of Iron

Unit	Content	Hours
1	Preparation of Ash Solution (Thermogravimetric Method)	12
2	Quantitative estimation of vitamin C.	12
3	Quantitative estimation of phosphorous.	12
4	Quantitative estimation of Calcium	12
5	Qualitative Analysis of Minerals	12
6	Demonstration Experiments Estimation of total nitrogen in foods (Micro or Macro Kjeldahl method) • Estimation of Iron	12

CO	Course Outcomes
CO1	Students will be able to understand Ash properties in the sample
CO2	Students will be able to understand Vitamin C properties in the sample
CO3	Students will learn to estimate calcium, phosphorous levels.
CO4	Students will learn to estimate Minerals levels.
CO5	Gain hands-on experience with biochemical testing and standard laboratory procedures.

Textbooks:	
1	**Practical Biochemistry** by Keith Wilson and John Walker Bio chemical methods – Sadashiv and A. Manic
2	**Dairy Chemistry and Bio chemistry** by P. F. Fox and P. L. H. Mc Sweeney
3	Food Chemistry by Keith A. Cox.
4	Vitamin Analysis for the Health and Food Sciences by Ronald R. Eiten miller.
5	**Fundamentals of Clinical Chemistry"** by Norbert W. Tietz
Reference Books:	
1	Varley, H., Gowenlak, A.H. and Hill, M. Practical Clinical Biochemistry, William Intiman Medical Books, London, 2000.

2	Oser, B.L., Harke's Physiological Chemistry XIV Edition Tata McGraw Hill Publishing Company Ltd., Bombay, 2001
3	Sadasivam, S. and Manickam, A. Biochemical Method, Second Edition, New Age International P. Ltd., Publishers, New Delhi, 2003.
4	Raghuramulu,N, N., Madhavannair, K. and Kalyana Sundaram, National Institute of Nutrition, 2013, A Manual of Laboratory Techniques, Hyderabad, 500007
5	Textbook of Clinical Chemistry and Molecular Diagnostics by Nader Rifai
Web Resources	
https://lifesciencedirect.com/determination-of-energy-value-of-food-using-bomb_calorimeter/	
https://my.clevelandclinic.org/health/articles/15416-carbohydrates	
https://basicmedicalkey.com/protein-and-amino-acid-requirements/	

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	2	3	3	2
CO2	2	3	3	3	3	3	3	3	3	3	2
CO3	3	3	3	2	3	2	2	2	3	3	3
CO4	2	2	3	2	3	2	3	3	2	3	3
CO5	3	3	3	3	3	3	2	3	3	2	3
Total	**13**	**13**	**15**	**13**	**15**	**13**	**13**	**13**	**14**	**14**	**13**
Average	**2.6**	**2.6**	**3.0**	**2.6**	**3**	**2.6**	**2.6**	**2.6**	**2.8**	**2.8**	**2.6**

3 – Strong, 2- Medium, 1- Low

Subject Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDA41	**EC AL- Foundation Of Baking And Confectionery**	Elective	3	1	0	0	4	4	25	75	100

Learning Objectives	
LO1	Gain knowledge about bakery and confectionery and hygiene practice.
LO2	Familiarize ingredients involved in varieties of baking.
LO3	Understand the role of various ingredients used in cakes, bread and jelly cake.
LO4	Acquire knowledge about the process involved in pastries, cookies, biscuits, pudding and pie .
LO5	Marketing strategies involved in sales promotion of bakery and confectionery.

Unit	Content	Hours
1	**An Overview of Bakery Industry** Introduction to bakery and confectionery, Scope of Baking, Terms used in Baking, Weights and measurements. **Baking**–principles and process. Equipment-tools used in baking and Confectionery. Bakery sanitation and personnel hygiene.	12
2	**Ingredients in Bakery and Confectionery** **Ingredients**-Flour, Sugar, Shortenings, Egg. **Leavening agents**-yeast, baking soda, baking powder, chocolates, cocoa powder. **Other ingredients-** salt, milk and milk derivatives, malt products, dough improve ,oxidizing agents, flavours and colors, nuts, spices and condiments, preserved and candied fruit peels.	12
3	**Breads and Cakes** **Bread-**ingredients, types of breads, faults and its prevention **Cakes**–ingredients, types of cakes, **c**ake judging, faults and remedies. **Jelly cake –**ingredients and Processing of jelly fruit cake **Modified baked goods**–using alternative healthy ingredients for special dietary needs. Different types and techniques of cake decoration-icings and fillings.	12
4	**Pastries, Cookies and Biscuits** **Pastries**-types of pastries-puff pastry, short crust, phyllo pastry, flaky pastry, choux pastry **Cookies &biscuits**–ingredients, types and processing, millet cookies and Coconut macaroons. **Pudding & Pies -** millet pudding, trifle pudding, almond crunch pudding Apple and pineapple pie.	12
5	**Confectionery and Marketing of Baked Products** Chocolates-production, types, chocolate decorations **S**ugar based confectionery–fudge, fondant, sugar candies. **Marketing and sales promotion**-costing, packaging and labeling.	12

CO	Course Outcomes
CO1	Understand the principles and process of baking and confectionery.
CO2	Acquire knowledge on various ingredients and its role in baking and confectionery
CO3	Develop skills to use of alternative healthy ingredients to dietary needs
CO4	Acquire skill to bake pastries ,cookies and biscuits
CO5	Enhance entrepreneurial skills in bakery and confectionery to improve business.

Textbooks:	
1	John Kingslee (2006) A Professional Textbook to Bakery and Confectionary. New Age International Pvt Limited Publisher, New Delhi.
2	Uttam K Singh (2011).Theory of Bakery and Confectionary- An Operational Approach. Kanishka Publishers and Distributors, New Delhi.
3	Yogambal Ashok kumar (2012) Theory of Bakery and Confectionary, PHI publication. New Delhi.
4	colelloI .and Foote, R (2000).Complete Confectionary Techniques. Hodder and Solution, London.
Reference Books:	
1	Bakersh and Book on practical Baking (2000) Published by U.S.Wheat Associates, New Delhi.
2	Dubey.S.C (2002) Basic Baking. 4th Edition. Published by the Society of Indian Bakers, New Delhi.
3	Sarah R . Lebensky, Pricillaetal., (2004) Textbook of Baking and Pastry Fundamentals, third edition, Pearson Education Ltd.
4	The Culinary Institute of America, Baking & Pastry: Mastering the Art and Craft, John Wiley & Sons, Inc New Jersy.2009.
Web resources	
https://www.lifestyleasia.com/ind/food-drink/dining/bookmark-the-best-baking-youtube-channels-to-bake-like-a-pro/	
http://www.bakels.in/	

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	2	3	3	2
CO2	2	3	3	3	3	3	3	3	3	3	2
CO3	3	3	3	2	3	2	2	2	3	3	3
CO4	2	2	3	2	3	2	3	3	2	3	3
CO5	3	3	3	3	3	3	2	3	3	2	3
Total	**13**	**13**	**15**	**13**	**15**	**13**	**13**	**13**	**14**	**14**	**13**
Average	**2.6**	**2.6**	**3.0**	**2.6**	**3**	**2.6**	**2.6**	**2.6**	**2.8**	**2.8**	**2.6**

3 – Strong, 2- Medium, 1- Low

Subject Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDA42P	**ECAL Practical - Foundation Of Baking And confectionery**	Elective	**0**	**0**	2	0	2	2	25	75	100

Learning Objectives	
LO1	Gain knowledge about bakery and confectionery and hygiene practice.
LO2	Familiarize ingredients involved in varieties of baking
LO3	Understand the role of various ingredients used in cakes, bread and jelly cake.
LO4	Acquire knowledge about the process involved in pastries, cookies, biscuits, pudding and pie .
LO5	Marketing strategies involved in sales promotion of bakery and confectionery

Unit	Content	Hours
1	**Baking & Hygiene Practices** Terms used in Baking ,Weights, measurements, tools involved in baking and hygiene practices.	6
2	**Ingredients in Bakery and Confectionery** Ingredients , Leavening agents, Other ingredients, Oxidizing agents Preparation of buns, rolls and pizza base.	6
3	**Breads and Cakes**-Preparation of butter cake, sponge cake, chocolate cake, cupcake. **Modified baked products**- High Fiber, alternative sugar, low fat and millet based bakery products for special nutritional requirements –Obesity, Diabetes Mellitus.	6
4	**Pastries, Cookies and Biscuits** Preparation of biscuits, cookies. Preparation of Pies.	6
5	**Confectionery and Marketing of Baked Products** Preparation of fudge, fondant and candies. Marketing strategies.	6

CO	Course Outcomes
CO1	Understand the principles and process of baking and confectionery.
CO2	Acquire knowledge on various ingredients and its role in baking and confectionery.
CO3	Develop skills to use of alternative healthy ingredients to dietary needs.
CO4	Acquire skill to bake pastries, cookies and biscuits.
CO5	Enhance entrepreneurial skills in bakery and confectionery to improve business.

Textbooks:	
1	John Kingslee (2006) A Professional Textbook to Bakery and Confectionary. New Age International Pvt Limited Publisher, New Delhi.
2	Uttam K Singh (2011).Theory of Bakery and Confectionary- An Operational Approach. Kanishka Publishers and Distributors, New Delhi.
3	Yogambal Ashok kumar (2012) Theory of Bakery and Confectionary, PHI publication. New Delhi.
4	colelloI .and Foote, R (2000).Complete Confectionary Techniques. Hodder and Solution, London.
Reference Books:	
1	Bakersh and Book on practical Baking (2000) Published by U.S.Wheat Associates, New Delhi.
2	Dubey.S.C (2002) Basic Baking. 4th Edition. Published by the Society of Indian Bakers, New Delhi.
3	Sarah R . Lebensky, Pricillaetal., (2004) Textbook of Baking and Pastry Fundamentals, third edition, Pearson Education Ltd.
4	The Culinary Institute of America, Baking & Pastry: Mastering the Art and Craft, John Wiley & Sons, Inc New Jersy.2009.
Web resources	
https://www.lifestyleasia.com/ind/food-drink/dining/bookmark-the-best-baking-youtube-channels-to-bake-like-a-pro/	
http://www.bakels.in/	

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	2	3	3	2
CO2	2	3	3	3	3	3	3	3	3	3	2
CO3	3	3	3	2	3	2	2	2	3	3	3
CO4	2	2	3	2	3	2	3	3	2	3	3
CO5	3	3	3	3	3	3	2	3	3	2	3
Total	**13**	**13**	**15**	**13**	**15**	**13**	**13**	**13**	**14**	**14**	**13**
Average	**2.6**	**2.6**	**3.0**	**2.6**	**3**	**2.6**	**2.6**	**2.6**	**2.8**	**2.8**	**2.6**

3 – Strong, 2- Medium, 1- Low

Subject Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDS41	**SEC -PRE-SCHOOL AND CRECHE MANAGEMENT**	Sec	1	0	1	0	2	2	25	75	100

Learning Objectives	
LO1	To Understand the concepts & organization of Creche and preschool.
LO2	Create awareness on resource management.
LO3	To familiarize the students with the Significance of managing the Records & Registers.
LO4	Understand the elements involved in organization and management of Preschool and crèche.
LO5	Create awareness on Personnel Management dealing with Preschool and crèche.

Unit	Content	Hours
1	**Concept and organization of Creche and Preschool** Introduction, types of preschools, need, importance Of organization, Elements of organization and administration. Difference between crèche and preschool, Preschool Programme -Principles of preschool programme.	6
2	**Resource Management** Location and building, Food Distribution and Preparation, Types of rooms, Storage facilities, arrangement of room (activity centers), ventilation, lighting and safety, Provision of safe drinking water and sanitary facilities & safety measures.	6
3	**Records and registers** Need, importance and maintenance of records and registers. Types Of records (Important records)–Admission, Progress, Financial, Equipment, Health sickness of child and immunization. Types of register , importance Attendance (Staff, children), Accounts, Stock, Staff Profile, services for children and daily diary.	6
4	**Planning of Preschool Education Activities** Skills & qualities of preschool children, Introductory Games for Rapport Building with Children. **Physical & Motor Development-**Gross Motor & Fine Motor Skills. Essentials of Physical Development Games for Gross and Fine Motor Skills **Social &Emotional Development-**Essentials for Social & Emotional Development Activities and games for Social-Emotional development	6
5	**Personnel Management** Roles and responsibilities of teacher and care - taker and other staff involved In welfare and care of children, Recruitment and selection, Teacher child ratio, Need for and importance of in-service training	6

CO	Course Outcomes
CO1	Describe key Concept and organization of Creche and Preschool
CO2	Explain Resource Management for creche and preschools
CO3	Understand the criteria for Records and registers maintenance
CO4	Identify importance and Planning of Preschool Education Activities
CO5	Introduction to Personnel Management required for crèche and preschools

Textbooks:	
1	Ax line,V.M.(1964).Dibs insearchofself.NewYork:Ballentinebooks754
2	Clarke,P.(2001).Teaching & learning: the culture of pedagogy. New York: Sage
3	Thomson, C.L., Holmberg, M.C., Baer, D.M., Hodges, W. L., and Moore, S.G.(1978). An Experimental Analysis of Some Procedures to Teach Priming
4	Jaya, N., & Jayapoorani. N. (2004). Participation in a nursery school – Laboratory manual for students. Coimbatore: Saradalaya.
Reference Books:	
1	TN Forces and IAPE, (2000). Pre- school Curriculum, Activity based developmentally appropriate curriculum for preschoolers. Chennai
2	Tileston,D.W.(2005).Training Manual for Every Teacher, Chennai: Sage.
3	s.Mono graphs of the Society for Research in Child Development. 43 (4), pp 1-86.
4	Management Of Nursery Education (Pre-School Child Development Centre)" by Dr. K.S. Bhardwaj
Web Resources:	
https://www.nextos.in/preschool-erp-software.html	
https://scert.kerala.gov.in/wp-content/uploads/2020/06/07-creche%20and%20preschool.pdf	
https://wcd.nic.in/sites/default/files/national_ecce_curr_framework_final_03022014%20%28	

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	2	3	3	2
CO2	2	3	3	3	3	3	3	3	3	3	2
CO3	3	3	3	2	3	2	2	2	3	3	3
CO4	2	2	3	2	3	2	3	3	2	3	3
CO5	3	3	3	3	3	3	2	3	3	2	3
Total	**13**	**13**	**15**	**13**	**15**	**13**	**13**	**13**	**14**	**14**	**13**
Average	**2.6**	**2.6**	**3.0**	**2.6**	**3**	**2.6**	**2.6**	**2.6**	**2.8**	**2.8**	**2.6**

3 – Strong, 2- Medium, 1- Low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDC51	**CC -9 Nutrition Through Life Cycle**	**Core**	**4**	**1**	0	0	**4**	**5**	**25**	**75**	**100**

Learning Objectives	
LO1	To understand the principles of meal planning and Nutrition for adults
LO2	To Explain nutritional needs and their impact on maternal and fetal health during pregnancy and Lactation
LO3	To understand the growth, feeding practices, and nutritional needs for different age groups
LO4	To Analyze nutritional needs, eating habits, and common health issues in school children and adolescents.
LO5	To Understand physiological changes and plan appropriate diets for elders.

Unit	Content	Hours
1	**Human Nutrition Across Adulthood:** **Introduction to meal planning –** Balanced diet – Food groups – Food Guide Pyramid (ICMR) – Food Plate and My Plate for (Eat right India) Recommended Dietary Allowances (RDA) – Factors affecting RDA – Principles and steps involved in meal planning. **Nutrition for adults** – Reference man and reference woman – Nutritional requirements – Planning balanced diets for adult men and women – Promotion of healthy lifestyle through holistic approach.	**15**
2	**Maternal Nutrition and Lactation** **Pregnancy:** Physiological changes and nutritional requirements – Effect of nutrition on pregnancy outcome – Optimal weight gain – Nutrition-related problems and complications during pregnancy – Meal planning for pregnant women. **Lactation:** Physiology of lactation – Nutritional requirements – Nutritional concerns of breastfeeding mothers – Meal planning for lactating women.	**15**

3	**Infant and Preschool Nutrition:** **Infant nutrition and feeding practices** – Growth and development – Growth standards – Food and nutritional requirements – Breastfeeding and artificial feeding – Nutrition for low birth weight and preterm babies – Complementary feeding – Meal planning for infants. **Nutrition for preschool children** – Growth and development – Food and nutritional requirements – Eating habits and food behaviours – Nutrition-related problems: PEM and VAD – Dietary interventions – Meal planning for infants.	**15**
4	**Nutrition and Health Across School-age and Adolescence:** **Nutrition for school children** – Physical growth patterns – Nutritional requirements – Importance of healthy snacks – Factors affecting eating habits – School lunch – Meal planning for school children. **Nutrition during adolescence** – Physiological and developmental changes – Nutritional requirements – Food habits – Nutritional problems: Obesity, underweight, anaemia and eating disorders – Meal planning for adolescents.	**15**
5	**Gerontology and Healthy Ageing:** Physiological changes during ageing – Food and nutritional requirements – Nutritional and health concerns in old age – Dietary modifications for elderly – Nutrition in age-related disorders – Hydration and immune health – Healthy lifestyle and meal planning for elderly.	**15**

CO	Course Outcomes
CO1	Understand the role of interventions to enhance wellness in diverse individuals and Groups
CO2	Skills to develop an educational program for a target population
CO3	Apply various methods of nutritional assessment, including anthropometric, biochemical, clinical, dietary, and indirect assessment techniques for identifying nutritional status and risk groups.
CO4	Discuss national and international nutrition policies, agencies, and programmes related to nutrition intervention, surveillance, and public health improvement.
CO5	Evaluate strategies used to combat nutritional problems such as food fortification, enrichment, supplementation, immunization, and nutrition education programmes.

Textbooks:	
1	Brown, J. E. et al. Nutrition Through the Life Cycle. 8th Ed., Cengage Learning, 2024.
2	Stephenson, T. J. & Schiff, W. Life Cycle Nutrition: An Evidence-Based Approach. 7th Ed., Jones & Bartlett Learning, 2024.
3	Chadha, R. & Mathur, P. Nutrition: A Lifecycle Approach. 6th Ed., Orient BlackSwan, 2019.
4	Wardlaw, G. M. & Smith, A. M. Contemporary Nutrition: A Functional Approach. 7th Ed., McGraw-Hill, 2022.
5	Whitney, E. & Rolfes, S. R. Understanding Nutrition. 16th Ed., Cengage Learning, 2024.
Reference Books:	
1	Srilakshmi B. (2011) Dietetics, sixth edition, New age Publishing Press, New Delhi.
2	Gopalan,C., Ramanathan, P.V. Balasubramanian, S.C. (2001) Nutritive value of Indian foods, NIN, Hyderabad
3	Longvah T, Ananthan R, Bhaskar K, Venkaiah K. (2017) Indian Food Composition Tables, National Institute of Nutrition
4	Abraham S, Nutrition through Lifecycle. (2016) 1st edition, New age international publishers, New Delhi.
5	Parida, S. *Nutrition: A Life Cycle Approach*. Academic Guru Publishing House, 2024.
Web Resources:	
1	World Health Organization – Nutrition
2	UNICEF – Nutrition
3	Food and Agriculture Organization (FAO) – Nutrition
4	National Institute of Nutrition (NIN), India
5	NPTEL – Nutrition, Therapeutics and Health

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	2	2	2	2	2	2
CO2	3	3	2	2	2	2	2	2	3	2	2
CO3	3	3	3	2	2	2	2	2	3	3	2
CO4	3	3	3	3	2	2	2	2	3	3	2
CO5	3	3	3	3	3	2	2	2	3	3	3
Total	**15**	**14**	**13**	**12**	**11**	**10**	**10**	**10**	**14**	**13**	**11**
Average	**3.0**	**2.8**	**2.6**	**2.4**	**2.2**	**2.0**	**2.0**	**2.0**	**2.8**	**2.6**	**2.2**
3 – Strong, 2- Medium, 1- Low											

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDC52P	**CC-10 (Practical) Nutrition Through Life Cycle**	**Core**	**0**	**0**	**4**	**0**	**4**	**4**	**25**	**75**	**100**

Learning Objectives	
LO1	To Understand the principles of menu planning and food exchange lists.
LO2	To Identify nutritional requirements for different age groups and physiological conditions.
LO3	To Plan balanced diets for infants, children, adolescents, adults and elderly people.
LO4	To Prepare diets for pregnant and lactating women.
LO5	To Develop low- and medium-cost diets for deficiency diseases such as PEM, vitamin A deficiency and nutritional anemia.

Unit	Content	Hours
1	Menu Planning and Food Exchange List	**12**
2	Nutritional and Food Requirements to meet the needs of the following: a. Complementary feeding b. pre-school children c. School going children	**12**
3	Nutritional and Food Requirements to meet the needs of the following: a. Adolescent b. Adult c. Elderly Peoples and Low-income elderly People.	**12**
4	Nutritional and Food Requirements to meet the Physiological conditions of: a. Expectant Women b. Nursing Women	**12**
5	Nutritional and Food Requirements to meet the needs of the following (low and medium cost) for deficiency diseases: a. PEM b. Vitamin A deficiency c. Nutritional anemia	**12**

CO	Course Outcomes
CO1	Apply principles of menu planning and food exchange lists in diet planning.
CO2	Plan balanced diets for different age groups and physiological conditions.
CO3	Prepare nutritionally adequate diets for pregnant and lactating women.
CO4	Develop low- and medium-cost therapeutic diets for deficiency diseases.
CO5	Evaluate nutrient adequacy using recommended dietary guidelines and food exchanges.

Textbooks:	
1	Stacy N, William's Basic Nutrition and Diet Therapy. (2005) 12th edition, Elseivier publications, United Kingdom.
2	Whitney EN and Rolfes SR, Understanding Nutrition. (2002) 9th edition West/Wordsworth, London.
3	Cataldo, DeBruyne and Whitney, Nutrition and Diet therapy– Principles and Practice.(1999) 5th edition, West/ Wadsworth, London.
4	Brown, J. E. Nutrition Through the Life Cycle. 8th Ed., Cengage Learning, 2024.
5	Chadha, R. & Mathur, P. Nutrition: A Lifecycle Approach. 6th Ed., Orient BlackSwan, 2019
Reference Books:	
1	Srilakshmi B. (2011) Dietetics, sixth edition, New age Publishing Press, New Delhi.
2	Gopalan,C., Ramanathan, P.V. Balasubramanian, S.C. (2001) Nutritive value of Indian foods, NIN, Hyderabad
3	Longvah T, Ananthan R, Bhaskar K, Venkaiah K. (2017) Indian Food Composition Tables, National Institute of Nutrition
4	Abraham S, Nutrition through Lifecycle. (2016) 1st edition, New age international publishers, New Delhi.
5	Wardlaw, G. M. & Smith, A. M. *Contemporary Nutrition: A Functional Approach*. 7th Ed., McGraw-Hill Education, 2022.
Web Resources:	
1	http://vikaspedia.in/health/nutrition/dietary-guidelines-1/dietary-guideline-1
2	https://www.nhp.gov.in/healthlyliving/healthy-diet
3	Mother Child Nutrition – Complementary Feeding Guidelines
4	World Health Organization – Nutrition
5	NPTEL – Nutrition, Therapeutics and Health

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	2	2	2	2	2	2
CO2	3	3	2	2	2	2	2	2	3	2	2
CO3	3	3	3	2	2	2	2	2	3	3	2
CO4	3	3	3	3	2	2	2	2	3	3	2
CO5	3	3	3	3	3	2	2	2	3	3	3
Total	**15**	**14**	**13**	**12**	**11**	**10**	**10**	**10**	**14**	**13**	**11**
Average	**3.0**	**2.8**	**2.6**	**2.4**	**2.2**	**2.0**	**2.0**	**2.0**	**2.8**	**2.6**	**2.2**

3 – Strong, 2- Medium, 1- Low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDC53	CC-11 Dietetics	Core	2	1	1	0	4	4	25	75	100

Learning Objectives	
LO1	Apply the Nutritional Care Process (NCP) to assess, plan, implement, and monitor appropriate nutritional support for Critically Ill Patient
LO2	Plan appropriate dietary modifications for fever and infectious conditions.
LO3	Evaluate and modify diet plans based on disease progression and patient response.
LO4	Apply clinical nutrition knowledge to assess, manage, and provide appropriate Medical Nutrition Therapy
LO5	Understand and outline the diagnostic criteria for different eating disorders.

Unit	Content	Hours
1	**Nutritional Care Process & Nutritional Support for Critically Ill Patient:** **Types of Feeding Methods** - **Oral Feeding**: Routine Hospital Diet and Therapeutic Diet, - **Enteral Feeding:** Routes of EN, Types of Enteral Tubes, Formula Delivery Methods. - **Parenteral Feeding**: Types of PN, PN Administration, Formulation, Monitoring and its Complication.	12
2	**Nutrition in Infectious Diseases:** Classification, Stages of Infection, Pathophysiology, Signs and Symptoms, Diagnostic Tests, Medical Treatment and Medical Nutrition Therapy in (i) Fevers, Influenza, typhoid, tuberculosis, Dengue, Leptospirosis and swine flu. (ii) HIV and AIDS (iii) Food Allergy	12
3	**Nutrition in Liver and Pulmonary Diseases:** Etiology, signs and symptoms, diagnostic test, medical treatment, medical nutrition therapy and dietary management of:	12

	Diseases of the Liver, Gall Bladder and Pancreas -Hepatitis, Cirrhosis, Hepatic encephalopathy, Cholecystitis – acute and chronic, Cholelithiasis and Pancreatitis- acute and chronic. **Pulmonary diseases**-Pneumonia, COPD and Chronic Bronchitis.	
4	**Diseases of Gastrointestinal Disorder** Etiology, Signs and Symptoms, Diagnostic Tests, Medical Treatment and Medical Nutrition Therapy of (i) **Diseases of the oesophagus, stomach and duodenum:** Esophagitis, Gastritis and Peptic Ulcer. (ii) **Diseases of the small intestine and colon:** Diarrhea, Constipation, IBS, IBD	**12**
5	**Nutrition in Eating Disorder** Etiology, Signs and Symptoms, Diagnostic criteria, Medical and Psychological Management and Medical Nutrition Therapy of (i) Anorexia Nervosa (ii) Bulimia Nervosa (iii) Binge Eating disorder, Role of Influencers in Promoting Disordered Eating Patterns	**12**

CO	**Course Outcomes**	**Knowledge Level**
CO1	Apply the Nutritional Care Process (NCP) to assess, diagnose, and manage patients' nutritional needs.	**K2**
CO2	Analyze clinical features and diagnostic methods of common infectious diseases.	**K3**
CO3	Design and evaluate nutrition care plans to support recovery and manage complications in affected patients.	**K1**
CO4	Analyze the clinical features and medical management of upper and lower GI diseases.	**K4**
CO5	Analyze the medical and psychological management of eating disorders.	**K5**

Textbooks:	
1	"Nutrition and Dietetics" – Shubhangini A. Joshi
2	"Textbook of Nutrition and Dietetics" – Kumud Khanna & S.R. Gupta
3	"Krause's Food & the Nutrition Care Process" – Janice L. Raymond

4	Whitney, E. & Rolfes, S. R. Understanding Nutrition. 16th Ed., Cengage Learning, 2024.
5	Srilakshmi, B. Nutrition Science. 7th Ed., New Age International Publishers, New Delhi.
Reference Books:	
1	Clinical Dietetics & Nutrition F.P. Anita & Philip Abraham, 4th Edition, Oxford University Press, India 2002
2	Williams' Basic Nutrition & Diet Therapy, Staci Nix McIntosh, 16th Edition, Elsevier, 2021
3	Modern Nutrition in Health and Disease, A. Catharine Ross et al. 11th Edition, Wolters Kluwer / Lippincott Williams & Wilkins 2019
4	Academy of Nutrition and Dietetics Complete Food and Nutrition Guide, Roberta Larson Duyff , 5th Edition, Houghton Mifflin Harcourt
5	Brown, J. E. *Nutrition Through the Life Cycle*. 8th Ed., Cengage Learning, 2024.
Web Resources:	
1	**https://www.nin.res.in/**
2	**https://www.who.int/health-topics/nutrition**
3	**https://www.nutritioncare.org/**
4	Food and Agriculture Organization (FAO) – Nutrition
5	NPTEL – Nutrition, Therapeutics and Health

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	2	2	2	2	2	2
CO2	3	3	2	2	2	2	2	2	3	2	2
CO3	3	3	3	2	2	2	2	2	3	3	2
CO4	3	3	3	3	2	2	2	2	3	3	2
CO5	3	3	3	3	3	2	2	2	3	3	3
Total	15	14	13	12	11	10	10	10	14	13	11
Average	3.0	2.8	2.6	2.4	2.2	2.0	2.0	2.0	2.8	2.6	2.2

3 – Strong, 2- Medium, 1- Low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDC54P	**CC-12 (Practical) Dietetics**	**Core**	**0**	**0**	**3**	**0**	**2**	**3**	**25**	**75**	**100**

Learning Objectives	
LO1	Identify and demonstrate different hospital diet types based on consistency and clinical needs.
LO2	Plan therapeutic diets based on disease condition, severity, and recovery stage.
LO3	Design appropriate diet modifications for hepatobiliary disorders such as hepatitis, cirrhosis, Cholelithiasis, and pancreatitis.
LO4	Prepare low-fiber, high-fiber, soft, and GERD-friendly diets based on clinical needs.
LO5	Apply dietary strategies to prevent binge–purge cycles through structured meal planning.

Unit	Content	Hours
1	**Meal Planning** • Portion control meal planning • Mindful eating-based diet charts • Normalized meal pattern planning (structured eating)	**9**
2	**Routine Hospital Diet:** **a) Planning and Preparation of diets for the following Conditions/stages:** • Clear Fluid • Full Fluid • Soft diet **b) Planning and Preparation of diets for the following febrile Conditions & Infections:** • Influenza, typhoid, • tuberculosis, HIV • Dengue	**9**
3	**Planning and Preparation of diets for the following Conditions/stages:**	**9**

	• Hepatitis • Cirrhosis • Cholelithiasis and Pancreatitis • COPD and Chronic Bronchitis	
4	**Planning and Preparation of diets for the following Conditions/stages:** • Diarrhea • Constipation • Irritable Bowel Syndrome (IBS) • GERD	**9**
5	**Nutrition in Eating Disorder:** **a. Case Study – Anorexia Nervosa** • Assess dietary intake, BMI and nutritional deficiencies. • Plan a high-calorie, nutrient-dense diet for recovery. **b. Case Study – Bulimia Nervosa** • Analyse binge–purge eating patterns. • Prepare meal plans to normalize eating behaviour and electrolyte balance. **c. Case Study – Binge Eating Disorder** • Record emotional eating triggers and food frequency patterns. Develop balanced meal plans focusing on portion control and satiety.	**9**

CO	Course Outcomes	Knowledge Level
CO1	Prepare and modify different hospital diets (liquid, soft, semi-solid, and regular) based on patient requirements.	**K2**
CO2	Demonstrate knowledge of nutritional requirements in infectious diseases such as influenza, typhoid, tuberculosis, malaria, and dengue.	**K3**
CO3	Design appropriate modified diets such as low-fat, high-protein, energy-dense, and fluid-controlled diets.	**K1**
CO4	Plan and prepare therapeutic diets appropriate for different GI conditions and clinical symptoms	**K4**
CO5	Design portion-controlled meal plans suitable for maintaining healthy eating patterns.	**K5**

Textbooks:

1	Antia,F.B.(2010),Clinical Nutrition and Dietetics, Oxford University Press, London.
2	IDA.(2018),ClinicalDieteticManual,2ndedition,ElitePublishingHouse,NewDelhi
3	Sri Lakshmi. B.,(2019)Dietetics,8thEd, New Age International Pub. Co,Chennai.
4	Joshi, S. A. Nutrition and Dietetics. McGraw Hill Education, India, 2022.
5	Raymond, J. L. & Morrow, K. Krause's Food & the Nutrition Care Process. 16th Ed., Elsevier, 2020.
Reference Books:	
1	VimalaV.(2010).AdvancesinDietTherapy,1stEd.,NationalInstituteofNutrition–Hyderabad..
2	Williams S.R, (2000)Basic Nutrition and Diet Therapy, MOs by publication
3	Sharma. A (2017), Principles of Therapeutic Nutrition and Dietetics, CBS Publishers & Distributors Pvt Ltd, New Delhi.
4	Bajaj .M (2019) Diet Metrics: Handbook of Food Exchanges, Nort on Press, Chennai
5	Ross, A. C. et al. *Modern Nutrition in Health and Disease*. 11th Ed., Wolters Kluwer/Lippincott Williams & Wilkins, 2019.
Web Resources:	
1	IASRI e-Course – Diet Therapy Resources
2	IASRI e-Course – Clinical Nutrition Resources
3	MIT Scripts – Nutrition Resources
4	National Institute of Nutrition (NIN)
5	NPTEL – Nutrition, Therapeutics and Health

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	2	2	2	2	2	2
CO2	3	3	2	2	2	2	2	2	3	2	2
CO3	3	3	3	2	2	2	2	2	3	3	2
CO4	3	3	3	3	2	2	2	2	3	3	2
CO5	3	3	3	3	3	2	2	2	3	3	3
Total	**15**	**14**	**13**	**12**	**11**	**10**	**10**	**10**	**14**	**13**	**11**
Average	**3.0**	**2.8**	**2.6**	**2.4**	**2.2**	**2.0**	**2.0**	**2.0**	**2.8**	**2.6**	**2.2**

3 – Strong, 2- Medium, 1- Low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDA51	**EC-8 Community Nutrition**	**EC**	**4**	**1**	**0**	**0**	**4**	**5**	**25**	**75**	**100**

Learning Objectives	
LO1	Understand role of Community Nutrition to maintain the health status
LO2	Understand nutrition problems existing in the community
LO3	Identify risk groups and explain the use of sampling techniques and growth charts in nutritional assessment.
LO4	Knowledge to apply nutrition policy and programs in alleviating nutritional problems.
LO5	Develop the ability to plan and implement community-based nutrition education and intervention programmes.

Unit	Content	Hours
1	**Nutrition and Health in National Development** - Concept of Community, Types of Community, Factors affecting the health of community. **Malnutrition** - Etiology, symptoms, Prevalence of malnutrition, factors contributing to malnutrition - Under nutrition and Over nutrition.	15
2	**Nutritional problems confronting our country** – Protein Energy Malnutrition - Prevalence, classification - Kwashiorkor and Marasmus - etiology, symptoms, pathological changes, biochemical changes. Prevalence, etiology, symptoms, prophylaxis Programmes - **Anaemia, IDD and Vitamin A deficiency**	15
3	**Methods of assessment of Nutritional status** - sampling techniques - identification of risk group. **Direct methods**- anthropometry, biochemical estimation, clinical, and diet survey. **Indirect methods**- Food balance sheet, Ecological parameter and vital statistics, use of growth chart.	15

4	**Nutrition policy and programmes** - National Nutrition policy - need for nutrition policy, policy strategies and their implementation - ICDS, Noon Meal Programme, FAO, WHO, UNICEF, CARE, ICMR, ICAR, CSIR, NIN, CFTRI, NGOs, National Nutrition surveillance system, National prophylaxis programmes for IDA, VAD and IDD.	15
5	**Strategies to combat Nutritional problems**-fortification, enrichment, supplementation and Immunization programmes. **Nutrition Education** - Meaning, Scope, Methods - Planning, conduct and evaluation of Nutrition education Programme.	15

CO	Course Outcomes
CO1	Understand the role of interventions to enhance wellness in diverse individuals and groups
CO2	Skills to develop an educational program for a target population
CO3	Apply various methods of nutritional assessment, including anthropometric, biochemical, clinical, dietary, and indirect assessment techniques for identifying nutritional status and risk groups.
CO4	Discuss national and international nutrition policies, agencies, and programmes related to nutrition intervention, surveillance, and public health improvement.
CO5	Evaluate strategies used to combat nutritional problems such as food fortification, enrichment, supplementation, immunization, and nutrition education programmes.

Textbooks:	
1	Textbook of Community Nutrition, By Suryatapa Das,Academic Publishers, India.
2	Jelliffe, and Jelliffe D.B: Assessment of Nutritional Status of the community. World Health Organization.1986
3	Public Health Nutrition,By Archana Kasaudhan,Covers nutritional epidemiology, maternal and child nutrition, nutrition education, food security, and national nutrition programmes.
4	Public Health Nutrition: A Textbook,Useful for public health nutrition concepts, policies, and interventions.
5	Bamji MS, Hemalatha R, Bhanuprakash Reddy G. *Textbook of Human Nutrition*. CBS Publishers.

Reference Books:	
1	Archana Kasaudhan. *Public Health Nutrition.*
2	Nnakwe NE. *Community Nutrition: Planning Health Promotion and Disease Prevention.*
3	Mahtab S. Bamji, Kamala Krishnaswamy and G.N.V. Brahmam. *Textbook of Human Nutrition*. Oxford and IBH Publishing.
4	Swaminathan M. *Advanced Textbook on Food and Nutrition*. Volumes I & II. BAPPCO Publications.
5	Park K. *Park's Textbook of Preventive and Social Medicine*. Banarsidas Bhanot Publishers.
E-**Learning Resources:**	
1	https://www.fao.org/nutrition/e-learning-courses/en/?utm_source
2	https://www.nin.res.in/?utm_source
3	https://sdghelpdesk.unescap.org/e-learning/nutrition-knowledge-hub?utm_source
4	https://ndl.iitkgp.ac.in/?utm_source
5	https://poshan-abhiyaan.nin.res.in/?utm_source

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	2	1	2	2	1	3	2	2
CO2	2	3	3	2	2	2	3	2	3	3	2
CO3	3	3	3	2	2	3	2	2	3	3	3
CO4	2	2	2	3	2	2	3	2	2	3	2
CO5	3	2	3	3	2	3	3	2	3	3	3
Total	**13**	**12**	**13**	**12**	**9**	**12**	**13**	**9**	**14**	**14**	**12**
Average	**2.6**	**2.4**	**2.6**	**2.4**	**1.8**	**2.4**	**2.6**	**1.8**	**2.8**	**2.8**	**2.4**

3 – Strong, 2- Medium, 1- Low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDA52	EC-8 Food Preservation & Processing	EC	4	1	0	0	4	5	25	75	100

Learning Objectives	
LO1	To Learn the basic concepts and importance of Food Preservation
LO2	To Understand the different methods of Food Preservation
LO3	To Understand the High Temperature Preservations and processing techniques
LO4	To Analyze the effects of low temperature on microorganisms and enzymes.
LO5	To Evaluate the use of preservatives in squashes, ketchup, and marmalade.

Unit	Content	Hours
1	**Food preservation**: Concept, importance, principles, Common terms used in food preservation. Different methods and Principles of preservation. **Food processing**: Concept, importance, Applications and Equipments used in food Processing **Food Spoilage** – Definition causes, Food storage – Importance, changes during food storage. Qualitative and quantitative deterioration in Food Spoilage	15
2	**Methods of food preservation**: Traditional preservation methods, preservation by low temperature, Preservation by preservatives, Preservation by Chemical and Osmotic Preservation. Hurdle Technology. High Pressure processing High concentration of sugar, High concentration of salt. Preservation by dehydration. Food irradiation. Sustainable Preservation	15
3	**Food preservation by high temperature:** Thermal and Non Thermal Processing- Commercial heat preservation methods – Sterilization, commercial sterilization, Pasteurization, and Canning – bottling. Pulsed Electric Fields (PEF) Cold plasma, UV radiation. Minimal processing	15

	techniques, Clean-label preservation.	
4	**Food preservation by Low temperature:** Introduction, Stages, Principles, Methods of Low Temperature preservation, Effects of Low temperature on microorganism, Advantage & disadvantage of Low Temperature, Limitations, Temperature changes during storage. Emerging innovative Techniques, Integration with Multi-Hurdle Approach.	**15**
5	**Preservation using Chemicals and Irradiation:** Introduction. Types of Chemical Preservatives. Preservation using Chemical preservatives-Squashes, Ketchup and Marmalade Preservation by Irradiation: Gamma rays, X-rays and Electron Beam Preservation. Advantages and Limitations of Chemical Preservatives. Emerging Trends in natural preservatives Vs Chemical Preservatives	**15**

CO	**Course Outcomes**	**Knowledge Level**
CO1	To understand the concept, importance, and applications of food processing.	**K1, K2, K3**
CO2	To Develop sustainable and innovative strategies for food preservation.	**K1, K2, K3, K4**
CO3	To Develop innovative and sustainable food preservation strategies using clean-label approaches.	**K1, K2, K3**
CO4	To Analyze the impact of low temperature on microbial activity and food quality.	**K1, K2, K3, K4**
CO5	To Understand the knowledge of chemical and irradiation preservation Methods	**K1, K2, K3, K4**

Textbooks:	
1	"Food Preservation and Processing" by Shirley J. VanGarde and Margy Woodburn
2	"Food Processing Technology: Principles and Practice" by P.J. Fellows
3	Potter, N. N. & Hotchkiss, J. H. Food Science. 5th Ed., CBS Publishers, New Delhi.
4	Desrosier, N. W. & Desrosier, J. N. The Technology of Food Preservation. CBS Publishers & Distributors, New Delhi.
5	Manay, N. S. & Shadaksharaswamy, M. Foods: Facts and Principles. New Age International Publishers, New Delhi.
Reference Books:	
1	Prakash Triveni (2010). Food Preservation, Aadi Publication, Delhi.

2	M.Shafiur Raman (2007): Hand Book of Food Preservation, Marcel Dekker Inc, New York.
3	Mc Williams and Paine (2009):Modern Food Preservation, Surjeet Publications
4	Karnal, Marcus and D.B.Lund (2003).“Physical Principles of Food Preservation”.
5	Rutledge. Van Garde,S.J .and Wood burn. M (2001)“Food Preservation and Safety Principles and Practice”. Surbhi Publications
Web Resources:	
1	**https://www.atlas.org/documents/l-u5-food-processing-and-preservation-technologypdf-r9PMYp1KyCvYErK3qmkWhu?utm_source**
2	**https://www.perlego.com/book/2800379/food-processing-and-preservation-pdf?utm_source**
3	**Food Processing and Preservation Technology**
4	Food and Agriculture Organization (FAO) – Food Processing
5	National Institute of Food Technology Entrepreneurship and Management (NIFTEM)

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	2	3	3	3	3	3	3	3	3
CO2	3	3	2	2	3	3	2	3	3	3	3
CO3	3	3	3	2	3	3	2	3	3	3	3
CO4	3	3	2	2	3	3	2	3	3	3	3
CO5	3	3	2	2	3	3	33	2	2	2	2
Total	**15**	**15**	**11**	**11**	**15**	**15**	**12**	**15**	**14**	**14**	**14**
Average	**3**	**3**	**2.2**	**2.2**	**3**	**3**	**2.4**	**3**	**2.8**	**2.8**	**2.8**

3 – Strong, 2- Medium, 1- Low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDA53	**EC-9 Foundation in Research Methodology**	EC	4	1	0	0	4	5	25	75	100

Learning Objectives

LO1	To understand the basics of research and research process.
LO2	To learn methods of data collection and sampling techniques.
LO3	To develop skills in classification, tabulation and statistical presentation of data.
LO4	To introduce qualitative and quantitative research methods.
LO5	To understand review of literature, report writing and research ethics.

Unit	Content	Hours
1	**Introduction to Research:** Meaning and Importance of Research – Objectives and Types of Research – Research Process – Scientific Method – Research Problem – Hypothesis – Variables in Research – Basic Concepts in Research.	15
2	**Research Design and Sampling**: Meaning and Functions of Research Design – Types of Research Design – Exploratory, Descriptive and Experimental Research – Sampling Methods – Sample Size Determination – Random and Non-Random Sampling.	15
3	**Data Collection and Representation:** Types of Data – Primary and Secondary Data – Observation – Interview – Questionnaire Method – Classification and Tabulation of Data – Graphical Representation of Data.	**15**
4	**Measurement and Data Analysis**: Measurement Scales – Likert Scale – Reliability and Validity – Measures of Central Tendency: Mean, Median and Mode – Basics of Statistical Analysis – Hypothesis and Testing of Hypothesis.	15
5	**Research Report Writing:** Structure of Research Report – Research Paper Writing – Literature Review Writing – Research Ethics – Plagiarism – Citation and Referencing – Presentation of Research Findings.	15

CO	Course Outcomes
CO1	Understand the fundamentals of research methodology.
CO2	Apply appropriate methods for data collection.
CO3	Classify, tabulate and statistically present data.
CO4	Conduct basic review of literature and differentiate research methods.
CO5	Prepare research reports following ethical guidelines.

Textbooks:	
1	Foundations of Research Methodology: A Guide book of Research Techniques, Along with Measurement & Sampling by Partha Sarathi Basu 2019
2	Donald R. Cooper & Pamela Schindler – Ranjit Kumar 2018
3	Research Methodology: Methods and Techniques by C. R. Kothari 4 th Edition (New Age International)
4	Kumar, R. Research Methodology: A Step-by-Step Guide for Beginners. Sage Publications, 2018.
5	Dawson, C. Introduction to Research Methods. 5th Ed., How To Books, 2021.
Reference Books:	
1	*John W. Creswell* Research Design: Qualitative, Quantitative and Mixed Methods Approaches 3rd Edition (New Age international) 2019
2	Research Methodology: A Step-by-Step Guide for Beginners by Ranjit Kumar
3	Research in Education John W. Best & James V. Kahn Published by PHI Learning (Review date 2023)
4	Jilcha Sileyew, K. (2020). Research Design and Methodology.
5	Kerlinger, F. N. *Foundations of Behavioral Research*. Surjeet Publications.
E-**Learning Resources:**	
1	SWAYAM – Introduction to Research Methodology
2	SAGE Research Methods
3	National Centre for Research Methods (NCRM)
4	NPTEL – Research Methodology Course
5	e-PG Pathshala – Research Methodology

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	4	3	3	3	4	3	3	3	2
CO2	3	3	2	2	2	2	3	3	3	3	2
CO3	3	3	3	3	3	3	2	2	3	3	2
CO4	3	3	3	3	2	2	2	2	3	3	2
CO5	3	3	3	3	3	2	2	2	3	3	3
Total	**15**	**14**	**13**	**12**	**11**	**10**	**10**	**10**	**14**	**13**	**11**
Average	**3.0**	**2.8**	**2.6**	**2.4**	**2.2**	**2.0**	**2.0**	**2.0**	**2.8**	**2.6**	**2.2**

3 – Strong, 2- Medium, 1- Low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDA54	**EC-9Perspectives of home science**	**EC**	**4**	**1**	**0**	**0**	**4**	**5**	**25**	**75**	**100**

Learning Objectives	
LO1	Develop awareness regarding professional ethics, leadership, and extension activities in Home Science education.
LO2	Discuss principles involved in the selection of clothing and Prepare a simple clothing budget for individuals or families.
LO3	Discuss the role of Home Science Extension in improving family welfare and quality of life.
LO4	Develop awareness regarding healthy family relationships and life-span development.
LO5	Identify the features and characteristics of major Indian cuisines.

Unit	Content	Hours
1	**Meaning of Home Science Education-** Philosophy of Home and Family- Components of Home Science-Carrier Perspectives- Its Relation to other Disciplines- Science and Humanities. The Home Science Association of India- History and Objectives, Achievements of the Association- Representation in National Bodies	15
2	**Concept of Interior Design**-Importance of Good Taste, Components of an Artistic Interior- Resource Classification, Methods of Conserving Energy, **Values**- Types, Value to be Imbibed by Youth, **Fiber**-Classification: Nature. Synthetic, **Yarn**-Definition, Fabric: Construction Method- Weaving Basic Steps, Knitting and its Importance, Nonwovens and Types, Clothing: Selection of Clothing, Clothing Budget, Laundering and Storing-Cotton, Wool and Delicate Fabrics. Basic concepts of Home management and steps - Decision making, Work simplification	15
3	Meaning, Definition, Objectives, Philosophy, Principles of Extension Education, Extension as the Third Dimension of Higher Education, Home Science Extension Service at Various Levels- Village, Block and District Level, Role of Home Science Extension in Rural And National Development- Welfare Programme- National, Social Assistance Programme (NSAP) - Member of Parliament Local Area Development Scheme	15

	(MPLADS), Member of Legislative Assembly Area Development Scheme (MLAADS), Rajiv Gandhi Rehabilitation Package (RGAP), Mahatma Gandhi National Rural Employment Scheme (MNRES)	
4	**Conception**-Pre Natal Development, Pre and Post Natal Care, Growth and Development during Childhood and Adolescence, Characteristics of Adulthood, Characteristics and Problems of Elderly and Emerging Trends in Parenting.	15
5	Classification of Foods according to Function and Origin, Food Groups-Balanced Diet- Meaning and Importance of Balanced Diet, Meal Planning, Macro and Micro Nutrients of Foods- Introduction of Dietetics- Principles of Diet Therapy - Aims, Objectives and Classification of Commercial and Non-Commercial Food Service Operations and Functioning of Commercial and Non-Commercial Food Service, Indian Cuisines and their Features, Setting up a Cover and Simple Service.	15

CO	Course Outcomes
CO1	Develop an understanding of the contribution of Home Science professionals in education, research, extension, and entrepreneurship.
CO2	Classify fibres, yarns, and fabrics and explain various methods of fabric construction including weaving, knitting, and nonwovens.
CO3	Analyze the role of Home Science Extension in rural development and national development programmes
CO4	Describe prenatal development and the importance of pre-natal and post-natal care for maternal and child health.
CO5	Describe the characteristics of Indian cuisines and demonstrate basic food service practices such as table setting and simple service.

Textbooks:	
1	Sethi M and Gupta S. *Home Science: Concept, Scope and Philosophy*. New Age International Publishers.
2	Premavathy Seetharaman and Pannu P. *Interior Design and Decoration*. CBS Publishers.
3	Mikkelsen B. *Methods for Development Work and Research*. Sage Publications
4	Rajammal P. Devadas. *A Textbook of Child Development*. Macmillan Publishers.
5	Srilakshmi B. *Food Science*. New Age International Publishers
Reference Books:	
1	The Home Science Association of India (HSAI). *Souvenir and Publications on Home Science Education*

	and Development.
2	Robinson JP. *Work Simplification in Home Management*. Macmillan Publications
3	Dahama OP and Bhatnagar OP. *Education and Communication for Development*. Oxford and IBH Publishing.
4	Feldman RS. *Development Across the Life Span*. Pearson Education.
5	Sethi M and Malhan S. *Catering Management: An Integrated Approach*. Wiley India
E-**Learning Resources:**	
1	The Home Science Association of India (HSAI). *Souvenir and Publications on Home Science Education and Development.*
2	https://www.nift.ac.in/?utm
3	https://www.manage.gov.in/?utm
4	https://www.who.int/health-topics/maternal-health?utm_
5	https://www.fssai.gov.in/?utm

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	3	2	2	3	2	3	2	2
CO2	3	3	3	2	2	2	2	1	3	3	2
CO3	2	2	3	3	2	3	3	2	3	2	3
CO4	3	2	2	3	3	2	2	2	3	3	2
CO5	2	3	2	2	3	2	2	2	2	3	3
Total	**13**	**12**	**12**	**13**	**12**	**11**	**12**	**9**	**14**	**13**	**12**
Average	**2.6**	**2.4**	**2.4**	**2.6**	**2.4**	**2.2**	**2.4**	**1.8**	**2.8**	**2.6**	**2.4**

3 – Strong, 2- Medium, 1- Low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UAEC51	**AEC-4 GENDER EQUALITY AND SOCIAL INCLUSION**	**AEC**	**2**	**0**	0	0	2	**2**	25	75	100

Learning Objectives	
LO1	To understand the introduction to Gender and Social Inclusion
LO2	To acquire knowledge on Gender inequality in society
LO3	To equip Social Exclusion and Marginalized Group
LO4	To understand Legal Frameworks and Policies
LO5	To assimilate knowledge about Strategies for Promoting Equality and Inclusion

Unit	Content	Hours
1	**Introduction to Gender and Social Inclusion:** Concepts Gender-Gender roles, stereotypes, and socialization - Meaning and importance of social inclusion- Intersectionality (gender, caste, class, disability, etc.) - Historical perspectives on gender inequality.	6
2	**Gender Inequality in Society:** Forms of gender discrimination (education, health, employment) - Gender-based violence and its types - Wage gap and economic inequality - Representation of gender in media and culture - Case studies on gender inequality (local and global).	6
3	**Social Exclusion and Marginalized Groups:** Understanding social exclusion - Marginalized communities (women, LGBTQ+ individuals, persons with disabilities, minorities) - Barriers to inclusion (social, economic, political) - Role of culture, tradition, and norms in exclusion - Impact of exclusion on development.	6
4	**Legal Frameworks and Policies:** National and international laws promoting gender equality - Human rights perspective on inclusion - Government policies and welfare programs - Role of institutions (NGOs, UN, civil society).	6

5	**Strategies for Promoting Equality and Inclusion:** Gender mainstreaming and inclusive development - Education and awareness programs - Role of media and technology - Empowerment approaches (economic, social, political) - Community participation and leadership - Measuring progress (indicators like SDGs)	6
	Total	30

Theory 100%

CO	Course Outcomes
CO1	Understand the introduction to Gender and Social Inclusion
CO2	Acquire knowledge on Gender inequality in society
CO3	Equip the knowledge on Social Exclusion and Marginalized Group
CO4	Understand Legal Frameworks and Policies towards gender Equality
CO5	Gain knowledge about Strategies for Promoting Equality and Inclusion
Textbooks:	
1	Development as Freedom, Amartya Sen, Publisher: Oxford University Press (1999).
Reference Books:	
1	Gender Trouble: Feminism and the Subversion of Identity, 2nd Edition (1999 revised edition) Publisher: Routledge, London & New York.
2	David E. Newton, Gender Inequality: A Reference Handbook, Bloomsbury Academic, 2019.
3	Gender Inequality: A Reference Handbook, by David E. Newton ABC-CLIO, 2019.
Web resources:	
1	GESI-Traning-Module.pdf
2	Gender Equality_and_Social_Inclusion WV.pdf
3	integrity-action-gesi-strategy-version-2.pdf
4	Major Marginalized Groups: A Closer Look - Urban Studies
5	UNOPS GESI Mainstreaming in Projects Strategy (Final)

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	2	2	3	2	3	2	3	3	2	2	2
CO2	2	2	2	2	2	2	2	2	2	2	2
CO3	2	3	3	2	3	2	3	3	2	2	2
CO4	2	2	2	2	2	2	2	2	3	2	2
CO5	3	3	3	2	3	2	3	3	3	2	2
TOTAL	**11**	**12**	**13**	**10**	**13**	**10**	**13**	**13**	**12**	**10**	**10**
AVERAGE	**2.2**	**2.4**	**2.6**	**2**	**2.6**	**2**	**2.6**	**2.6**	**2.4**	**2**	**2**

3– Strong,2-Medium, 1-Low

Subject Code	Course Name	L	T	P	S	Credits	Instructional Hours	Marks		
								CIA	External	Total
24UNDIK51	**IKS-Introduction to Indian Science and Technology**	**0**	**0**	**0**	**2**	**2**	**2**	**25**	**75**	**100**

Learning Objective		
LO1	To understand Indian science philosophy: unity of science–spirituality, knowledge types, and epistemology.	
LO2	To Understand key contributions of Indian astronomy, metallurgy, and medicine.	
LO3	To Understand traditional Indian practices in agriculture, water management, and textile science.	
LO4	To knowledge transmission, daily-life science, colonial impact, and NEP 2020 revival.	
LO5	To Understand integration of Ayurveda, Vastu Shastra, and Jyotisha with modern fields, and related digitization, standardization, and global challenges.	
UNIT	**Contents**	**No.of Hours**
1	Philosophical Foundations of Indian Science-Unity of science and spirituality - Śāstra, Kalā, Vidyā: categories of knowledge - Epistemology: Pratyakṣa (perception), Anumāna (inference), Śabda (testimony).	6
II	Astronomy: Jyotiṣa, planetary motion, eclipse theory, Āryabhaṭa, Varāhamihira Metallurgy: Iron pillar, zinc distillation, wootz steel Medicine: Āyurveda (Caraka, Suśruta), health systems, surgery.	6
III	Agriculture and irrigation: canal systems, crop rotation, organic methods Water management: stepwells, tanks, dams Textile science: dyeing, spinning, weaving, cotton technology	6
IV	Role of guilds, hereditary knowledge, community transmission - Science in rituals, festivals, and daily life - Colonial disruption and documentation - NEP 2020 and revival of traditional knowledge systems.	6

V	Integrative models: Ayurveda + modern medicine, Vāstu + architecture, Jyotiṣa + data science - Challenges and possibilities in digitization, standardization, and global relevance.	6

Course Outcome	
CO1	Understand Indian scientific philosophy, its knowledge systems, and core epistemological methods.
CO2	Understand key contributions of Indian science in astronomy, metallurgy, and medicine.
CO3	Understand traditional Indian practices in agriculture, irrigation, water management, and textile science.
CO4	Understand knowledge transmission, daily-life science, colonial impacts, and revival of traditional systems under NEP 2020.
CO4	Understand integration of Ayurveda, Vāstu, and Jyotiṣa with modern fields and related challenges.
Text Books	
1	Dharampal. Indian Science and Technology in the Eighteenth Century.
2	Rajaram, N.S., and Frawley, D. Vedic Aryans and the Origins of Civilization.
3	Balasubramanian, R. (Ed.). History of Science, Philosophy and Culture in Indian Civilization (PHISPC Series).
4	Kak, S. The Astronomical Code of the Ṛgveda.
5	Pingree, D. The Logic of Science in Indian Mathematics and Astronomy.
Reference Books	
1	Salomon, R. Indian Epigraphy and Scientific Inscriptions.
2	Sharma, R.S. Irrigation and State in Ancient India.
Web Resources	
1	https://philosophy.institute/epistemology/pramanas-indian-philosophy-foundations/?utm_
2	Pramanas: The Foundations of Knowledge in Indian Philosophy • Philosophy Institute

MAPPING WITH PROGRAMME OUTCOME AND PROGRAMME SPECIFIC OUTCOME

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	1	1	2	1	3	3	3	3
CO2	3	3	3	2	1	3	1	3	3	3	3
CO3	3	3	3	3	2	2	1	3	3	3	3
CO4	3	3	2	1	3	2	1	3	3	3	2
CO5	3	3	3	2	3	3	1	3	3	3	3
TOTAL	**15**	**15**	**14**	**9**	**10**	**12**	**5**	**15**	**15**	**15**	**14**
AVERAGE	**3**	**3**	**2.8**	**1.8**	**2**	**2.4**	**1**	**15**	**3**	**3**	**2.8**

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDC61	**CC-13 Food Service Management**	**Core**	**4**	**1**	**0**	**0**	**4**	**5**	**25**	**75**	**100**

Learning Objectives	
LO1	To understand the structure and types of food service industries.
LO2	To develop knowledge on kitchen planning and food purchasing.
LO3	To gain skills in quantity food service and menu planning.
LO4	To understand management principles in food service establishments.
LO5	To acquire knowledge on personnel, financial management, sanitation, and safety.

Unit	Content	Hours
1	**Food Service Industry:** Food service industry – definition and scope. Types of catering: Commercial catering – hotel, motel, restaurant, cafeteria, chain hotels and cloud kitchen. Welfare catering – hospital, school lunch, residential establishments, industrial and corporate food service. Transport catering – air, train, sea and space catering. Miscellaneous catering – contract catering and outdoor catering.	15
2	**Kitchen Planning and Food Purchase:** Layout of kitchens – Types of kitchens – Planning of receiving, preparation, storage and service areas – Principles of workflow and space allocation – Kitchen safety and sanitation – Food purchase procedures – Purchasing methods – Factors involved in the selection of food – Receiving and storage of food materials – Inventory control – Waste management and sustainable kitchen practices.	15
3	**Quantity Food Service and Menu Planning:** Quantity food service – definition and objectives. Styles of service: waiter service, self-service and vending. Mechanics of waiter service.. Menu planning – origin and importance. Types of menu: Table d'hôte, À la carte, Du jour, theme, static and cycle menu. French classical menu, menu construction and design. Factors affecting menu planning. Standardization of recipes, portion control, stepping up and stepping down of recipes.	15
4	**Management:** Management – Definition, principles – Functions and tools of management – Leadership: qualities of a good leader, styles of leadership. Resource management – Money, Time, Energy – Computer applications in menu planning.	15
5	**Personnel, Financial Management and Safety:** Personnel management – Recruitment, selection, induction. Financial management – Cost control – Methods of food cost control – Bookkeeping – Advantages of double entry system. Sanitation and safety – Plant sanitation, kitchen hygiene, personal hygiene – First aid principles and practices – Health and safety at work.	15

CO	Course Outcomes
CO1	Explain the types and functions of food service industries.
CO2	Plan kitchen layout and food purchasing procedures.
CO3	Apply quantity food service principles and menu planning techniques.
CO4	Understand management and leadership in food service.
CO5	Apply personnel, financial, sanitation, and safety practices.

Textbooks:	
1	Sethi, M. & Malhan, S. – *Catering Management: An Integrated Approach*
2	Mohini Sethi – *Institutional Food Management*
3	Food and Beverage Service by Lillicrap, Cousins & Weekes (First published 1981; widely used revised editions 2010s–2020s
4	Modern Cookery for Teaching and the Trade by Thangam E. Philip (First published 1965; commonly used revised edition 2017)
5	The Theory of Catering by Victor Ceserani & Ronald Kinton (First published 1964; widely used revised editions 2010s
Reference Books:	
1	West, B.B., Wood, L., & Harger – *Food Service in Institutions*
2	Food and Beverage Service by Lillicrap, Cousins & Weekes (First published 1981; widely used revised editions 2010s–2020s
3	The Theory of Catering by Victor Ceserani & Ronald Kinton (First published 1964; widely used revised editions 2010s
4	Food Production Operations by Parvinder S. Bali (First published 2000s; revised editions 2010s–2020s
5	Modern Cookery for Teaching and the Trade by Thangam E. Philip (First published 1965; commonly used revised edition 2017
E-**Learning Resources:**	
1	https://www.edx.org/?utm_
2	**National Institute of Nutrition (NIN) – https://www.nin.res.in**
3	**FAO – https://www.fao.org**
4	https://nchm.gov.in/?utm
5	https://www.coursera.org/?utm

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	2	2	2	2	2	2
CO2	3	3	2	2	2	2	2	2	3	2	2
CO3	3	3	3	2	2	2	2	2	3	3	2
CO4	3	3	3	3	2	2	2	2	3	3	2
CO5	3	3	3	3	3	2	2	2	3	3	3
Total	**15**	**14**	**13**	**12**	**11**	**10**	**10**	**10**	**14**	**13**	**11**
Average	**3.0**	**2.8**	**2.6**	**2.4**	**2.2**	**2.0**	**2.0**	**2.0**	**2.8**	**2.6**	**2.2**

3 – Strong, 2- Medium, 1- Low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDC62P	**CC-14 Practical – Food service Management**	**Core**	**0**	**0**	**5**	**0**	**3**	**5**	**25**	**75**	**100**

Learning Objectives	
LO1	To provide practical exposure to food service establishments.
LO2	To develop skills in table setting and service techniques.
LO3	To train students in standardization of recipes and cost calculation.
LO4	To impart knowledge on quantity cookery and menu preparation.
LO5	To develop managerial skills in organizing and serving meals for large groups.

Unit	Content	Hours
1	**Field Visit:** Visit to well-organized food service units such as: ❖ Hotel ❖ Restaurant ❖ Industrial canteen ❖ Hospital	15
2	**Table Setting and Service:** ❖ Identification and drawing of silverware, cutlery, and crockery ❖ Folding of napkins ❖ Laying of table cloth and table mats ❖ Arrangement of cover according to menu ❖ Table setting and appointments ❖ Serving of food at the table and Clearing of the table	15
3	**Standardization of Recipes:** Standardization of any 3 selected quantity recipes and their preparation. Calculation of: ❖ Nutritive value ❖ Cost per serving ❖ Size of serving	15

4	**Quantity Cookery-Stepping Up and Stepping Down of recipes:** Preparation of menus for 25 members: ❖ South Indian menu ❖ North Indian menu ❖ Western menu	15
5	**Meal Planning and Service:** ❖ Planning, organizing, preparation, and service of a special meal for 50 members ❖ Application of menu planning principles ❖ Teamwork and time management	15

CO	Course Outcomes
CO1	Demonstrate knowledge of food service units through field exposure.
CO2	Apply table setting and food service techniques.
CO3	Standardize recipes and calculate cost and nutritive value.
CO4	Plan and prepare quantity menus efficiently.
CO5	Organize and manage large-scale food service operations.

Textbooks:	
1	Sethi, M. & Malhan, S. – *Catering Management: An Integrated Approach*
2	Mohini Sethi – *Institutional Food Management*
3	Modern Cookery for Teaching and the Trade by Thangam E. Philip (First published 1965; commonly used revised edition 2017
4	Food and Beverage Service by Lillicrap, Cousins & Weekes (First published 1981; widely used revised editions 2010s–2020s
5	Professional Food Service and Catering by John Cousins et al. (First published 2002; revised editions 2010s
Reference Books:	
1	Modern Cookery for Teaching and the Trade by Thangam E. Philip (First published 1965; commonly used revised edition 2017
2	Food Production Operations by Parvinder S. Bali (First published 2000s; commonly used revised editions 2010s–2020s
3	Food and Beverage Management by Bernard Davis, Andrew Lockwood & Sally Stone (First published 2000s; widely used revised editions 2012–2020s
4	Design and Layout of Foodservice Facilities by John C. Birchfield (First published 2007; revised

	editions available
5	Food and Beverage Cost Control by Lea R. Dopson & David K. Hayes (First published 2000s; revised editions 2019+
E-**Learning Resources:**	
1	https://egyankosh.ac.in/?utm_
2	https://www.ignouonline.ac.in/?utm_
3	https://www.fssai.gov.in/
4	https://ndl.iitkgp.ac.in/
5	https://www.fssai.gov.in/

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	2	2	2	2	2	2
CO2	3	3	2	2	2	2	2	2	3	2	2
CO3	3	3	3	2	2	2	2	2	3	3	2
CO4	3	3	3	3	2	2	2	2	3	3	2
CO5	3	3	3	3	3	2	2	2	3	3	3
Total	**15**	**14**	**13**	**12**	**11**	**10**	**10**	**10**	**14**	**13**	**11**
Average	**3.0**	**2.8**	**2.6**	**2.4**	**2.2**	**2.0**	**2.0**	**2.0**	**2.8**	**2.6**	**2.2**

3 – Strong, 2- Medium, 1- Low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDA61	**EC-10 Human Development and Counselling**	EC	4	1	0	0	4	5	25	75	100

Learning Objectives	
LO1	To understand the concept and stages of human growth and development.
LO2	To gain knowledge about prenatal, postnatal, and infant development.
LO3	To study developmental changes during childhood and adolescence.
LO4	To understand adulthood and ageing processes.
LO5	To identify developmental problems and their management.

Unit	Content	Hours
1	**Introduction to Human Development:** Meaning, scope and principles of human development – Growth and development: concepts and differences – Factors influencing human development: heredity, environment, nutrition and family – Stages of human development: infancy, childhood, adolescence, adulthood and old age – Developmental tasks and milestones across the lifespan.	15
2	**Prenatal and Postnatal Development:** Prenatal development – Conception – Test tube baby – Periods of prenatal development – Signs of pregnancy. Prenatal care – Management of normal pregnancy: hygiene, diet and medical supervision – Hazards during pregnancy Labour – Signs and stages of labour – Types of birth – Multiple pregnancy. Postnatal care – Prevention of gynaecological complications. Adjustment of the newborn – temperature regulation, breathing, feeding and elimination.	15
3	**Infancy (Birth to 2 Years):** Infancy development – Physical and motor, social, emotional, cognitive and language development – Minor ailments. Effect of stimulation – Care of infants – Feeding, toilet training, bathing, clothing, sleeping and immunization. Prevention of accidents – Importance of mothering and emotional growth – Psychological needs of infants.	15
4	**Childhood Development:** **Early Childhood (2–6 years)** Physical and motor development – Emotional, social, cognitive and language development – Creativity – Importance of play – Family relationships – Behaviour problems: causes and treatment – Importance of preschool education. **Late Childhood (6–12 years)** Physical, social, emotional, cognitive and language development – Sex education. Children with special needs – Identification and rehabilitation.	15

5	**Adolescence, Adulthood and Old Age:** **Adolescence (12–18 years**) – Physical, emotional, intellectual and motor development – Personal adjustment and maladjustment. Delinquency – Causes, prevention and rehabilitation – Drug addiction and alcoholism – Rehabilitation. **Adulthood (18–60 years)** – Characteristics and developmental tasks – All aspects of development including vocational development. **Old Age (60 years and above) -** Physical, psychological, emotional and social changes during old age – Problems of the aged – Family attitude towards the elderly – Role and status of aged in Indian society – Adjustment and wellbeing in old age.	15

CO	Course Outcomes
CO1	Explain principles and stages of human development.
CO2	Describe prenatal and postnatal development and care.
CO3	Analyze growth and development during infancy and childhood.
CO4	Evaluate developmental changes during adolescence.
CO5	Understand adulthood, ageing, and related issues.

Textbooks:	
1	Human Development: A Life-Span View by Robert V. Kail & John C. Cavanaugh (First published 1980s; commonly used revised edition 2019–2023
2	Developmental Psychology: Childhood and Adolescence by David R. Shaffer & Katherine Kipp (First published 1980s; widely used revised editions 2010s–2020s
3	Human Development by Diane E. Papalia, Sally Wendkos Olds & Ruth Duskin Feldman (First published 1970s; commonly used revised edition 2017–2022
4	Human Development: A Life-Span View by Robert V. Kail & John C. Cavanaugh (First published 2000; commonly used revised edition 2019–2023 / 9th–10th edition
5	Experience Human Development by Diane E. Papalia & Gabriela Martorell (First published 1970s; commonly used revised edition 2015–2022 / 13th–15th edition
Reference Books:	
1	Child Development by Laura E. Berk (First published 1980s; widely used revised editions 2018–2021
2	The Developing Person Through the Life Span by Kathleen Stassen Berger (First published 1980s; widely used revised editions 2019–2023
3	Human Development by Elizabeth B. Hurlock (First published 1970s; widely used classic editions
4	Human Development by Diane E. Papalia, Sally Wendkos Olds & Ruth Duskin Feldman (First

	published 1970s; commonly used revised edition 2017–2022
5	Human Development: A Life-Span View by Robert V. Kail & John C. Cavanaugh (First published 2000; commonly used revised edition 2019–2023 / 9th edition 2022
E-**Learning Resources:**	
1	https://swayam.gov.in/?utm_
2	https://egyankosh.ac.in/?utm_
3	http://epgp.inflibnet.ac.in/
4	https://ndl.iitkgp.ac.in/
5	**UNICEF – https://www.unicef.org**

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	2	2	2	2	2	2
CO2	3	3	2	2	2	2	2	2	3	2	2
CO3	3	3	3	2	2	2	2	2	3	3	2
CO4	3	3	3	3	2	2	2	2	3	3	2
CO5	3	3	3	3	3	2	2	2	3	3	3
Total	**15**	**14**	**13**	**12**	**11**	**10**	**10**	**10**	**14**	**13**	**11**
Average	**3.0**	**2.8**	**2.6**	**2.4**	**2.2**	**2.0**	**2.0**	**2.0**	**2.8**	**2.6**	**2.2**

3 – Strong, 2- Medium, 1- Low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDA62	EC -10 Hospital Food Service Administration	EC	4	1	0	0	4	5	25	75	100

Learning Objectives	
LO1	Identify the changing healthcare needs and expectations of patients in contemporary society.
LO2	Develop awareness of patient-centered care and quality service delivery in hospitals.
LO3	Understand the structure and functioning of corporate multi-specialty hospitals.
LO4	Develop awareness of integrated management systems in modern healthcare organizations.
LO5	Understand the importance of coordination between dietitians, kitchen staff, and nursing personnel.

Unit	Content	Hours
1	Hospital based health care and its changing scenario, Effects of globalization on health care, concepts of corporate hospitals in developing countries, infrastructure and lay out of an ideal corporate hospital, functioning of modern hospital and changing needs of patients.	15
2	Patient Care Services, Patient Admission / discharge, cafeteria and dietary services, front office services, housekeeping services, blood bank, diagnostic services, lab, physiotherapy, pharmacy operation theatre, outpatient and inpatient ward -admission.	15
3	Principles of hospital management, managerial activities for effective hospital functioning duties and responsibilities of hospital managers, qualities of office managers, effective inter and intra departmental co-ordination, understanding functioning of corporate multi-specialty hospital.	15
4	Marketing and Material management, Human resource management, managerial accounting and financial management, importance of material management, principles of material management, inventory management. Point of sale systems (POS) and property management systems. (PMS)	15
5	Hospitality in hospital care-management of dietary department, diet planning for hospital diets, purchasing, storage and quantity food production, patient compliance, food production, serving to patient- tray and trolley service, plate, waste management, washing and garbage disposal.	15

CO	Course Outcomes
CO1	Describe the infrastructure, layout, and essential requirements of an ideal corporate hospital.
CO2	Explain the organization and importance of clinical services including laboratory, blood bank, diagnostic services, physiotherapy, and operation theatre
CO3	Analyze the functioning of corporate multi-specialty hospitals and their approach to patient-centered care
CO4	Analyze the role of Point of Sale (POS) systems and Property Management Systems (PMS) in modern hospital and healthcare operations.
CO5	Analyze waste management practices including washing, garbage disposal, and hygiene maintenance in hospital dietary departments

Textbooks:	
1	Sakharkar BM. *Principles of Hospital Administration and Planning*. Jaypee Brothers Medical Publishers.
2	Park K. *Park's Textbook of Preventive and Social Medicine*. Banarsidas Bhanot Publishers.
3	Sharma JK. *Hospital Management Systems*. Ane Books Pvt. Ltd.
4	Chandra S. *Hospital Administration and Management*. PHI Learning.
5	Philip E. Thangam. *Modern Cookery for Teaching and the Trade*. Orient BlackSwan.
Reference Books:	
1	Buchbinder SB and Shanks NH. *Introduction to Health Care Management*. Jones & Bartlett Learning.
2	Duggirala S and Singh R. *Hospital Operations Management*. PHI Learning.
3	Shortell SM and Kaluzny AD. *Health Care Management: Organization Design and Behavior*. Cengage Learning.
4	Arnold E and Boggs K. *Interpersonal Relationships in Health Care*. Elsevier.
5	FSSAI. *Food Safety and Hygiene Guidelines*. Food Safety and Standards Authority of India.
E-**Learning Resources:**	
1	https://www.who.int/health-topics/health-systems?utm
2	https://mohfw.gov.in/?utm
3	https://www.coursera.org/?utm_
4	https://egyankosh.ac.in/?utm
5	https://www.fssai.gov.in/?utm_

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	2	2	2	2	2	2
CO2	3	3	2	2	2	2	2	2	3	2	2
CO3	3	3	3	2	2	2	2	2	3	3	2
CO4	3	3	3	3	2	2	2	2	3	3	2
CO5	3	3	3	3	3	2	2	2	3	3	3
Total	**15**	**14**	**13**	**12**	**11**	**10**	**10**	**10**	**14**	**13**	**11**
Average	**3.0**	**2.8**	**2.6**	**2.4**	**2.2**	**2.0**	**2.0**	**2.0**	**2.8**	**2.6**	**2.2**

3 – Strong, 2- Medium, 1- Low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDA63	**EC-11 Food Standard & Quality Control**	**EC**	**4**	**1**	**0**	**0**	**4**	**5**	**25**	**75**	**100**

Learning Objectives	
LO1	To Apply quality control, principles in food processing and handling systems.
LO2	To Understand the concepts of Government Regulations in Quality control
LO3	To Understand the needs of food regulations and patent laws in quality Control
LO4	To Analyze the Inspection protocols for Quality Management
LO5	To Understand the Knowledge based food hazards and food adulteration.

Unit	Content	Hours
1	**Quality Control:** Objectives, Importance, functions of quality control, stages of quality control in food industry. Food Quality Assurance, Microbiological concerns. Good Manufacturing Practices (GMP), Good Hygienic Practices (GHP), Standard Operating Procedures (SOPs)	15
2	**Government Regulations In Quality Control:** FAO/WHO codex Alimentations commission, PFA, AGMARK, BIS, FPO, FSSAI, fair average quality (FAQ) specification for food grains, ISO 9000 series. HACCP: Principles, benefits and limitation. Consumer Protection Act (CPA)	15
3	**Food Safety:** Meaning of food safety. Importance of Food Quality and safety for developing countries. Patent: Definition, requirements, patent law in India, administrator, need for patent system, advantages, precautions to be taken by applicants, patent procedures, non-patentable.	15
4	**Inspection Protocols:** Preparation of HACCP based SOP Analysis - personal hygiene, food preparation, hot holding, cold holding, refrigerator, freezer and milk cooler, food storage and dry storage, cleaning and sanitizing, utensils and equipments, large equipments, garbage storage and disposal and pest control.	15
5	**Food Hazards:** Physical, Chemical, Biological hazards associated with food types. Effect of processing and storage on microbial safety. Food Adulterator: Adulteration of food - common adulterants and tests detect common adulterants. Risk Assessment. Food Toxicants and Contaminants. Rapid Detection Techniques.	15

CO	Course Outcomes
CO1	Identify **microbiological concerns** affecting food safety and quality.
CO2	Apply regulatory guidelines in food quality control and safety practices.
CO3	Evaluate the legal and regulatory framework governing patents in India.
CO4	Demonstrate knowledge of inspection protocols and HACCP-based SOP analysis in food safety management.
CO5	Apply methods to detect adulterants and ensure food safety.

Textbooks:	
1	Sivasankar, B. (2013) Food Processing and preservation 2nd edition, prentice Hall, Pvt, Ltd.
2	Srilakshmi, N., Food Science, New Age International Private Ltd., New Delhi, 2002.
3	Sommers, C.H. and Xveteng Fan, Food Irradiation Research and Technology, Blackwell Publishing, 2016
Reference Books:	
1	Srilakshmi B. (2011) Dietetics, sixth edition, New age Publishing Press, New Delhi.
2	Gopalan,C., Ramanadhan.N, P.V. Balasubramanian, S.C. (2001) Nutritive value of Indian foods, NIN, Hyderabad
3	Swaminathan, M., Food Science, Chemistry and Experimental Foods, Bappco Publishers, Bangalore, 2014
4	Chandrasekhar, U, Food Science and Applications in Indian Cookery, Phoenix Publishing House Private Ltd., New Delhi, 2012
E-**Learning Resources:**	
1	**https://www.fao.org/food-safety/food-control-systems/supply-chains-and-consumers/ghp-and-haccp/en/?utm_source**
2	**https://www.who.int/foodsafety/en/?utm_source**

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	2	2	2	2	2	2
CO2	3	3	2	2	2	2	2	2	3	2	2
CO3	3	3	3	2	2	2	2	2	3	3	2
CO4	3	3	3	3	2	2	2	2	3	3	2
CO5	3	3	3	3	3	2	2	2	3	3	3
Total	**15**	**14**	**13**	**12**	**11**	**10**	**10**	**10**	**14**	**13**	**11**
Average	**3.0**	**2.8**	**2.6**	**2.4**	**2.2**	**2.0**	**2.0**	**2.0**	**2.8**	**2.6**	**2.2**

3 – Strong, 2- Medium, 1- Low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDA64	**EC-11 Nutraceuticals and Nutrigenomics**	**Core**	**4**	**1**	**0**	**0**	**4**	**5**	**25**	**75**	**100**

Learning Objectives	
LO1	Learn to define Nutraceuticals and nutrigenomics.
LO2	Understand the role of dietary supplements and nutraceuticals in health and disease.
LO3	Knowledge to classify the probiotics and prebiotics.
LO4	Acquire knowledge for the application of nutrigenomics in health and disease.
LO5	Identify dietary strategies that may help in modifying gene expression for disease prevention

Unit	Content	Hours
1	Definition of functional and traditional foods, nutraceuticals, designer foods and pharma foods, history of functional foods, components of functional foods, foods containing nutraceuticals and classification of nutraceuticals - based on plant sources, mechanism of action and chemical nature.	15
2	Concept of dietary supplements, sources and functions of phytochemicals with suitable examples, FOSHU foods - concepts, regulatory aspects.	15
3	Human gastrointestinal tract and its microbiota, functions, concept of probiotic, prebiotics and symbiotics; applications of probiotics in human nutrition.	15
4	Definition of nutrigenomics, gene expression - transcription, translation, post translational modification, nutrition in the omics era- elementary concepts on epigenetics, transcriptomics, proteomics, metabolomics; genetic variation and nutritional implications.	15
5	Nutrient control of gene expression - amino acids, nucleotides, basic concepts of nutrigenomics and complex diseases - diabetes, cancer and obesity.	15

CO	Course Outcomes
CO1	Understand the developments in the field of nutraceuticals and nutrigenomics
CO2	Comprehend the components of functional foods and foods containing of \ nutraceuticals
CO3	Know the importance of probiotics and prebiotics in human health
CO4	Understanding the effects of nutrients in molecular level in the body and the effect of pytochemicals in disease in disease conditions
CO5	Articulate and advocate the principle of nutrigenomics in controlling life style disease

Textbooks:	
1	**Wildman REC (Ed.).** ***Handbook of Nutraceuticals and Functional Foods*** CRC Press.
2	**Robert E.C. Wildman & Denise M. Wallace.** ***Advanced Human Nutrition*** CRC Press.
3	Gropper SS & Smith JL. *Advanced Nutrition and Human Metabolism*
4	**Kaput J & Rodriguez RL.** ***Nutritional Genomics: Discovering the Path to Personalized Nutrition*** Wiley-Blackwell.
5	**Gibson GR & Roberfroid MB.** ***Handbook of Prebiotics*** CRC Press.
Reference Books:	
1	Mahtab, S, Bamji, Kamala Krishnasamy, G.N.V. Brahmam, Text Book of Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi, 2009.
2	Srilakshmi, B. Second Edition, Food Science, New Age International (P) Limited Publishers, New Delhi, 2010.
3	Simopoulus, A.P. and Ordovas, K.J.M., 2004, Nutrigenetics and Nutrigenomics, Vol. 93, Karger, Switzerland
4	Watson, David, H., 2003, Performance Functional Foods, CRC Press, Wood Head Publishing Ltd., England
5	Narasinga Rao, B.S., 2005, Nutrition Research in India - A Country Report, Published by INSA, New Delhi.
E-**Learning Resources:**	
1	https://www.fao.org/nutrition/e-learning-courses/en/?utm
2	https://www.who.int/health-topics/nutrition?utm
3	https://ndl.iitkgp.ac.in/?utm_
4	https://www.coursera.org/?utm_
5	https://cdn.wfp.org/nutrition/nutx/?utm_

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	2	2	2	2	2	2
CO2	3	3	2	2	2	2	2	2	3	2	2
CO3	3	3	3	2	2	2	2	2	3	3	2
CO4	3	3	3	3	2	2	2	2	3	3	2
CO5	3	3	3	3	3	2	2	2	3	3	3
Total	**15**	**14**	**13**	**12**	**11**	**10**	**10**	**10**	**14**	**13**	**11**
Average	**3.0**	**2.8**	**2.6**	**2.4**	**2.2**	**2.0**	**2.0**	**2.0**	**2.8**	**2.6**	**2.2**

3 – Strong, 2- Medium, 1- Low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDP61	PEC -1 Nutritional Assessment and Diet Counseling	PEC	1	1	0	0	2	2	25	75	100

Learning Objectives	
LO1	To explain the principles of nutrition and categorize nutrients based on their sources
LO2	To demonstrate knowledge of dietary assessment methods and their applications
LO3	To analyze various nutritional disorders and their underlying causes
LO4	To evaluate the role of diet counseling in promoting health and disease
LO5	To design and implement therapeutic diets for Managing specific conditions

Unit	Content	Hours
1	**Basics of Nutrition & Nutritional Assessment:** Definition of nutrition and nutrients. Classification into macronutrients and micronutrients. Functions of food, concept of balanced diet, and nutritional requirements across life stages. Introduction to nutritional assessment and its methods including anthropometric, biochemical, clinical, and dietary assessment techniques.	6
2	**Anthropometry & Dietary Assessment Techniques:** Anthropometric measurements including height, weight, BMI, waist-hip ratio, and skin fold thickness. Growth charts and interpretation. Dietary survey methods such as 24-hour recall, food diary, and weighing method. Nutrient calculation, interpretation, and errors in dietary assessment.	6
3	**Nutritional Deficiency & Problems** Clinical signs and symptoms of nutrient deficiencies. Protein-energy malnutrition (PEM). Vitamin deficiencies (A, D, C, B-complex) and mineral deficiencies (Iron, Iodine, Calcium). Lifestyle disorders including obesity, diabetes mellitus, and hypertension.	6
4	**Principles of Diet Counseling:** Concept and importance of diet counseling. Steps in counseling including assessment, diagnosis, intervention, and monitoring. Communication skills, behavior change techniques, ethics in counseling, and use of dietary guidelines and food pyramids.	6
5	**Diet Planning & Therapeutic Diets:** Principles of meal planning and menu planning for children, adolescents, and elderly. Therapeutic diets including diabetic, low-fat, high-protein, and low-sodium diets. Nutrition education tools and practical diet counseling sessions.	6

CO	Course Outcomes
CO1	Analyzes the functions of food and importance of a balanced diet.
CO2	Explain the principles and importance of anthropometric measurements in nutritional assessment.
CO3	Apply Nutritional knowledge to assess and manage common nutrition-related disorders.
CO4	Demonstrate effective communication skills required for successful counseling.
CO5	Evaluate the effectiveness of counseling and modify diet plans accordingly.

Textbooks:	
1	Srilakshmi, B. – Nutrition Science, New Age International Publishers
2	Mudambi, S.R. & Rajagopal, M.V. – Fundamentals of Foods and Nutrition, New Age International
Reference Books:	
1	Swaminathan, M. – Advanced Textbook on Food and Nutrition, Vol I & II
2	Krause, M.V. – Krause's Food & Nutrition Therapy
3	Gibney, M.J. – Public Health Nutrition
4	Wardlaw, G.M. – Contemporary Nutrition
5	Bamji, M.S. – Textbook of Human Nutrition, Oxford & IBH
E-**Learning Resources:**	
1	World Health Organization (WHO) – https://www.who.int
2	Food and Agriculture Organization (FAO) – https://www.fao.org
3	Indian Council of Medical Research (ICMR) – https://www.icmr.gov.in

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	2	2	2	2	2	2	3	3	2
CO2	3	3	3	2	2	2	2	2	3	3	2
CO3	3	3	3	2	2	2	2	2	3	3	2
CO4	3	3	3	3	2	2	2	2	3	3	2
CO5	3	3	3	3	2	2	2	2	3	3	2
Total	**15**	**15**	**14**	**12**	**10**	**10**	**10**	**10**	**15**	**15**	**10**
Average	**3.0**	**3.0**	**2.8**	**2.4**	**2.0**	**2.0**	**2.0**	**2.0**	**3.0**	**3.0**	**2.0**

3 – Strong, 2- Medium, 1- Low

Course Code	Course Name	Category	L	T	P	S	Credits	Hours	Marks		
									CIA	External	Total
24UNDL61	SLC-1Sports Nutrition	SLC	0	0	0	3	2	3	25	75	100

Learning Objectives	
LO1	To understand the fundamental concepts, principles and types of exercise and sports
LO2	To understand the Apply techniques for assessing fitness and body composition
LO3	To Analyze the role of micro and macronutrients in sports performance
LO4	To evaluate nutritional strategies for competition and performance
LO5	To Assess dietary requirements for special populations and athletes

Unit	Content	Hours
1	**Fundamentals of Exercise & Sports** - Concepts of sports, games and exercise; Principles of exercise (overload, specificity, progression); Importance, advantages and limitations of exercise; Types of exercise: Aerobic, Resistance training, Isometric and isotonic exercises Yoga and flexibility exercises.	9
2	**Fitness & Body Composition Assessment** -Body composition: BMI, body fat %, somatotyping, ideal body weight Muscle mass and bone mass assessment; Components of fitness: strength, endurance, flexibility, power; Cardio respiratory fitness tests: VO_2 max, Harvard Step Test, Walk and run tests, Physical Work Capacity (PWC); Exercise testing using treadmill and cycle ergo meter.	**9**
3	**Micro & Macro nutrients in sports** **Micronutrients** - vitamins and mineral requirements in athletes, sports anemia, antioxidants and exercise induced free radicals. **Macronutrients** - Carbohydrates: types, glycemic index, carbohydrate loading, carbohydrate counting and fueling strategies; Fats: role in exercise and factors affecting fat oxidation; Proteins: requirements, metabolism and recovery.	**9**
4	**Nutrient timing –** Pre-competition nutritional guidelines – Nutrition during exercise and nutrition after exercise – Nutrition planning for sports events. **Sports foods** – Sports drinks, sports gels, energy bars and protein supplements for pre-, during and post-exercise meals – Dietary supplements – MCT diets – Antioxidant-rich dietary supplements and their role in sports performance.	**9**
5	**Nutrition for athletes with special dietary needs**-Nutrition for special population - children, young and older athlete, Female athletes tried, weight loss and weight gain in athletes, vegetarian athlete, diabetic athlete. Factors affects nutritional needs for travel athletes. **Nutrition for special populations:** Child, young and older athletes – Female	**9**

	athlete triad – Vegetarian and diabetic athletes – Weight gain and weight loss in athletes – Factors affecting nutritional needs of travelling athletes – Dietary modifications and meal planning for athletes.	

CO	Course Outcomes
CO1	Explain concepts, principles and classifications of exercise and sports
CO2	Perform and interpret fitness and body composition assessments
CO3	Analyze the role of nutrients in exercise metabolism and performance
CO4	Design nutrition plans for competition and evaluate Sports foods
CO5	Assess and plan nutrition for athletes with special dietary needs

Textbooks:	
1	McArdle, W.D., Katch, F.I., & Katch, V.L. – Exercise Physiology: Nutrition, Energy & Human Performance
2	Jeukendrup, A. & Gleeson, M. – Sport Nutrition: An Introduction to Energy Production and Performance
Reference Books:	
1	Williams, M.H. – Nutrition for Health, Fitness and Sport
2	Burke, L.M. & Deakin, V. – Clinical Sports Nutrition
3	Powers, S.K. & Howley, E.T. – Exercise Physiology: Theory and Application
4	American College of Sports Medicine – ACSM's Guidelines for Exercise Testing and Prescription
5	Sharkey, B.J. & Gaskill, S.E. – Fitness and Health
E-**Learning Resources:**	
1	**American College of Sports Medicine (ACSM) – https://www.acsm.org**
2	**World Health Organization (WHO) – https://www.who.org**
3	**International Olympic Committee (IOC) – https://www.olympics.org**

Mapping with Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	2	2	2	2	2	2
CO2	3	3	2	2	2	2	2	2	3	2	2
CO3	3	3	3	2	2	2	2	2	3	3	2
CO4	3	3	3	3	2	2	2	2	3	3	2
CO5	3	3	3	3	3	2	2	2	3	3	3
Total	**15**	**14**	**13**	**12**	**11**	**10**	**10**	**10**	**14**	**13**	**11**
Average	**3.0**	**2.8**	**2.6**	**2.4**	**2.2**	**2.0**	**2.0**	**2.0**	**2.8**	**2.6**	**2.2**

3 – Strong, 2- Medium, 1- Low