MOTHER TERESA WOMEN'S UNIVERSITY

KODAIKANAL– 624102

DEPARTMENT OF HOME SCIENCE

M.Sc FOODS AND NUTRITION

Curriculum Framework, Syllabus, and Regulations

(Based on TANSCHE Syllabus under Choice Based Credit System–CBCS)

(For the candidates to be admitted from the Academic Year 2023-2024)

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Mother Teresa Women's University, Kodaikanal
Department of Home Science - M.Sc Foods and Nutrition

1. About the Department

The Primary Purpose of the Home Science Department is to provide opportunities for students to pursue a quality education in Home Science. Importance is placed on providing opportunities within the curricula for development of enhanced skills in critical thinking, communication, leadership, and computer literacy. The Department of Home Science also seeks to provide students opportunities for growth beyond the classroom through a wide range of extracurricular activities, programmes, and services through the maintenance of environment, cultural and intellectual diversity. The Courses offered under the Department of Home Science prevails in all three Research and Extension centres such as Madurai, Chennai and Coimbatore seeking opportunities for developing Academic Excellence, the students have more scope to get the exposure for research, projects, internship, industrial visit, and placement.

2. Program Educational Objectives (PEOs)

PEO 1	To develop quality professionals with skills and competencies to serve in food and nutrition related institutions and industries.
PEO 2	To equip the learners with professional qualities in food production and to impart innovative ideas with critical thinking skills.
PEO 3	To motivate the learners to explore novel research problems and apply practical solutions to them.
PEO 4	To encourage the students to promote interactions with societal organizations for learning and problem solving.
PEO 5	To enhance communal participation with ethical responsibility

3. Programme Outcomes (POs)

The Expected Programme Outcomes on completion of M.Sc. Foods and Nutrition

PO 1	Provide quality education to make the students expertise in the field of Food Science, Nutrition, and Dietetics.
PO 2	Impart knowledge and skills to work in hospitals, research laboratories, food industries, health sectors.
PO 3	Promote professional competence to face the challenges of the food processing sector and other nutritional organizations.
PO 4	Acquire knowledge and skills in highly entrepreneurial courses in the areas of Food Processing, Quality Control, Food product development, Food labeling, and Nutritional Sciences.
PO 5	Attained-based research in Foods and nutrition for improving the livelihood of the community and the nation.

PO 6	Identify food-based approaches for alleviating nutritional problems to improve nutrition and health security.
PO 7	Develop entrepreneurial skills by providing skill development programs in the food processing sectors.

4. Programme Specific Outcomes (PSOs)

The Expected Programme Outcomes on completion of M.Sc. Foods and Nutrition

PSO 1	Understand the nature and basic concepts in the field of Food Science and Nutrition.
PSO 2	Extend the knowledge on applications of research in Foods and nutrition for improving the livelihood of the community
PSO 3	Analyze the relationship between diet and health and impart knowledge to alleviate nutritional problems and to achieve health security.
PSO 4	Gain proficiency to get employability in hospitals, food processing sectors
PSO 5	Apply knowledge on clinical intervention, nutrition education, diet planning, counseling, and health promotion.

5. Eligibility

A pass in B.Sc. Foods and Nutrition/ B.Sc.-Home Science/B.Sc. Nutrition and Dietetics/ B.Sc. Food Science and Nutrition/ B.Sc. Food Technology/B.Sc. Clinical Nutrition and Dietetics, B.Sc. Nutrition, Food Service Management and Dietetics, B.Sc.-Nutrition Food Service Management with computer applications.

B.Voc. Degree related to Foods and nutrition discipline (with equivalence) are eligible to register and seek admission for the degree of Master of Science in Foods and Nutrition.

6. General Guidelines for PG Programme

i. **Duration:** The programme shall extend through a period of 4 consecutive semesters and the duration of a semester shall normally be 90 days or 450 hours. Examinations shall be conducted at the end of each semester for the respective subjects.

ii. **Medium of Instruction:** English

7. Evaluation (25+75): Evaluation of the candidates shall be through Internal Assessment and External Examination for Theory and Practical.

7.1 Evaluation Pattern

EVALUATION PATTERN		**Maximum Marks (Theory & Practical)**	**Minimum Marks (Theory & Practical)**
Internal Evaluation	Continuous Internal Assessment Test	**25 Marks**	**13 Marks**
	Assignments / Snap Test / Quiz		
	Seminars		
	Attendance and Class Participation		
External Evaluation	End Semester Examination	**75 Marks**	**38 Marks**
	Total	**100 Marks**	**50 Marks**

***Minimum credits required to pass: 91**

7.2 Internal Assessment CIA

There shall be three tests conducted by the facultyconcerned and the average of

the best two can be taken as the Continuous Internal Assessment (CIA) for a maximum of 25 marks. The duration of each test shall be one / one and a half hour.

7.3. End Semester Examination (Theory): Max. Marks: 75; Time: 3 hrs.

7.4. Written Examination Question Paper Pattern

Theory Paper (Bloom's Taxonomy based) (Common for PG Programme)

Intended Learning Skills	**Maximum 75 Marks** **Passing Minimum: 50%** **Duration: Three Hours**
Memory Recall/Example/ Counter Example / Knowledge about the Concepts/Understanding	**Part–A (10x2=20Marks)** Answer ALL questions **Each Question carries 2 marks** Two questions from each Unit **Question 1 to Question10**
Descriptions/Application (problems)	**Part–B (5x5=25Marks) Answer** **ALL questions** **Each question carries 5 Marks** **Either - or Type** Both parts of each question from the same Unit **Question 11 (a) or 11(b)** to **Question 15(a) or 15(b)**
Analysis/Synthesis / Evaluation	**Part-C (3x 10 = 30 Marks)** **Answer any THREE questions** **Each question carries 10 Marks** There shall be FIVE questions covering all the five units **Question 16 to Question 20**

Each question should carry the course outcome and cognitivelevel for instance,
[CO1 : K2] Question xxxx [CO3 : K1] Question xxxx

7.5 Methods of Assessment

METHODS OF ASSESSMENT	
Remembering (K1)	● The lowest level of questions requires students to recall information from the course content ● Knowledge questions usually require students to identify information in the text book.
Understanding (K2)	● Understanding of facts and ideas by comprehending organizing, comparing, translating, interpolating, and interpreting in their own words. ● The questions go beyond simple recall and require students to combine data together
Application (K3)	● Students must solve problems by using/applying a concept learned in the classroom. ● Students must use their knowledge to determine an exact response.
Analyze (K4)	● Analyzing the question is one that asks the students to breakdown something into its component parts. ● Analyzing requires students to identify reasons causes or motives and reach conclusions or generalizations.

Evaluate (K5)	● Evaluation requires an individual to make judgment on something. ● Questions to be asked to judge the value of an idea, a character, a work of art, or a solution to a problem. ● Students are engaged in decision-making and problem–solving. ● Evaluation questions do not have single right answers.
Create (K6)	● The questions of this category challenge students to get engaged in creative and original thinking. ● Developing original ideas and problem-solving skills

8. Project

8.1 Project Report

A student should select a topic for the Project Work at the end of the third semester itself and submit the Project Report at the end of the fourth semester. The Project Report shall not exceed 40 typed pages in Times New Roman font with 1.5-line space.

8.2. Project Evaluation

There is a Viva Voce Examination for Project Work. The Guide and an External Examiner shall evaluate and conduct the Viva Voce Examination. The Project Work carries 100 marks (Internal: 25 Marks; External (Viva): 75 Marks).

9. Conversion of Marks to Grade Points and Lette Grade (Performance in a Course/ Paper)

Range of Marks	Grade Points	Letter Grade	Description
90 – 100	9.0 – 10.0	O	Outstanding
80-89	8.0 – 8.9	D+	Excellent
75-79	7.5 – 7.9	D	Distinction
70-74	7.0 – 7.4	A+	Very Good
60-69	6.0 – 6.9	A	Good
50-59	5.0 – 5.9	B	Average
40-49	4.0 – 4.9	C	Satisfactory
00-39	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

10. Attendance

Students must have earned 75% of attendance in each course for appearing for the examination. Students with 71% to 74% of attendance must apply for condonation in the Prescribed Form with prescribed fee. Students with 65% to 70% of attendance must apply for condonation in the Prescribed Form with the prescribed fee along with the Medical Certificate. Students with attendance less than 65% are not eligible to appear for the examination and they shall re-do the course with the prior permission of the Head of the Department, Principal, and the Registrar of the University.

11. Maternity Leave

The student who avails maternity leave may be considered to appear for the examination with the approval of Staff i/c, Head of the Department, Controller of Examination, and the Registrar.

12. Any Other Information

In addition to the above-mentioned regulations, any other common regulations pertaining to the PG Programme are also applicable for this Programme.

13. Faculty Course File Structure - Contents

A.	Academic Schedule
B.	Students Name List

C.	Time Table
D.	Syllabus
E.	Lesson Plan
F.	Staff Workload
G.	Course Design (content, Course Outcomes (COs), Delivery method, mapping of COs with Programme Outcomes(POs), Assessment Pattern interms of Revised Bloom's Taxonomy).
H.	Sample CO Assessment Tools
I.	Faculty Course AssessmentReport(FCAR)
J.	Course Evaluation Sheet
K.	Teaching Materials (PPT, OHP etc.,)
L.	Lecture Notes
M.	Home Assignment Questions
N.	Tutorial Sheets
O.	Remedial Class Record, if any
P.	Projects related to the Course
Q.	Laboratory Experiments related to the Courses
R.	Internal Question Paper
S.	External Question Paper
T.	Sample Home Assignment Answer Sheets
U.	Three best, three middle level and three average Answersheets
V.	Result Analysis (CO wise and whole class)
W.	Question Bank for Higher studies Preparation(GATE/Placement)
X.	List of mentees and their academic achievements

14. COMMON TEMPLATE FOR ALL PG PROGRAMMES AS PER TANSCHE [2023-24]

Semester–I	Credits	Hours	Semester-II	Credit	Hours	Semester-III	Credit	Hours	Semester–IV	Credit	Hours
1.1. Core-I	5	7	2.1. Core-IV	5	6	3.1. Core-VII	5	6	4.1. Core-XI	5	6
1.2 Core-II	5	7	2.2 Core-V	5	6	3.2 Core-VII	5	6	4.2 Core-XII	5	6
1.3 Core – III	4	6	2.3 Core – VI	4	6	3.3 Core – IX	5	6	4.3 Project with viva voce	7	10
1.4 Discipline Centric Elective -I	3	5	2.4 Discipline Centric Elective – III	3	4	3.4 Core – X	4	6	4.4Elective - VI (Industry / Entrepreneurship) 20% Theory 80% Practical	3	4
1.5 Generic Elective-II:	3	5	2.5 Generic Elective - IV:	3	4	3.5 Discipline Centric Elective - V	3	3	4.5 Skill Enhancement course / Professional Competency Skill	2	4
			2.6 NME I	2	4	3.6 NME II	2	3	4.6 Extension Activity	1	
						3.7 Internship/ Industrial Activity	2	-			
	20	**30**		**22**	**30**		**26**	**30**		**23**	**30**
Total Credit Points - 91											

15.Templates for Semesters

Choice Based Credit System (CBCS),
Learning Outcomes Based Curriculum Framework (LOCF)
Guideline Based Credits and Hours Distribution System
for all Post – Graduate Courses including Lab Hours
SEMESTER-I

S.No.	Course Code	List of Courses	Credits	Hours		CIA	ESE	Total
				L	P			
1.	P23FNT11	Core – I	5	7	-	25	75	100
2.	P23FNT12	Core – II	5	7	-	25	75	100
3.	P23FNP11	Core – III	4	-	6	25	75	100
4.	P23FNE1A/ P23FNE1B/ P23FNE1C	Elective – I (Discipline Centric)	3	5	-	25	75	100
5.	P23WSG11	Generic Course – 1: Women Empowerment	3	5	-	25	75	100
		Total	**20**	**30**		**-**	**-**	**500**

SEMESTER-II

S.No.	Course Code	List of Courses	Credits	Hours		CIA	ESE	Total
				L	P			
6.	P23FNT23	Core – IV	5	6	-	25	75	100
7.	P23FNT24	Core – V	5	6	-	25	75	100
8.	P23FNP22	Core – VI	4	-	6	25	75	100
9.	P23FNE2A / P23FNE2B/ P23FNE2C	Elective – III (Discipline Specific)	3	4	-	25	75	100
10.	P23CSG22	Generic Course – 2: Cyber Security	3	4	-	25	75	100
11.	P23FNS1A/ P23FNS1B/ P23FNS1C	NME - Skill Enhancement Course-1 (SEC-1)	2	4	-	25	75	100
		Total	**22**	**30**		**-**	**-**	**600**

M. Sc FOODS AND NUTRITION SYLLABUS

Semester wise Structure

SEMESTER I

S. No.	Course Code	Course	Name of Course	Inst. Hours	Credits	Exam HRS	Max. Marks	
							CIA	External
1	P23FNT11	Core -I	Advanced food science	7	5	3	25	75
2	P23FNT12	Core -II	Human Physiology	7	5	3	25	75
3	P23FNP11	Core-III Practical-I	Advanced food science practical	6	4	3	25	75
4	P23FNE1A/ P23FNE1B/ P23FNE1C	Elective –I (Discipline Specific)	A)Fundamentals of food technology B) Functional foods and nutraceuticals C) Food safety and quality control	5	3	3	25	75
5	P23WSG11	Generic Course-I	Women Empowerment	5	3	3	25	75
			Total Credits	30	**20**		**500**	

SEMESTER-II

S .No.	Course code	Course	Name of Course	Inst. Hours	Credits	Exam HRS	Max. Marks	
							CIA	External
1	P23FNT23	Core -IV	Nutritional biochemistry	6	5	3	25	75
2	P23FNT24	Core -V	Advanced Dietetics	6	5	3	25	75
3	P23FNP22	Core –VI Practical- II	Therapeutic nutrition practical	6	4	3	25	75
4	P23FNE2A/ P23FNE2B/ P23FNE2C	Elective – III (Discipline Specific)	A)Home science composite B) Food packaging C) ICT tools for nutrition education	4	3	3	25	75
5	P23CSG22	Generic Course -2	Cyber security	4	3	3	25	75
6	P23FNS1A P23FNS1B P23FNS1C	NME-I Skill Enhancement Course-I	A)Basics of human nutrition B) Women and health C) Food processing	4	2	3	25	75
			Total	**30**	**22**		**600**	

FIRST YEAR - SEMSTER I

Course Code	P23FNT11	ADVANCED FOOD SCIENCE	L	T	P	C
CORE I			7	-	-	5
Cognitive level	K2:Understand K3:Apply K4:Analyze					
Learning Objectives	The course aims to ➢ To understand the composition, classification, and function of various food groups ➢ To analyze the factors affecting cooking and keeping quality of food. ➢ To identify the foods with their nutritional properties and the scope of the research in future foods					
Course Outcomes	On successful completion of the course, the students will be able to gain knowledge on					
CO	Course Outcome		Knowledge Level			
CO 1	The importance of food groups based on the nutrient value to enable meal planning in cereals		K2			
CO 2	The scientific basis of preliminary of food: pulses and fruits		K2			
CO 3	Conservation of nutrients and acceptability of food preparation in egg and Fish		K3			
CO 4	Advanced food science in milk and oil.		K2			
CO 5	The effect of processing and storage on the nutritional composition of sugar, beverages, and spices		K4			
UNIT	Course Contents					
UNIT I	**Food classification: cereals and pulses** Food classification by ICMR - FSSI - Food groups- Cereals - Rice & wheat and other Millets– Composition- Nutritive Value-and Processing - Role of starch and gluten in cookery Pulses and legumes–Nutritive value- types- Processing- and anti-nutritional factors- factors affecting cooking quality- germination.					
UNIT II	**Fruits and Vegetables** Fruits - Classification Nutritive value- ripening of fruits- changes in ripening and peptic substances- browning-Vegetables: classification - nutritive values- processing- pigments- color changes-browning- Vegetable based preserved foods.					
UNIT III	**Milk and Meat foods** Milk – Classification- Nutritive value- Putrefaction- processing- Egg – Structure- Composition- Nutritive Value - and Role of egg in cookery- Meat - Structure, Composition- Nutritive value- Changes on cooking and Rigor mortis- Poultry – Composition- Nutritive value- changes in cooking- Fish - Composition, Nutritive value- Selection- Spoilage- Changes on Cooking-Fish processing and its advancements.					
UNIT IV	**Fats and Oils** Fats and Oils – Types - Properties of fat relating to cooking - Rancidity- Tests for rancidity- antioxidants used for rancidity - Hydrogenation- The role of fats in cookery					
UNIT V	**Sugar and Beverages** Sugar cookery - Types of sugar – Properties - Crystallization - Stages in Sugar cookery - Application in Indian recipes - Artificial sweeteners: processing and safety measures of artificial sugar intake. a. Beverages –Basic Classification - Nutritive value - Preparation of milk-based beverages- Tea- Coffee Cocoa processing - malted beverages - flavored drinks - Processing of beverages - Recent developments in beverage processing. b. Spices and Condiments – production - nutrient contents – classification -					

	processing of spices and condiments.
Textbooks	1. Srilakshmi, M., Food science, New Age International (P) Ltd., Publishers2010. 2. Swaminathan, M., Food science, Chemistry and Experimental Foods, Bappco Publishers,2005 3. Potter, Norman N., and Joseph H. Hotchkiss. Food Science. Springer Science & Business Media, 2012. 4. Manay S and Swamy S, Food Facts and Principles, New Age International (P) LtdPublishers, New Delhi,2001.
Reference Books	1. Brown. A. Understanding Food, Wadsworth, Thomson Learning Publications,2000. 2. Mehas, K.Y., and Rodgers, S. L., Food science and You. Mcmillan Mcgraw Hill Company,2000. 3. Paul, P.C., and Palmer, H. H., Food Theory and Applications. John Wiley and Sons, New York, 2000 Revised Edition. 4. Fellows, Food Processing Technology-Principles and Practice.,2nd edition, CRC press Wood Lead Publishing Ltd, Cambridge, England,2000. 5. Vaclavik, Vickie A., Elizabeth W. Christian, and Elizabeth W. Christian. Essentials of food science. Vol. 42. New York: Springer,2008. 6. Sivasankar B, Food Processing and Preservation, Prentice-Hall of India Private Limited, New Delhi,2002 7. Mehas, K.Y., and Rodgers, S. L., Food science and You. Mcmillan Mcgraw Hill Company,2000.
Journals	1. Indian Food Science Journal 2. International journal of Food Technology

Mapping of Cos with POS & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	S	S	S	M	M	S	M
CO2	S	S	S	S	M	S	S	S	M	M	S	M
CO3	S	S	S	S	M	S	S	S	M	M	S	M
CO4	S	S	S	S	M	S	S	S	M	M	S	M
CO5	S	S	S	S	M	S	S	S	M	M	S	M

Strongly Correlating (S)	3 Marks	Moderately Correlating (M)	2 Marks
Weakly Correlating (W)	1 Mark	No Correlation (N)	0 Mark

Course Code	P23FNT12	HUMAN PHYSIOLOGY	L	T	P	C
CORE II			7	-	-	5
Cognitive Level	K1:Recall K2: Understand K4:Analyze					
Learning Objectives	The course aims to ➢ To aid the students to conquer knowledge about the various physiological structure and body ➢ To integrate the functions of all the systems and disease conditions					
Course Outcome	On successful completion of the course, the students will be able to gain knowledge on					

CO	Course Outcomes	Knowledge Level
CO1	Cellular science and the human digestive system	K2
CO2	Respiratory functions and excretory system functions	K4
CO3	Immune system and role of the digestive system	K2
CO4	Endocrine and reproductive system	K1
CO5	Nervous system and sensory organs	K2

UNITS	Course Contents
UNIT I	**Cell Components** Cellular basis of Physiology- Body fluid compartment, membrane potential- cell structure and functions - Regulation of cell multiplication. Digestive System -Review of structure and function of various parts in the gastrointestinal tract in brief - Role of liver- pancreas - gall bladder and their dysfunction- Role of specific hormones associated in GI tract.
UNIT II	**Respiratory System** Review of structure and functions. Role of lungs in the exchange and transport of gases. Respiratory volumes - Excretory System- Anatomy and physiology of kidneys and nephron- Formation of urine, acid - base balance - Role of the kidney in maintaining pH of the blood.
UNIT III	**Immune System** Immunity – Properties - natural and acquired Immunity - features of immune responses - antigen - antibodies – types - properties - and antigen - antibody interaction - Autoimmune disorder and allergy - Circulatory System - Structure and function of the heart and blood vessels – Blood- Composition – plasma - blood cells – hemoglobin - blood clotting process - Regulation of cardiac output - cardiac cycle - blood pressure.
UNIT IV	**Endocrine System** Anatomy and physiological functions of endocrine glands - Hormones - Mode of action – Pituitary- Adrenal- Thyroid- Parathyroid- Sex glands- and Pancreas -. Hypo and Hyper activities of the glands. Reproduction System: structure, physiological functions of male and female reproductive organs, menstrual and ovarian cycle, spermatogenesis, contraceptives, infertility and its recent developments, Rh factor.
UNIT V	**Nervous System** Review of CNS & ANS, the function of neuron, conduction of nerve impulse, synapse, the role of neurotransmitters. The blood-brain barrier, CSF. Hypothalamus and its role in various body functions –sleep, memory, and obesity. Sense organs: Review of structure and function

	skin, eye, ear, nose, and tongue in the perception of stimuli.
Textbooks	1. Sembulingam, Kirma, and Prema Sembulingam. *Essentials of medical physiology*. JP Medical Ltd,2012. 2. Ashalatha, P. R., and G. Deepa. *Textbook of Anatomy & Physiology for Nurses*. JP Medical Ltd, 2012. 3. Chatterjee CC, Human Physiology, Volume I, 11th Edition, CBS Publishers, New Delhi,2016. 4. Sathya P and Devanand V, Textbook of Physiology, First edition, CBS Publishers and Distributers Pvt Ltd, New Delhi,2013
Reference books	1. Ganong, WF, Review of Medical Physiology,21st Edition, McGraw Hill Publishers, 20039. 2. Guyton AC & Hall JE,Textbook of Medical Physiology,10th Edition, Harcourt AsiaP. Ltd Singapore,2001 3. Subrahmanyam, Sarada, K. Madhavankutty, and H. D. Singh. *Textbook of human physiology*. S. Chand Publishing,1987. 4. Boron WF and Boulpaep EL, Medical Physiology, II edition, Saunders Elsevier,2009 5. MariebEN,Human Anatomy and Physiology, VI edition, Pearson edition,2004 6. Tortora. G&Grabowski, S.R. Principles of Anatomy & Physiology,10thEdition, John Wiley & Sons, USA,2003

Mapping of Cos with POS & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	S	S	S	M	S	M	S	S	M
CO2	M	S	M	S	S	S	M	S	M	S	S	M
CO3	M	S	M	S	S	S	M	S	M	S	S	M
CO4	M	S	M	S	S	S	M	S	M	S	S	M
CO5	M	S	M	S	S	S	M	S	M	S	S	M

Strongly Correlating (S)	3 Marks	Moderately Correlating (M)	2 Marks
Weakly Correlating (W)	1 Mark	No Correlation (N)	0 Mark

Course Code	P23FNP11	PRACTICAL I ADVANCED FOOD SCIENCE PRACTICALS	L	T	P	C
CORE III Practical I			**-**	**-**	**6**	**4**
Cognitive Level	**K2:Understand K5:Evaluate K6:Create**					
Learning Objectives	**The course aims to** ➢ To do various food evaluation methods for the determination of food constituents. ➢ To understand the processing conditions on physiochemical properties of food constituents during food processing.					
Course Outcomes	On successful completion of the course, the students will be able to gain knowledge on					

CO	Course Outcomes	Knowledge Level
CO1	Food evaluation techniques.	K5
CO2	Various cookery methods and their evaluation procedures in cereals, pulses, and vegetable cookery.	K5
CO3	The cooking principles on meat and poultry	K5
CO4	The smoking point of different fats and oils.	K2
CO5	Various sugar-based recipes food analytical techniques on sugar and milk cookery.	K6

Course Contents

1. **Food Evaluation**: - Organoleptic evaluation with different scales.
2. **Cereal cookery** – Dextrinization, caramelization, and gelatinization. Study the development of gluten, water holding capacity.
3. **Pulse cookery** - Effects of soaking, acid, alkali, and sprouting and different methods of cooking- on-cooking time and quality of pulses.
4. **Fruits and vegetable cookery** - Effect of acid, alkali, and methods of cooking on pigments. Browning reactions in fruits and vegetables.
5. **Egg, meat, fish, poultry** – Egg foaming, egg coagulation, effect of temperature on egg coagulation, study of cooking time on different types of meat.
6. **Fats and oils** - Smoking point of different fats and oils, rancidity assessment.
7. **Sugar cookery** - Stages of sugar cookery, uses of sugar in Indian recipes. Crystallization and factors affecting crystallization.

Milk cookery- effect of acid, salt, heat on milk proteins, fermentation techniques.

Mapping of Cos with POS & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	M	S	S	M	M	S	S
CO2	S	S	S	S	M	M	S	S	M	M	S	S
CO3	S	S	S	S	M	M	S	S	M	M	S	S
CO4	S	S	S	S	M	M	S	S	M	M	S	S
CO5	S	S	S	S	M	M	S	S	M	M	S	S

Strongly Correlating (S)	3 Marks	Moderately Correlating (M)	2 Marks
Weakly Correlating (W)	1 Mark	No Correlation (N)	0 Mark

Course Code	P23FNE1A	FUNDAMENTALS OF FOOD TECHNOLOGY	L	T	P	C
ELECTIVE I			5	-	-	3

Cognitive Level	**K1-Recall K2:Understand K3:Apply K4:Analyze**
Learning Objectives	**The course aims to** ➢ To have appropriate knowledge about the significance of food technology ➢ To formulate the various food products through various food techniques
Course Outcomes	On successful completion of the course, the students will be able to gain knowledge on

CO	Course Outcome	Knowledge Level
CO1	the food technology principles	K2
CO2	the food preservation, food spoilage, and role of microorganisms	K1
CO3	food fermentation techniques and their products	K1
CO4	information on advanced food techniques	K4
CO5	fundamental of food technology in packaging aspects.	K2

UNIT	Course Contents
UNIT I	**Introduction about food technology** Food technology-definition, introduction to terminology, principles involved in food technology, recent trends and developments in food technology. Application of technology in Food: food science to the selection, preservation, processing, packaging, labeling distribution, and use of safe food.
UNIT II	**Food processing techniques** Recent trends in food processing technology in brief: New or novel raw materials including bioactive compounds, Ingredients and technologies, Novel processing and packaging technologies, risk assessment of both biological and non-biological hazards in food, Food allergies and, intolerances, Food function and relationships between diet and disease, Consumer attitudes to food and risk assessment.
UNIT III	**Fermentation and its by-products** Fermentation: mechanism, process, advantages of fermentation technology - types of aerobic and anaerobic fermentation Steps in fermentation, Fermented Food Products from various food groups, Dairy products, Beverages, and related products of baking. Role of fermentation in nutrient bioavailability and health
UNIT IV	**Enzyme technology** Enzyme Technology - Production of enzymes - Amylase, Protease, Lipase, Lactase and pectinase, Use of enzymes in food & beverage industry (Cheese, fruit, juice, Wine, Meat tenderizing & dairy). Commercial enzyme production and its application, enzyme applications advantages.
UNIT V	**Food packaging and its importance** Food packaging technology and labeling: types of packages-traditional and modern Design and testing of package materials, package performance. Principles in the development of safe and protective

	packing, safety assessment of food packaging materials. Recent packaging methods- principles-hazards related to packaging.
Textbooks	1. Swaminathan, M., Food Science, Chemistry and Experimental Foods, Bappco Publishers,2005. 2. Paul, P.C., and Palmer, H. H., Food Theory and Applications. John Wiley and Sons, New York, 2000. 3. Srilakshmi, M., Food science, New Age International (P) Ltd., Publishers 2010. 4. Robertson, G.L. Food Packaging: Principles and Practice (2nd Ed)., Taylor & Francis, 2006. 5. Peppler, H.J. and D. Perlman, Microbial Technology: Fermentation Technology, 2nd Edition, Vol. II Academic Press / Elsevier,2004. 6. Stanbury, Peter F., Allan Whitaker, and Stephen J. Hall. *Principles of fermentation technology*. Elsevier,2013.
Reference Books	1. RichardColes,DerekMcDowell,MarkJ.Kirwan,FoodPackagingTechnology, Blackwell Publishers,2003 2. Aaron L. Brody, E. P. Strupinsky, Lauri R, Active Packaging for Food Applications, CRC Press, U.S.A.,2001 3. Ahvenainen, R. (Ed.) 2003 Novel Food Packaging Techniques, CRC Press, Han, J.H. (Ed.) 2005 Innovations in Food Packaging, Elsevier Academic Press 4. Desrosier, N.W. and James N. The technology of food preservation. AVI Publishers,2007.

Mapping of Cos with POS & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	M	S	S	M	M	S	S
CO2	S	S	S	S	M	M	S	S	M	M	S	S
CO3	S	S	S	S	M	M	S	S	M	M	S	S
CO4	S	S	S	S	M	M	S	S	M	M	S	S
CO5	S	S	S	S	M	M	S	S	M	M	S	S

Strongly Correlating (S)	3 Marks	Moderately Correlating (M)	2 Marks
Weakly Correlating (W)	1 Mark	No Correlation (N)	0 Mark

Course Code	P23FNE1B	FUNCTIONAL FOODS AND NUTRACEUTICALS	L	T	P	C
ELECTIVE I			5	-	-	3

Cognitive Level	**K1:Recall K2: Understand K3:Apply**
Learning Objectives	**The course aims to** ➢ Knowledgeable about specific issues concerning functional foods and nutraceuticals ➢ Understanding the use of various functional foods in therapeutic conditions ➢ To develop diet supplements incorporating functional foods ➢ Practicing the effect of each food and its effect on health
Course Outcomes	On successful completion of the course, the students will be able to gain knowledge on

CO	Course Outcome	Knowledge Level
CO1	the growing importance of Nutraceuticals and functional foods	K1
CO2	the role of functional foods in health	K2
CO3	the commercial food supplements and their occupation in the market	K2
CO4	the functional assessment of foods	K3
CO5	Nutraceuticals and functional foods on health.	K2

UNIT	Course Contents
UNIT I	**Functional foods and Nutraceuticals** Functional foods and Nutraceuticals – Introduction – Defining, the concept – Review of the history of functional foods – technology of Nutraceuticals – primary and secondary metabolites in plants general teleology – a) Carotenoids b) Conjugated linolenic acid c) Flavonoids d) Nitrogen and Sulphur containing Amino acid derivatives e) proteinase and alpha-amylase inhibitors f) Omega – 3 PUFA g) Terpenoids.
UNIT II	**Classifying Nutraceuticals Organizational models for Nutraceuticals** Classifying Nutraceuticals Organizational models for Nutraceuticals a) Food source – Plant: Soya, olive oil, plant steroid, tea, grapevine, garlic, capsicum, dietary fibre, and other fruits. b) Animal: Milk and products, meat, fish. Microbial probiotics. c) Mechanism of action – Anticancer, positive influence on blood lipid profile, anti-oxidation, anti- inflammatory, osteogenesis. d) Chemical nature – Isoprenoid derivatives, phenolic substances, fatty acids, and structural lipids, carbohydrates and derivatives, amino acid-base substances, microbes, minerals.
UNIT III	**Dietary supplements** Regulation of dietary supplements – Types – inborn errors of metabolism, - obesity, neurological disorder, diabetes mellitus, hypertension vitamin A deficiency, protein energy malnutrition, anemia, Instant foods, and formulas supplement soups, Herbal, and Flowers as functional foods.
UNIT IV	**Bioavailability of nutrients** Bioavailability of nutrients in different foods; measurement of functional component and their bioavailability. Need for measurement, safety quality assurance, and cost bioavailability: definition, factor affecting, chemical measurement and physical testing and microbiological testing- functional foods and vitro studies.

UNIT V	**Nutrigenomics** Pharmacology and Nutraceuticals pharmacology of chemical components. derived from a plant source and the therapeutic derived from a plant source and the therapeutic efficiency of functional food ingredients. Nutrigenomics Relationship between nutritional supplementation and gene expression and disease prevention. Dietary supplements
Textbooks	1. Mary, K. Schmidl and Theodre, P. Labuza, Essentials of Functional Foods, Culinary and hospitality industry publication services,2000. 2. Israel Goldberg, Functional foods, pharma foods, Nutraceuticals, Culinary and hospitality industry publication services,2001. 3. Robert easy Wildman, Handbook of Nutraceuticals, and functional foods, Culinaryand hospitality industry publication services,2001.
Reference Books	1. Paresh, C. Dutta, Phytosterols as Functional Food Components and Nutraceuticals, Marcel Dekker Inc, New York,2004. 2. Jeffery Horst, Methods of Analysis for Functional Foods and Nutraceuticals, CRS press,2002. 3. Webb, G.P, Dietary Supplements and Functional Foods. New York: Blackwell Publishing Ltd, 2006. 4. Wildman, R.E.C, Handbook of Nutraceuticals and Functional Foods. London: CRC Press, Taylor, and Francis, Boca Raton, 2007. 5. Gibson GR & William CM. Functional Foods - Concept to Product.2000. 6. Goldberg I. Functional Foods: Designer Foods, Pharma Foods.2004. 7. Brigelius-Flohé, J & Joost HG. Nutritional Genomics: Impact on Health and Disease. Wiley VCH. 2006. 8. Cupp J & Tracy TS. Dietary Supplements: Toxicology and Clinical Pharmacology. Humana Press.2003.

Mapping of Cos with POS & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	M	S	S	M	M	S	S
CO2	S	M	S	S	M	M	S	S	M	M	S	S
CO3	S	M	S	S	M	M	S	S	M	M	S	S
CO4	S	M	S	S	M	M	S	S	M	M	S	S
CO5	S	M	S	S	M	M	S	S	M	M	S	S

Strongly Correlating (S)	3 Marks	Moderately Correlating (M)	2 Marks
Weakly Correlating (W)	1 Mark	No Correlation (N)	0 Mark

CourseCode	P23FNE1C	FOOD SAFETY AND QUALITY CONTROL	L	T	P	C
ELECTIVE I			5	-	-	3
CognitiveLevel	K2:Understand K3: Apply K4 Analyze					
Learning Objectives	The course aims to ➢ To study the importance of food safety and quality. ➢ To know the laws and standards ensuring food quality and safety. ➢ To know about the food additives and adulterants.					
Course Outcomes	On successful completion of the course, the students will be able to gain knowledge on					
CO	Course Outcome		Knowledge Level			
CO1	the various criteria of food safety and quality.		K2			
CO2	the role and significance of national and international food lawthat ensures the safety of the food products.		K3			
CO3	Food additives and adulterants information and its consequences.		K4			
CO4	various food safety programs.		K2			
CO5	The laws and standards ensuring food quality and safety.		K3			
UNIT	Course Contents					
UNIT I	**Food safety** Food safety: Principles of quality control and safety, need of quality control and safety, strategy and criteria for food safety, Quality Standards – mandatory standards, Quality Standards - optional standards, Consumer lifestyle, Consumer demand, issues in food safety, food traceability, food recall.					
UNIT II	**Importance of food safety** Importance of food safety in the food processing industry, risk classification, national and international food regulatory agencies, nutritional labeling regulation (mandatory and optional nutrients, nutritional descriptors, and approved health claims); microbial contamination (including cross-contamination/indirect contamination), chemical contamination, physical contamination, and allergen contamination.					
UNIT III	**Food Additives and Adulterants** Food Additives and Adulterants: Food additives definition; Common food additives and theirfunction and usage; Permissible limits of additives in foods; Implications of additives on consumers health; Food adulteration: Meaning and definition; Types of food adulterants; Methods used for detection of food adulterants.					
UNIT IV	**Food safety programs** Food safety programs: HACCP, codex Alimentarius, pest control program, facility maintenance, personal hygiene, supplier control, sanitary, design of equipment and infrastructure, procedures for raw material reception, storage, and finished product loading, sanitation program. Sanitation standard operating procedures (SSOPs), product identification, tracking and recalling program, preventive equipment.					
UNIT V	**Food Laws and Standards**					

	Food Laws and Standards: Need and importance; National food legislation such as FSSA, Essential Commodities Act, ISI, or BIS, AGMARK, FPO, and PFA; International Organization such as FAO, WHO, Codex Alimentarius, and APEDA. Good Manufacturing Practices (GMP), Good Hygienic Practices (GHP), Good Laboratory Practices (GLP), ISO 22000, FSSC 22000, Food Safety Audit.
Textbooks	1. Ronald H. Schmidt, and Gary E. Rodrick., "Food Safety Handbook," John Wiley & Sons,New Jersey,2005.
Reference Books	1. Yasmine Motarjemi and HuubLelieveld., "Food Safety Management - A Practical Guide for theFood Industry", Elsevier, New York,2014. 2. FSSAI., "Manual of Food Safety Management System", FSS Act, 2006, Ministry of the Healthand Family Welfare, New Delhi,2006. 3. FSSAI., "Food Safety and Standards Regulations – 2011", Ministry of the Health and FamilyWelfare, New Delhi,2011. 4. InteazAlli, "Food Quality Assurance: Principles and Practices", 2nd Edition, Taylor andFrancis, UK,2014.
Journals	1. George, A.B. 2006. Encyclopedia of Food and Color Additives. Vol. III. CRC Press. 2. Surendar S. Ghokrokta., "Science and Strategies for Safe Food", CRC Press, USA,2017. 3. Branen, A.L., Davidson PM & Salminen S. 2001. Food Additives. 2nd Ed. MarcelDekker.

Mapping of Cos with POS & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	S	S	M	S	M	S	M
CO2	S	S	S	S	M	S	S	M	S	M	S	M
CO3	S	S	S	S	M	S	S	M	S	M	S	M
CO4	S	S	S	S	M	S	S	M	S	M	S	M
CO5	S	S	S	S	M	S	S	M	S	M	S	M

Strongly Correlating (S)	3 Marks	Moderately Correlating (M)	2 Marks
Weakly Correlating (W)	1 Mark	No Correlation (N)	0 Mark

SEMESTER II

Course Code	P23FNT23	NUTRITIONAL BIOCHEMISTRY	L	T	P	C
CORE IV			6	-	-	5

Cognitive Level	**K1:Recall K2:Understand K5:Evaluate**
Learning Objectives	**The course aims to** On successful completing of this course the student will be able to: ➢ Understand the biochemical basis for nutrition and health ➢ Understand the mechanisms adopted by the human body for the regulation of metabolic pathways. ➢ Get an insight into interrelationships between various metabolic pathways.
Course Outcomes	On successful completion of the course, the students will be able to gain knowledge on

CO	Course Outcome	Knowledge Level
CO1	The concepts and chemistry of biological oxidation	K1
CO2	The concepts of macronutrient metabolism	K2
CO3	The metabolism of lipids	K5
CO4	The concepts of protein and amino acid metabolism	K2
CO5	The role of nucleic acids in metabolism	K2

UNIT	Course Contents
UNIT I	**Metabolism of carbohydrate** Introduction, Classification. Structure and Properties of monosaccharides (hexoses and pentoses). Oligosaccharides – Sucrose, maltose, lactose, isomaltose, cellulose. Homopolysaccharides - Structures of storage polysaccharides (starch and glycogen). Heteropolysaccharides – Structures of Hyaluronic acid, Heparin, and Chondroitin sulfate. Glycolysis, Gluconeogenesis, TCA cycle, HMP shunt, bioenergetics, disorders of carbohydrate metabolism - galactosemia, glycogen storage disease, pentosuria, abnormal level in blood glucose.
UNIT II	**Protein and amino acid metabolism** Structure and classification of amino acids. Biosynthesis of protein, general catabolism of amino acids, deamination, transamination, urea cycle, disorders of amino acid metabolism - phenylketonuria, cystinuria, albinism, alkaptonuria, and maple syrup disease.
UNIT III	**Biological Oxidation** Enzymes and co-enzymes involved in oxidation and reduction, respiratory chain, phosphates in biologic oxidation and energy capture, the role of the respiratory chain, and mechanism of phosphorylation.
UNIT IV	**Metabolism of nucleic acids** Structure of DNA, Structure of RNA, Replication, Biosynthesis of purine and pyrimidine nucleotides, Disorders of purine and pyrimidine metabolism: hyperuricemia, gout, neurological problems, developmental disorders: causes, symptoms, risk factors, complications, and preventive measures.

UNIT V	**Metabolism of lipids** Biosynthesis and oxidation of saturated and unsaturated fatty acids, glycerides, phospholipids and cholesterol, bioenergetics, disorders of lipid metabolism (fatty liver, atherosclerosis), lipoproteins and their significance.
Textbooks	1. Ramadevi K, Ed: Ambika Shanmugam Fundamentals of biochemistry for medical students, 8th edition, Wolters Kluwer Health, India,2016 2. Rodwell V, Bender D, Botham KM, Kennelly PJ, Weil PA, Harper's Illustrated Biochemistry, 30th Edition, McGraw hill Education, 2015
Reference Books	1. Sulochana H, Principles of Biochemistry, PBS enterprises, Chennai,2010. 2. Cox MM and Nelson DL, Leininger Principles of biochemistry, 5th edition, EH Freman&Company, New York,2008. 3. Vasudevan DM, Sreekumari S, Textbook of Biochemistry, 5th edition, Jaypee Publishers, New Delhi,2007. 4. Veera Kumari L, Biochemistry, 1st edition, MJP Publishers, 2005. 5. Murray RK, Granner DK, Mayes PA, Rodwell VW, Harper's Illustrated Biochemistry,26th edition, Mcgraw hill publishing house,2003.
Journals	1. International journal of Clinical Nutrition 2. Indian Journal of medical Biochemistry

Mapping of Cos with POS & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	M	M	S	S	S	M	M
CO2	S	S	S	S	S	M	M	S	S	S	M	M
CO3	S	S	S	S	S	M	M	S	S	S	M	M
CO4	S	S	S	S	S	M	M	S	S	S	M	M
CO5	S	S	S	S	S	M	M	S	S	S	M	M

Strongly Correlating (S)	3 Marks	Moderately Correlating (M)	2 Marks
Weakly Correlating (W)	1 Mark	No Correlation (N)	0 Mark

CourseCode	P23FNT24	ADVANCED DIETETICS	L	T	P	C
CORE V			6	-	-	5

CognitiveLevel	**K2:Understand K4: Analyze K6:Create**
Learning Objectives	**The course aims to** ➢ To intervene in the metabolic anomalies of acute and chronic diseases. ➢ To plan a menu for various diseases based on their nutritional status anddietary needs.
Course Outcomes	On successful completion of the course, the students will be able to gain knowledge on

CO	Course Outcome	Knowledge Level
CO1	the etiology, physiology, and metabolic anomalies of acuteand chronic diseases and patient needs.	K2
CO2	the effect of the various diseases on nutritional and dietary requirements.	K4
CO3	Nutritional care for the prevention and treatment of gastrointestinal diseases	K6
CO4	Nutritional management in cardiovascular diseases and hypertension	K2
CO5	renal diseases and drug and nutrient interactions.	K2

UNIT	Course Contents
UNIT I	**Techniques of feeding** Techniques of feeding: Principle of Nutritional care, recent advances, and techniques in feeding substrates. Types of hospital diets. Nutrition Support Techniques, Enteral feeding - indications, Types - Nasogastric, Gastrostomy, and jejunostomy - requirements and advantages. Parenteral feeding - Nutritional Support, Formula feeds, and Complications in TPN. Diet in Trauma and surgical conditions- Stress response, physiological response to surgery, pre- and post-operative nutritional care, Burns-complications, nutritional requirement, and dietary management.
UNIT II	**Nutritional Management in Energy Imbalance** Nutritional Management in Energy Imbalance - Underweight and obesity, Etiology, and dietary management. Diabetes mellitus: etiology, classification, metabolism, factors affecting normal blood sugar levels, diagnosis, signs and symptoms, types of insulin, glycemic index, oral hypoglycemic drugs, complications, and prevention of diabetes.
UNIT III	**Nutritional Management of GI tract Diseases and Disorders** Nutritional Management of GI tract Diseases and Disorders: Disorders, Etiology, Symptoms and dietary management of Acute gastritis, Chronic gastritis, Peptic ulcer - duodenal & gastric Intestinal disease - Flatulence, Diarrhea and Dysentery, Constipation, Celiac disease, Tropicalsprue, irritable bowel syndrome, diverticular disease, colon cancer, Ulcerative colitis. Nutritional management of Liver, gall-bladder, and pancreatic disorders: Liver disease - Hepatitis, cirrhosis, Jaundice, fatty liver, cholecystitis

	cholelithiasis, Hepatic coma gall stones, and Pancreatitis.
UNIT IV	**Nutritional management in cardiovascular diseases and hypertension** Nutritional management in cardiovascular diseases and hypertension - prevalence, etiology- Dyslipidemia, atherosclerosis, angina pectoris, myocardial infarction, Ischemic heart disease, Prevention of CVD. Hypertension - Classification, prevalence, Diet related factors influencing hypertension, Management of hypertension. Nutritional Management of Cancer and AIDS - the role of diet, metabolic effects, and nutritional effects.
UNIT V	**Renal diseases and drug interaction** Diseases of the Kidney - Etiology, Symptoms and Dietary modification, Nephritis, Nephrosis,Acute, and chronic renal failure, End-Stage Renal Disease (ESRD), Renal calculi. Transplantation and dialysis, Dietary Modification. Diet and Drug Interaction: effects of drugs on food and nutrient intake – ingestion, digestion,absorption, metabolism, and requirements.
Textbooks	1. Robinson, Corinne Hogden, and Marilyn R. Lawler. *Normal and therapeutic nutrition*. No.Ed. 16. Collier Macmillan Publishers, 1982. 2. Dietary Guidelines of Indians- A Manual, National Institute of Nutrition, Hyderabad,2006. 3. Srilakshmi B, Dietetics, sixth edition, new age Publishing Press, New Delhi,2011 4. Stacy N, William's Basic Nutrition and Diet Therapy, 12th edition, Elsevier publications, UK,2005. 5. Elia M, Ljunggvist O, Stratton RJ, Lanham SA, Clinical Nutrition (The Nutrition SocietyTextbook), 2nd edition, Wiley Blackwell Publishers,2013. 6. Mahan LK, Stump SE and Raymond JL, Krause's Food and Nutrition Care Process, 13th Edition, Elsevier Saunders, Missouri,2012. 7. Stump SE, Nutrition and diagnosis related care, 7th edition, Lippincott Williams and Wilkins,Canada,2012.
Reference Books	1. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indian foods, NIN,Hyderabad,2010 2. Marian M et al., Clinical Nutrition for surgical patients, Jones and Bartlett Publishers, Canada,2008 3. Joshi Y.K, Basics of Clinical Nutrition, 2nd edition, JP Medical Publishers Pvt Ltd, New Delhi,2008 4. Stacy N, William's Basic Nutrition and Diet Therapy, 12th edition, Elsevier publications, UK,2005 5. Gibney MJ, Elia M, Ljunggvist O, Clinical Nutrition (The Nutrition Society Textbook) WileyBlackwell Publishers,2005 6. Whitney EN and Rolfes SR, Understanding Nutrition, 9 th edition, West/Wordsworth,2002 7. Guthrie H, Introductory Nutrition, CV Mosby Co.St. Louis,2002

	8. Williams SR, Nutrition & Diet Therapy, CV. Mosby St. Louis,2001 9. Garrow et al, Human Nutrition & Dietetics, 10th Edition, Churchill Livingston,2001
Journals	➢ Journal of American Dietetic Association. ➢ The American Journal of Clinical Nutrition ➢ The Indian Journal of Nutrition and Dietetics, ➢ Journal of Clinical Nutrition ➢ Food and Nutrition Bulletin

Mapping of Cos with POS & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	S	M	S	S	S	S	M
CO2	S	S	S	S	M	S	M	S	S	S	S	M
CO3	S	S	S	S	M	S	M	S	S	S	S	M
CO4	S	S	S	S	M	S	M	S	S	S	S	M
CO5	S	S	S	S	M	S	M	S	S	S	S	M

Strongly Correlating (S)	3 Marks	Moderately Correlating (M)	2 Marks
Weakly Correlating (W)	1 Mark	No Correlation (N)	0 Mark

CourseCode	P23FNP22	THERAPEUTIC NUTRITION PRACTICAL	L	T	P	C
CORE VI PRACTICAL II			-	-	6	4

CognitiveLevel	**K1:Recall K2:Understand K3:Apply K5: Evaluate K6:Create**	
Learning Objectives	**The course aims to** ➢ The students will be able to plan a day's menu based on the person/patient's disease condition. ➢ The students will be able to prepare a nutritious/ hospital/pediatric diet.	
Course Outcomes	On successful completion of the course, the students will be able to gain knowledge on	
CO	**Course Outcome**	**Knowledge Level**
CO1	various disorders and their complications	K1
CO2	different types of therapeutic diet.	K6
CO3	the dietary measures to reduce/prevent the disease.	K3
CO4	the hands-on experience in therapeutic nutrition andits planning.	K5
CO5	learn the diet counseling process	K2

UNIT	Course Contents
UNIT I	**Routine hospital diet** Routine hospital diet, importance of hospital diets, types of diet - Full liquid, clear liquid, soft, light, bland, and regular diet. Different types of diseases conditions and its variations. Diet for obesity, underweight: menu planning, preparation, standardization, sensory analysis, nutrientcalculation, and cost calculation.
UNIT II	**Diet for gastrointestinal diseases** Diet in gastrointestinal disorders – lower and upper GI diseases, peptic ulcer, pancreatitis diarrhea, constipation. Diet in liver disorders - jaundice, cirrhosis, hepatic coma, fatty liver, and gall stones: menu planning, preparation, standardization, sensory analysis, nutrient calculation, and cost calculation.
UNIT III	**Diet for kidney diseases and Diabetes mellitus** Diet in kidney disorders - Glomerulonephritis, nephrotic syndrome, renal failure, dialysis: menu planning, preparation, standardization, sensory analysis, nutrient calculation, and cost calculation. Diet in Diabetes mellitus –type 1, type 2, GDM: menu planning, preparation, standardization, sensory analysis, nutrient calculation, and cost calculation.
UNIT IV	**Diet for cardiovascular diseases** Diet in Cardiovascular disease - Hypertension, atherosclerosis, congestive heart failure, coronary heart disease, menu planning, preparation, standardization, sensory analysis, nutrient calculation, and cost calculation. Dietary counselling for cardio vascular and its associated complications.
UNIT V	**Diet counselling for different conditions**

	Preparation of Diet Counseling aids for common disorders. Dietary counseling of the patients. Different types of nutritional counselling, importance of nutritional counselling.Nutritional assessment of pediatrics and adults by IAP, SGA: menu planning, preparation, standardization, sensory analysis, nutrient calculation, and cost calculation.
Reference Books	1. Stump SE, Nutrition and Diagnosis Related Care, 7th edition, Lippincott Williams and Wilkins,Canada,2012. 2. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indian foods, NIN,Hyderabad,2010 3. Srilakshmi B, Dietetics, sixth edition, new age Publishing Press, New Delhi,2011. 4. Marian M et al., Clinical Nutrition for surgical patients, Jones and Bartlett Publishers, Canada,2008 5. Joshi Y.K, Basics of Clinical Nutrition, 2nd edition, JP Medical Publishers Pvt Ltd, New Delhi,2008.

Mapping of Cos with POS & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	S	M	S	M	S	S	S
CO2	S	S	M	S	S	S	M	S	M	S	S	S
CO3	S	S	M	S	S	S	M	S	M	S	S	S
CO4	S	S	M	S	S	S	M	S	M	S	S	S
CO5	S	S	M	S	S	S	M	S	M	S	S	S

Strongly Correlating (S)	3 Marks	Moderately Correlating (M)	2 Marks
Weakly Correlating (W)	1 Mark	No Correlation (N)	0 Mark

Course Code	P23FNE2A	HOME SCIENCE COMPOSITE	L	T	P	C
ELECTIVE III			4	-	-	3
Cognitive Level	K1:Recall K2:Understand K3:Apply					
Learning Objectives	The course aims to 1. Describe the importance of each branch of Home Science 2. Understand the essence of each subject 3. Prepare them for UGC NET, SLET and ICMR					
Course Outcomes	On successful completion of the course, the students will be able to gain knowledge on					
CO	Course Outcome		Knowledge Level			
CO1	the field of food science and nutrition		K1			
CO2	various concepts of home science extension education		K2			
CO3	the concepts of home science and its applications in resource management		K3			
CO4	the basic knowledge of human development.		K2			
CO5	the importance of textile and clothing in our daily life events.		K3			
UNIT	Course Contents					
UNIT I	**Food science and nutrition** Basic concepts of food groups and nutrients- Role of microorganisms in food spoilage and its prevention - Recent advances in food processing and preservation-Recent techniques in food technology. Institutional management: Management of hospitality institutes- hospitals/ hotels/ restaurants/ cafeteria and outdoor catering.					
UNIT II	**Extension education** History and development of home science - Formal/ non-formal and extension education - Vocationalisation of home science in India - Concept and classification of communication - Trends in home science research.					
UNIT III	**Resource management** Concept of home management and steps - Classification of resources - Basic characteristics of resources. Work simplification - Interior decoration - Household equipment, decision making, resource management, financial management.					
UNIT IV	**Human development** Child development-principles and stages - Life span development - Theories of human development - Early childhood care and education - Family welfare programs.					
UNIT V	**Textiles and Clothing** Textile Fibers-Definition, Classification of Fibers. Natural fiber – Cotton, silk, wool - Man Made Fibers- Polyester, Nylon - Primary and secondary characteristics of textile fibers. Yarn-Definition- Types- Applications. Fabric manufacturing techniques – Weaving, Knitting, Non-woven -					

	Definition and applications. Garment Manufacturing-Terminology used in apparel industry- Introduction to apparel categories- Men, Women, and children. Tools used-Measuring, Marking, Cutting, finishing and general tools. Steps involved in Garment Manufacturing-Design development, Body measurements, Pattern making, spreading, marking, cutting and apparel construction
Reference Books	1. Jha, J.K, Encyclopedia of Teaching of Home Science, Vol.I, II and III. New Delhi: Anmol Publications,2002 2. Varghese, M.A.et al. Home Management, New Delhi: Viley Eastern Limited,2001 3. Suriakanthi. A.,Child Development - An Introduction Gandhi gram: Kavitha Publications, 2002. 4. Education Planning group, Home Management. New Delhi: Arya Publishing House,2001. 5. Hurlock, E.B, Developmental Psychology A Life-Span Approach. New Delhi: Tata Mcgraw Hill Publishing Company Limited,2007. 6. E.P.G. Gohl, L.D. Velensky, "Textile Science" CBS Publishers and Distributors,2003. 7. AJ. Hall. "The standard hand book of Textiles," Wood head Publishing 8th edition2004. 8. P.V. Vidyasagar, "Hand Book of Textiles," A. Mittal Publications, 2005 9. Sara J. Kadolph, "Textiles," Prentice Hall, 10th edition2007. 10. Williams, Abigail. *The Social Life of Books*. Yale University Press,2018.

Mapping of Cos with POS & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	S	S	M	M	S	S	S	M
CO2	S	M	S	S	S	S	M	M	S	S	S	M
CO3	S	M	S	S	S	S	M	M	S	S	S	M
CO4	S	M	S	S	S	S	M	M	S	S	S	M
CO5	S	M	S	S	S	S	M	M	S	S	S	M

Strongly Correlating (S)	3 Marks	Moderately Correlating (M)	2 Marks
Weakly Correlating (W)	1 Mark	No Correlation (N)	0 Mark

CourseCode	P23FNE2B	FOOD PACKAGING	L	T	P	C
ELECTIVE III			4	-	-	3

CognitiveLevel	**K2:Understand K3: Apply K4 Analyze**
Learning Objectives	The course aims to ➢ impart knowledge about the various food packaging materials and their importance ➢ understand the Packaging techniques of food products ➢ recognize the role and significance of packaging
Course Outcomes	On successful completion of the course, the students will be able to gain knowledge on

CO	Course Outcome	Knowledge Level
CO1	the functions of packaging along with the influence ofvarious factors on food.	K2
CO2	different types of packaging materials	K3
CO3	the packaging techniques	K4
CO4	recent trends in packaging technology.	K2
CO5	the ecofriendly and modernized packaging	K3

UNIT	Course Contents
UNIT I	**Introduction to food packaging** Introduction to food packaging: recent developments and advances, Packaging terminology- definition, Functions of food packaging, importance of food packaging, packaging environment. Characteristics of foodstuff that influences packaging selection, role of packaging in food safety and food spoilage.
UNIT II	**Different types of food packaging** Types of packaging materials (metals, glass, paper, and plastics), their characteristics, and uses. Paper: pulping, fibrillation and beating, types of papers, and their testing methods. Glass: composition, properties, types of closures, methods of bottle making; Metals: Tinplate containers, tinning process, components of tinplate, tin-free steel (TFS), types of cans, aluminum containers, lacquers; Plastics: types of plastic films, laminated plastic materials, co-extrusion.
UNIT III	**Packaging aspects of fresh and processed foods** Packaging aspects of fresh and processed foods: Packaging of Fruits and vegetables, Fats and Oils, Spices, Meat, Poultry and seafoods, Dairy Products, Bakery, beverages, Dehydrated and frozen foods. Liquid and powder filling machines – like aseptic system, form, and fill (volumetric and gravimetric), bottling machines. Form Fill Seal (FFS) and multilayer aseptic packaging machines.
UNIT IV	**Package accessories** Package accessories and advances in packaging technology (active packaging, modified atmosphere packaging, aseptic packaging, and packages for microwave ovens, biodegradable plastics, edible gums, and coatings). Advantages of package accessories and its recent developments

UNIT V	**Packaging Design & Environmental Issues in Packaging** Packaging Design & Environmental Issues in Packaging: Food marketing and role of packaging-Packaging aesthetic and graphic design; Coding and marking including barcoding; Consumer attitudes to food packaging materials; Packaging Laws and regulations, safety aspects of packaging materials; sources of toxic materials and migration of toxins into food materials; Packaging material residues in food products; Environmental & Economic issues, recycling, and waste disposal.
Textbooks	1. GardonL.RobertsonFoodPackaging:PrinciplesandPractice,ThirdEditio n,CRC Press,2012. 2. Robertson, G.L. Food Packaging: Principles and Practice (2nd ed.), Taylor & Francis,2006 3. NIIR. Food Packaging Technology Handbook, National Institute of Industrial ResearchBoard, Asia Pacific Business Press, 2003. 4. Richard Coles, Derek McDowell, Mark J. Kirwan Food Packaging Technology, BlackwellPublishers,2003. 5. Aaron L. Brody, E. P. Strupinsky, Lauri R. Active Packaging for Food Applications, CRCPress,2001.
Reference Books	1. Ahvenainen, R. Novel Food Packaging Techniques, CRC Press,2003 2. Han, J.H. Innovations in Food Packaging, Elsevier Academic Press,2005. 3. Coles, R., McDowell, D., and Kirwan, M.J. Food Packaging Technology,2003.

Mapping of Cos with POS & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	S	S	M	M	M	S	S
CO2	S	S	S	S	M	S	S	M	M	M	S	S
CO3	S	S	S	S	M	S	S	M	M	M	S	S
CO4	S	S	S	S	M	S	S	M	M	M	S	S
CO5	S	S	S	S	M	S	S	M	M	M	S	S

Strongly Correlating (S)	3 Marks	Moderately Correlating (M)	2 Marks
Weakly Correlating (W)	1 Mark	No Correlation (N)	0 Mark

CourseCode	P23FNE2C	ICT TOOLS FOR NUTRITION EDUCATION	L	T	P	C
ELECTIVE III			4	-	-	3

CognitiveLevel	**K2:Understand K3: Apply K4: Analyze**	
Learning Objectives	The course aims to ➢ create awareness among people with Mass media and advertisement. ➢ develop the tools for nutrition education.	
Course Outcomes	On successful completion of the course, the students will be able to gain knowledge on	
CO	**Course Outcome**	**Knowledge Level**
CO1	various concepts of nutrition education	K2
CO2	ICT significance nutrition education	K3
CO3	different tools in nutrition education	K4
CO4	content making for nutritional and health issues	K2
CO5	creation of mobile apps, videos, online counselling	K3

UNIT	Course Contents
UNIT I	**ICT in Nutrition Education** ICT in Nutrition Education a) Nutrition Education- Nature and Importance to the Community, Objectives, Training Workers in Nutrition Education, and Extension Work. ICT tools to include - Printed media (Newspaper, books, journal magazines) - Computers - Telephones - Communication Network - E-mail - Electronic media (Radio, television, videos films) - Telex - Satellite –Internet.
UNIT II	**Principles of nutrition education** Principles of Planning, Executing and Evaluating Nutrition Education Programme c) Problems of Nutrition Education Programme and Approaches to overcome. Information and communication devices for making learning in food and Nutrition education: concepts. Develop nutritional messages/ slogan on health and nutrition issues for vulnerable groupsin the community.
UNIT III	**Nutrition education tools** Selection and development of appropriate ICT aids for different health and nutrition issuesfor various vulnerable groups in the community – chart, poster, leaflet, flipbook/flashcard. Development of nutritional games on health and nutrition issues for vulnerable groups in thecommunity.
UNIT IV	**Different audio-visual aids in nutrition education** Audio-Video messages through mobile phones, mobile apps, alert calls regarding nutritional uptake of rural mass and regular health checkups. Package of practices of nutrient rich varieties. Monitoring and feedback mechanism through mobile based applications. Dissemination of recommended dietary requirement [carbohydrate, protein, fat, vitamin, minerals and dietary fibre) to rural mass. Nutritional Campaigns organization and mass awareness in villages.

UNIT V	**Nutritional intervention through ICT** Analyze the dietary intake and calorie requirement. Analyze the required quantity carbohydrate, protein, fat, vitamin, minerals and dietary fibre - Content Development regarding bestnutrition practices. Mobile based nutritional awareness: nitrify India, Dietary guidelines for Indians, Nutrition atlas, vikaspedia, blog creation online diet counselling: scope and importance.
Textbooks	1. Suryatapadas –Textbook of Community Nutrition, Academic Publishers,2016. 2. Prabha Bisht- Community Nutrition in India, Star Publications,2017. 3. B. Srilakshmi - Nutrition Science, New Age International, 2006.
Reference Books	1. Swaminathan. M- Advanced Textbook on Food & Nutrition Vol 1& 2,Bappco. 2. Hyun, Taisun, Miyong Yon, Sun Hee Kim, Nan Hee Kim, Suk Mi An, Sun Mi Lee, Hyun JungChi et al. "Development of a nutrition education website for children." *Korean Journal of Community Nutrition* 8, no. 3 (2003):259-269. 3. Bhatt D.P, Health Education, Khel Sahitya Kendra, New Delhi,2008.

Mapping of Cos with POS & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	M	S	M	M	M	S	M	S	M
CO2	M	S	M	M	S	M	M	M	S	M	S	M
CO3	M	S	M	M	S	M	M	M	S	M	S	M
CO4	M	S	M	M	S	M	M	M	S	M	S	M
CO5	M	S	M	M	S	M	M	M	S	M	S	M

Strongly Correlating (S)	3 Marks	Moderately Correlating (M)	2 Marks
Weakly Correlating (W)	1 Mark	No Correlation (N)	0 Mark

CourseCode	P23FNS1A	BASICS OF HUMAN NUTRITION	L	T	P	C
NME I			4	-	-	2
CognitiveLevel	K2:Understand K3: Apply K4 Analyze					
Learning Objectives	The course aims to ➢ To have appropriate knowledge on nutrition ➢ To address the role of nutrition in health and wellness					
Course Outcomes	On successful completion of the course, the students will be able to gain knowledge on					
CO	Course Outcome		Knowledge Level			
CO1	the basic concepts of health and food		K2			
CO2	the concept of macronutrients		K3			
CO3	the micro-nutrients role in health		K4			
CO4	role of nutrition in each stage of human life		K2			
CO5	communicable and non-communicable disease		K3			
UNIT	Course Contents					
UNIT I	**Basic concept of health** Health: definition, importance of health, malnutrition: undernutrition, overnutrition, factors associated with malnutrition: prevalence, dietary recommendations, RDA- ICMR. Functions of food: food groups, classification of food groups. Interaction between food and health:Role of food in health promotion.					
UNIT II	**Macronutrients** Nutrients: definition, classification, macronutrients: Carbohydrates: functions, requirements, food sources, deficiencies and recommended intake. Proteins: functions, requirements, food sources, deficiencies and recommended intake.Fats: functions, requirements, food sources, deficiencies and recommended					
UNIT III	**Micronutrients** Micronutrients: Vitamins and minerals: Fat soluble vitamins: functions, requirements, food sources, deficiencies and recommended intake.Water soluble vitamins: functions, requirements, food sources, deficiencies and recommended intake. Macro minerals: functions, requirements, food sources, deficiencies and recommended intake.Micro minerals: functions, requirements, food sources, deficiencies and recommended intake.					
UNIT IV	**Life cycle nutrition** life cycle nutrition: infancy: nutritional needs, nutritional deficiencies, RDA and dietary measures. Pre-school: nutritional needs, nutritional deficiencies, RDA and dietary measures. School going: nutritional needs, nutritional deficiencies, RDA and dietary measures. Adolescents: nutritional needs, nutritional deficiencies, RDA and dietary measures. Pregnancy: nutritional needs, nutritional deficiencies, RDA and dietary measures. Lactation: nutritional needs, nutritional deficiencies, RDA and dietary measures. Adulthood and old age: nutritional needs, nutritional deficiencies, RDA and dietary measures.					

UNIT V	**Communicable and non-communicable diseases** Communicable and non-communicable diseases: causes, symptoms, risk factors, consequences, dietary management. Communicable and non-communicable diseases (Epidemiology Prevalence Source of infection, Vaccination schedule, Preventive measures, diet therapy) Communicable diseases: Typhoid, tuberculosis, cholera, chicken box, hepatitis, SARS, and covid- 19. Non-communicable diseases: Hypertension, CVD, cancer, renal disorders, liver disorders.
Textbooks	1. Srilakshmi B, Dietetics, sixth edition, New age Publishing Press, New Delhi,2011 2. Stacy N, William's Basic Nutrition and Diet Therapy, 12th edition, Elsevier publications, UK,2005. 3. Mahan LK, Stump SE and Raymond JL, Krause's Food and Nutrition Care Process, 13th Edition, Elsevier Saunders, Missouri, 2012.
Reference Books	1. Barasi, Mary. *Human nutrition: a health perspective*. CRC Press,2003. 2. Roday S, Food science and Nutrition, Oxford university press, New Delhi,2007 3. Mahan LK, Stump SE and Raymond JL, Krause's Food and Nutrition Care Process, 13thEdition, Elsevier Saunders, Missouri, 2012. 4. Robinson CH, Normal and Therapeutic nutrition, Oxford and IBH publishing company,Bombay,2010.

Mapping of Cos with POS & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	S	S	S	M	M	S	M
CO2	S	S	S	S	M	S	S	S	M	M	S	M
CO3	S	S	S	S	M	S	S	S	M	M	S	M
CO4	S	S	S	S	M	S	S	S	M	M	S	M
CO5	S	S	S	S	M	S	S	S	M	M	S	M

Strongly Correlating (S)	3 Marks	Moderately Correlating (M)	2 Marks
Weakly Correlating (W)	1 Mark	No Correlation (N)	0 Mark

CourseCode	P23FNS1B	WOMEN AND HEALTH	L	T	P	C
NME I			4	-	-	2

CognitiveLevel	**K2:Understand K3: Apply K4 Analyze**
Learning Objectives	The course aims to ➢ to have appropriate knowledge of women's health ➢ to address women's Development and Empowerment
Course Outcomes	On successful completion of the course, the students will be able to gain knowledge on

CO	Course Outcome	Knowledge Level
CO 1	the status of women's health.	K2
CO 2	health care services and available health careproviders.	K3
CO 3	critical issues in women's health	K4
CO 4	women's health and education	K2
CO 5	health policy in India and international perspectiveson health.	K3

UNIT	Course Contents
UNIT I	**Basics of women's health** Concept of health, Concept of Women's Health, the status of women's health. Adolescent health: adolescent sexual and reproductive health, global strategy for adolescent health, adolescentmental health, adolescent pregnancy, adolescent nutritional requirements, nutritional deficiencies, eating disorders, obesity, underweight and adolescent anemia sexually transmitted diseases.
UNIT II	**Maternal nutrition** Maternal nutrition: MMR, health care delivery system, stages of pregnancy, physiological changes of pregnancy, nutritional requirements in pregnancy, nutritional deficiencies, complications of pregnancy: Anemia, under nutrition, Gestational Diabetes Mellitus (GDM), Pregnancy-induced Hypertension (PIH).
UNIT III	**Nutritional needs in lactation** Nourishing health: the physiological process of lactation, nutritional needs in lactation period, problems of lactation, the importance of breastfeeding, nutritional problems in the lactation period.
UNIT IV	**Health needs of women** Health needs of women: early, middle and late adulthood, nutritional needs in adulthood period, Polycystic ovarian disease, hormonal imbalances, menopause hormonal changes, nutritional care in menopause period.
UNIT V	**Lifestyle diseases of women** Lifestyle diseases of women: breast cancer, cervical cancer, osteoporosis, arthritis, andother degenerative diseases: incidence, causes, dietary preventive measures. Health care programs to improve women's health: International, national and state-level agenciesfor women's health

Textbooks	1. B. Srilakshmi S. Dietetics (5th edition) New age international publishers, 2. Park, K.: Park's Textbook of Preventive and Social Medicine, 18th Edition, M/s. Banarasidas Bhanot, Jabalpur,2000. 3. Swaminathan, M. Essentials of Food and Nutrition, Vols. I and II. Ganesh & Co.2000.
Reference Books	1. Indian National Code for Protection and Promotion of Breast Feeding, Govt. of India.Ministry of Social Welfare, New Delhi. 2. Mahan LK, Stump SE and Raymond JL, Krause's Food and Nutrition Care Process, 13th Edition, Elsevier Saunders, Missouri,2012

Mapping of Cos with POS & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	M	M	S	S	M	S	M
CO2	S	S	M	S	S	M	M	S	S	M	S	M
CO3	S	S	M	S	S	M	M	S	S	M	S	M
CO4	S	S	M	S	S	M	M	S	S	M	S	M
CO5	S	S	M	S	S	M	M	S	S	M	S	M

Strongly Correlating (S)	3 Marks	Moderately Correlating (M)	2 Marks
Weakly Correlating (W)	1 Mark	No Correlation (N)	0 Mark

CourseCode	P23FNS1C	FOOD PROCESSING	L	T	P	C
NME I			4	-	-	2
CognitiveLevel	K1:Recall K2:Understand K3:Apply					
Learning Objectives	**The course aims to** On successful completion of this course the student will be able to: ➢ to Knowledgeable about the applications of preservation ➢ to make out the different preservation process					
Course Outcomes	On successful completion of the course, the students will be able to gain knowledge on					
CO	Course Outcome		Knowledge Level			
CO1	the importance and methods of post-harvest conservation of foods.		K2			
CO2	food processing. technology for preservation and production		K1			
CO3	various food processing techniques and its recent developments in milk processing		K3			
CO4	various food processing technology and their applications in beverages		K2			
CO5	food fortification and enrichment in fermentation techniques		K2			
UNIT	Course Contents					
UNIT I	**Basic requirements in general for a food processing unit.** Basic requirements in general for a food processing unit: The principle underlying food processing operations, Physical means in food processing operation (including thermal, radiation, refrigeration, freezing, & dehydration) Chemical means in food processing (by sugar, salt, curing, smoke, acids and chemicals, Effect of processing on physicochemical characteristics.					
UNIT II	**Preservatives and processing of various foods** Different types of preservatives, natural and chemical preservatives, use of class II preservatives: advantages and disadvantages. Processing Technology for the preservation and production of various food products. Processing of cereals, legumes, oilseeds, fruits, and vegetables.					
UNIT III	**Processing Technology for milk and milk products** Processing Technology for milk and milk products. Indigenous milk products pannier and yogurt. Egg processing – manufacturing of egg powder. Fleshy food processing – preprocessing, canning, dehydro-freezing, dehydration of meat, poultry, and fish, smoking and curing of meat, fish oil extraction.					
UNIT IV	**Beverages and sugar processing** The brief manufacturing process of coffee, tea, cocoa, ready-to-serve beverages: treating water, compounding ingredients, carbonating product, filling product, packaging. Hazard prevention in beverage processing, potential risks and health effects. Sugar – Manufacturing of sugar from sugarcane and palm, sugar cubes, and powdered sugar.					

UNIT V	**Recent advances in food technology** Incorporation of conventional and innovative techniques in food processing: food fortification: in wheat flour, salt, oil rice and milk. Importance of food fortification and its recent developments in India. Technologies underlying in enrichment, fermentation, malting, germination.
Textbooks	1. Srilakshmi, M., Food science, New Age International (P) Ltd., Publishers2010. 2. Swaminathan, M., Food science, Chemistry and Experimental Foods, Bappco Publishers,2005 3. Potter, Norman N., and Joseph H. Hotchkiss. Food Science. Springer Science & Business Media, 2012. 4. Manay S and Swamy S, Food Facts and Principles, New Age International (P) LtdPublishers, NewDelhi,2001.
Reference Books	1. Jood S and Khetarpaul N, Food preservation, Agrotech Publishing, Udaipur,2002 2. Manay S and SwamyM S, Foods: Facts and Principles, New Age International (P)Limited,Chennai,2005. 3. Swaminathan, M.Advanced Textbook on Food Science and Nutrition, Vol:2, Second edition, Reprinted, Bangalore Printing and publishing Co Inc, Bangalore,2003.

Mapping of Cos with POS & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	S	S	S	M	M	S	S
CO2	S	M	S	S	M	S	S	S	M	M	S	S
CO3	S	M	S	S	M	S	S	S	M	M	S	S
CO4	S	M	S	S	M	S	S	S	M	M	S	S
CO5	S	M	S	S	M	S	S	S	M	M	S	S

Strongly Correlating (S)	3 Marks	Moderately Correlating (M)	2 Marks
Weakly Correlating (W)	1 Mark	No Correlation (N)	0 Mark