MOTHER TERESA WOMEN'S UNIVERSITY

KODAIKANAL – 624 102

DEPARTMENT OF HOME SCIENCE

B.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)

Mother Teresa Women's University, Kodaikanal
Department of Home Science

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B.Sc. Foods and Nutrition

1. About the Programme

Foods and Nutrition specialization provides the students an in depth knowledge and skills for enhancing employability and entrepreneurship in all areas namely; Food Processing, Quality Control, Food safety, Nutrition and Dietetics. This programme facilitates to gain knowledge on concepts, theories, principles of food science, food service management, food preservation, interior decoration, child development, physiology, biochemistry, microbiology, basic nutrition, clinical nutrition, life span nutrition, medical nutrition therapy and public health nutrition related to the holistic development and wellness of the individual, family and community at large.

2. Programme Educational Objectives (PEOs)

PEO1	To disseminate knowledge to the students to shape a successful career in Foods and Nutrition.
PEO2	To equip the students with fundamental concepts to handle scientific challenges.
PEO3	To emphasize the need for skilled nutritionist in the modern scientific society.
PEO4	To create awareness regarding the professional demands and opportunities in the field of Foods and Nutrition.
PEO5	To motivate the students to move for higher studies and research to contribute scientifically to the society.

3. Program Outcomes (POs)

Upon completion of the B. Sc Foods and Nutrition Programme, the students will be able to	
Programme Outcomes (PO):	**PO1 -** gain an understanding of the association between food and health.
	PO2 - learn the preventive measures to overcome metabolic abnormalities.
	PO3 - acquire knowledge and skills in the pursuit of academic excellence aimed at advancement in this area of specialization and extension activities.
	PO4 - develop self-reliance through the balance of freedom and discipline within the body, mind, and spirit.
	PO5 - understand and apply nutritional assessment techniques.
	PO6 - integrate the broad aspect of food into dietetics practice.
	PO7 - impart nutrition counseling and education to individuals, groups, and communities. Acquire professional, vocational, and entrepreneurial skills for career design and development.

4. Programme Specific Outcomes (PSOs)

On completion of the Programme the students will be able to

Programme Specific Outcomes (PSO):	**PSO1** - appraise the quality of foods and nutrition and appreciate their significance for healthy living.
	PSO2 - apply food science knowledge to describe the function of ingredients food.
	PSO3 - apply technical skills, knowledge of health behavior, clinical judgment, and decision-making skills.
	PSO4 - assess and evaluate the nutritional status of individuals and communities and their response to nutrition intervention.
	PSO5 - educate the community on dietary modification based on the severity of illness and complications of the diseases.

5. Eligibility

i. Candidates for admission to the first year of the Degree of B. Sc-Foods and Nutrition shall be required to have passed the Higher Secondary Examinations (with the specialization-Chemistry/ Biology/ Home Science/Nursing/Science-based disciplines) conducted by the Government of Tamil Nadu or any recognized board.

ii. Candidate should have secured at least 55% in the above subject and above in the aggregate.

iii. A relaxation of 10% in the total percentage will be given to SC, ST candidates.

6. General Guidelines for UG Programme

i. **Duration:** The programme shall extend through a period of 6 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: Evaluation of the candidates shall be through Internal Assessment and External Examination.

7.1. Evaluation Pattern

METHODS OF EVALUATION		Maximum Marks Theory and Practical	Minimum Marks Theory and Practical
Internal Evaluation	Continuous Internal Assessment Test	**25 Marks**	**10 Marks**
	Assignments / Snap Test / Quiz		
	Seminars		
	Attendance and Class Participation		
External Evaluation	End Semester Examination	**75 Marks**	**30 Marks**
Total		**100 Marks**	**40 Marks**

*** Minimum credits required to pass: 140**

7.2. Internal Assessment-CIA

Theory Course: For theory courses there shall be three tests conducted by the concerned faculty, 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. Theory Question Paper Pattern (Bloom's Taxonomy Based-Common for all UG Programmes)

S. No.	Part	Type	Marks
1	**A**	**10*1 Marks=10** Multiple Choice Questions (MCQs): 2 questions from each Unit	**10**
2	**B**	**5*4=20** Two questions from each Unit with Internal Choice (either / or)	**20**
3	**C**	**3*15=45** Open Choice: Any three questions out of 5: one question from eachunit	**45**
Total Marks			**75**

7.4. Methods of Assessment

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 off beat situations, Discussion, Debating or Presentations

8. Project

8.1. Project Report

A student should select a topic for the Project Work at the end of the fifth semester itself and submit the Project Report at the end of the fourth semester. The Project Report shall not exceed 30 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 Letter 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 lesser 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 UG Programmes are a1so applicable to this programme.

13. Faculty Course File

a.	Academic Schedule	**q.**	Laboratory Experiments related to the Courses
b.	Students Name List	**r.**	Internal Question Paper
c.	Time Table	**s.**	External Question Paper
d.	Syllabus	**t.**	Sample Home Assignment Answer Sheets
e.	Lesson Plan	**u.**	Three best, three middle level and three average Answersheets
f.	Staff Workload	**v.**	Result Analysis (CO wise and whole class)
g.	Course Design (content, Course Outcomes (COs), Delivery method, mapping of COs with Programme Outcomes (POs), Assessment Pattern interms of Revised Bloom's Taxonomy).	**w.**	Question Bank for Higher studies Preparation (GATE/Placement)
h.	Sample CO Assessment Tools	**x.**	List of mentees and their academic achievements
i.	Faculty Course Assessment Report (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		

14. TEMPLATES FOR SYLLABUS FRAMEWORK FOR UG PROGRAMMES

As per TANSCHE – From 2023-24

SEMESTER – 1

Part	List of Courses	Credits	No. of Hours
Part-1	Language-1 – Tamil	3	6
Part-2	Language-2 – English	3	6
Part-3	Core-1: Theory	5	5
	Core-2: Theory / Practical (Depending on the Discipline)	5	5
	Elective-1 (Departmental Elective)	3	4
Part-4	Skill Enhancement Course SEC - 1 (Subject Based)	2	2
	Foundation Course (Subject Based)	2	2
Total		**23**	**30**

SEMESTER-II

Part	List of Courses	Credit	No. of Hours
Part-1	Language-1 – Tamil	3	6
Part-2	Language-2 – English	3	6
Part-3	Core-3: Theory	5	5
	Core-4: Theory/Practical (Depending on the Discipline)	5	5
	Elective-2 (Departmental Elective)	3	4
Part-4	Skill Enhancement Course -SEC - 2 (Soft Skills)	2	2
	Skill Enhancement Course -SEC - 3 (Subject Based)	2	2
	Total	**23**	**30**

15. Syllabus in Detail

MOTHER TERESA WOMEN'S UNIVERSITY, KODAIKANAL
Framework of the Syllabus to be implemented from the Academic Year 2023-2024
Curriculum Framework and Syllabus for

B.Sc. FOODS AND NUTRITION

(For the candidates to be admitted from the academic year 2023-2024 onwards)

Part	Paper Code	Course Title	Credits	Hours		Maximum Marks		
				T	P	(CIA)	(ESE)	Total
Semester I								
Part-I	U23TAL11	Language I-Tamil	3	6	-	25	75	100
Part-II	U23ENL21	English 2-English	3	6	-	25	75	100
Part-III	U23FNT11	Core Course I - Food science	5	5	-	25	75	100
	U23FNP11	Core Course II practical I - Food science practical	5	-	5	25	75	100
	U23FNE1A/ U23FNE1B/ U23FNE1C	Elective-I (Departmental Specific) A. Nutritional Biochemistry B. Food Processing Fundamentals C. Nutritional Counseling	3	4	-	25	75	100
Part-IV	U23FNS11	Skill Enhancement Course SEC-I (Subject based) Entrepreneurship Development	2	2	-	25	75	100
	U23FNF11	Foundation course (Subject based)- Food Safety and Quality Control	2	2	-	25	75	100
			23	**25**	**5**			
		Total	**23**	**30**				**700**
Semester II								
Part-I	U23TAL12	Language II-Tamil	3	6	-	25	75	100
Part-II	U23ENL22	English II-English	3	6	-	25	75	100
Part-III	U23FNT22	Core Course III Fundamentals of nutrition	5	5	-	25	75	100
	U23FNT23	Core Course IV Human physiology	5	5	-	25	75	100
	U23FNE2A/ U23FNE2B/ U23FNE2C	Elective-II (Departmental Specific) A. Diet for Diseases B. Children with Special Needs C. Nutrition and Fitness	3	4	-	25	75	100

Part-IV	U23FNS22	Skill Enhancement Course SEC-2 – Soft skills	2	-	2	25	75	100
	U23FNS23	Skill Enhancement course - SEC-3- (SubjectBased) - Food hygiene and sanitation	2	2	-	25	75	100
			23	**28**	**2**			
		Total	**23**	**30**				**700**

SEMESTER I

Course code	U23FNT11	FOOD SCIENCE	L	T	P	C
Core 1			5	-	-	5
Pre-requisite		Basic knowledge in Food Science	Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1) To know the role of food in health.
2) To enable students to obtain knowledge of different food groups and their contribution to nutrition.
3) To help them study the different methods of cooking and their advantages and disadvantages.
4) To enable the students to apply the process of different foods.
5) To enable them to gain experience in the preparation of foods with attention to the preservation of their nutritive value-oriented to Indian cooking.

Expected Course Outcomes:

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

CO1	The student will gain knowledge about energy requirements and the Recommended Dietary Allowances.	K2
CO2	Knowledge of nutritive value, understand the cooking quality factors, and develop skills in the preparation and storage of milk and egg products.	K2
CO3	Knowledge on nutritional classification, understand the changes in pigments and acquire skills in preserving nutrients and pigments in the processing and storage of vegetables and fruits.	K3
CO4	determine the smoking point of any cooking oils and the stages of sugar cookery	K4
CO5	Assess the effect of the addition of acid, fat, salt, water, and sugar on the texture of flesh foods quality.	K5

K1-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**–Create

Unit:1	Food groups	

Food definition, functions of food, food groups-: energy-yielding foods, body building foods, protective foods, classification, five food groups, seven food groups, balanced diet- definition, planning of balanced diet, Recommended Dietary Allowances (RDA) Dietary guidelines.

Unit:2	Cereals and Pulses	

Cereals: Structure and nutritive value of rice and wheat, Gelatinization, Process of milling and malting -wheat, Rice, Gluten formation, Nutritive value of millets - ragi, bajra. Pulses: Germination process, factors affecting the cooking quality of pulses, composition, nutritive value, and its advantages in cookery. Cereals-structure, nutritive value, classification, processing, milling, Pulses and legumes - nutritive value, processing in pulses, toxins in pulses.

Unit:3	Vegetables and Fruits Vegetables	

Vegetables and Fruits Vegetables – Selection of vegetables, Nutritive value, Changes in nutritive value before and after cooking, Effect of cooking on the vegetable pigments. - chlorophyll, carotenoids, anthocyanin, anthoxanthin. Fruits- Classification, nutritive value, ripening of fruits, Effect of browning and its prevention, Storage of fruits.

Unit:4	**Milk and meat products**	
Milk and Milk Products: Types of milk, pasteurization of milk, composition and nutritive value, milk products – cheese, paneer, and khoa Egg: Structure, composition and nutritive value, Qualitative determination of egg and its role in cookery. Meat: Structure, composition, and nutritive value of meat, the cutting process of meat, cooking changes in meat, and tenderness of the meat. Poultry-classification, Nutritive value, Selection and cooking methods poultry. Fish -selection of fish, Structure, composition, and nutritive value.		
Unit:5	**Fats and sugar**	
Fats, Sugar, Beverages and Spices Fats and Oils- composition of common fats and oils, smoking temperature, rancidity, and role of fats and oils in cookery. Sugar – Nutritive value, sugar-related products, stages of sugar cookery, Crystallization, Factors affecting crystallization. Beverages: classification, nutritive value - coffee, tea, cocoa, milk-based beverages, fruit juices, and aerated beverages. Spices and condiments – Types and use in Indian cookery, Medicinal value.		
Text Books		
1	Srilakshmi Food Science, Seventh Edition, New Age International Publishers, New Delhi, 2018	
2	Manay S and Swamy S, Food Facts and Principles, New Age International (P) Ltd Publishers, New Delhi, 2001	
Reference book		
1	Reddy SM, Basic Food Science and Technology, New Age Publishers, New Delhi, 2015	
2	Lowe B, Experimental cookery from chemical and physical stand point, forgotten books, UK, 2015	
3	Potter NM and Hotchkiss JH, Food Science, C.B.S. Publishers, New Delhi, reprint 2008	
4	Roday S, Food Science and Nutrition, Oxford university press, New Delhi, 2007	
5	McCance and Widdowson, Composition of food, 6th Edition, Food Standards Agency, 2004	

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S	M	S
CO4	S	S	S	S	M	S	S	S	S	S	S	S
CO5	S	M	S	S	S	S	S	S	S	S	S	S

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

Course code	U23FNP11	FOOD SCIENCE PRACTICAL	L	T	P	C
Core II			-	-	5	5
Pre-requisite		Basic Knowledge in cooking methods and nutrition	Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. To understand the advantages and disadvantages of cooking methods on the stability of nutrients.
2. To analyze the effect of processing and storage on the nutritional composition of foods.
3. To learn the factors influencing the cooking quality of different foods.

Expected Course Outcomes:

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

CO1	Understand the fundamentals of cereals, pulses, fruits &vegetable processing, equipment, and products.	K1
CO2	Demonstrate the different methods of cooking.	K2
CO3	Choose Appropriate Cooking Method to Conserve Nutrients.	K3
CO4	Evaluate the basic methods and principles involved in cooking.	K4
CO5	evaluate the change of pigment during cooking	K6

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit 1	Grouping of foods	

a) Basic 4, 5, 7, and 11, Meaning of foods – solids, liquids, and butter.
b) My plate

Familiarizing with laboratory equipment, procedure, and learn to weigh food ingredients

Unit:2	Experimental cookery of cereals	

Preparation of cereal products using rice, wheat, and ragi based on steaming, absorption, pressure cooking, and straining methods. Steaming, boiling, and pressure -cooking separation of the gluten content of Wheat.

Unit:3	Experimental cookery of Pulses	

Effect of Cooking in hard and soft water, alkali.

Unit:4	Experimental cookery of vegetables, Green leafy Vegetables	

Study on the effect of acid, alkali, heat, and time on the color, texture, and flavor.

Unit:5	Milk & Stages of Sugar Cookery	

Milk

Preparation of Paneer, Curd, and Whey water using different types of milk. (Identification of physical parameters of developed products)

Stages Of Sugar Cookery

Text Books		
1	Srilakshmi B Nutrition Science, New age International Pvt Ltd, 2017	
Reference Books		
1	Williams Aspden Practical Skills in Food Science, Nutrition and Dietetics, Pearson Education Limited, 2011	
2	Mohini Sethi. Eram S. Rao Food Science Experiments and Applications, Second Edition2019	

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

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

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

Course code	U23FNE1A	NUTRITIONAL BIOCHEMISTRY	L	T	P	C
Elective I (DepartmentalSpecific)			4	-	-	3
Pre-requisite		Knowledge on principles of biochemistry	Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Understand the principles of Biochemistry
2. Learn the knowledge on the effect of diet on health and the functions of biological systems in relation to Nutritional biochemistry

Expected Course Outcomes:

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

CO1	Students will understand the principles of biochemistry and also chemistry of major nutrients.	K2
CO2	The knowledge about the major metabolic pathways in human metabolism.	K2
CO3	The synthesis of nucleic acids and proteins.	K3
CO4	obtain complete knowledge on Enzyme and its application	K4
CO5	gain knowledge about the importance of vitamins and minerals in Human development.	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1 **Carbohydrates**

Carbohydrate Metabolism Definition, Classification of carbohydrates – Monosaccharide, Disaccharide, and polysaccharide. Metabolism – glycolytic pathway, Electron transport chain, glycogenesis, Glycogenolysis, and Gluconeogenesis. Disorder of carbohydrate metabolism-Diabetes mellitus.

Unit:2 **Proteins and lipids**

Protein metabolism Definition, Classification of protein, Structure, Physical properties, Chemical properties, Amino acids- Essential and non-essential.
Lipid metabolism Definition, Structure, Classification of lipids-Saturated, Unsaturated fatty acid, Bio-Synthesis of fatty acid. Lipoproteins: Types, composition, role, and significance in diseases.

Unit:3 **Enzyme**

Enzymes –definition, functions of enzymes, classification of enzymes, mechanism of enzyme action, regulation of enzyme action, factors affecting enzyme activity. Role of enzymes in different digestion and metabolic pathways.

Unit:4 **Water balance**

Water- composition of water in the human body, functions of water, water intake, Output, Balance, Dehydration: causes, and overcome measures, edema: causes, and preventive measures. Factors affecting water balance, Buffer system.

Unit:5 **Antioxidants**

Biochemical reactions in the human body, antioxidants and human health, free radical formation, antioxidant-rich foods, application of biochemistry in medicine & treatment in food science and nutrition.

Text Books	
1	Ramadevi K, Ed: Ambika Shanmugam's 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.
3	Sulochana H, Principles of Biochemistry, PBS enterprises, Chennai, 2010
Reference Books	
1	Cox MM and Nelson DL, Lehninger Principles of biochemistry, 5th edition, EH Freman&Company, New York, 2008
2	Vasudevan DM, Sreekumari S, Textbook of Biochemistry, 5th edition, Jaypee Publishers, New Delhi, 2007.
3	Veera Kumari L, Biochemistry, 1st edition, MJP Publishers, 2005.

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

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

*S-Strong; M-Medium; L-Low

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

Course code	U23FNE1B	FOOD PROCESSING FUNDAMENTALS	L	T	P	C
Elective I (DepartmentalSpecific)			4	-	-	3
Pre-requisite		Basic Knowledge about Food Processing	Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Plan a processing method to increase the shelf life using Thermal and non-thermal methods of processing techniques.
2. Choose the best processing techniques to be used for a specific group of products.

Expected Course Outcomes:

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

CO1	Understand the pre-and post-harvest technology	K6
CO2	Different processing methods	K2
CO3	Various techniques in food processing	K2
CO4	Chemical preservation methods	K5
CO5	Thermal processing methods	K3

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1	Pre- and post-harvest processing	

Pre-and post-harvest processing: concepts, principles, advantages of pre-and post-harvest processing, nature of harvested crop, plant, and animal products. Maturity index – definition, principle, Assessment methods for various crops. Principles of storage: storage of grains – conditions and effects of cold storage on quality.

Unit:2	Processing and preservation	

Processing and preservation by heat: Blanching, Pasteurization, sterilization and UHT processing, canning, extrusion cooking, dielectric heating, microwave heating, roasting, and frying. Retort processing. Drying – types, principles, drying curve, water activity, and microbial spoilage due to moisture. Dehydration of fruits, vegetables, and animal products – ultra filtration, reverse osmosis

Unit:3	Different preservation	

Different preservation and processing methods: the objective of preservation, advantages of food preservation. Preservation using low temperature: Refrigeration, freezing, CA, MA & freeze-drying principles, mechanism of action, and effect on the quality of food product quality, advantages, and disadvantages

Unit:4	Other preservation methods	

Food irradiation and chemical preservation: Food irradiation regulations in food irradiation. Food additives and chemical preservatives: natural preservatives: honey, salt, sugar, oil and chemical preservatives, GRAS and permissible limits for chemical preservatives, advantages, and disadvantages.

Unit:5	Non-thermal methods	

Processing and principles using non-thermal methods: High-pressure processing, Use, and application of enzymes and microorganisms in processing and preservation of foods. Food

fermentation: objectives, principles, advantages of fermentation, fermented foods, pickling, and smoking.	
Text Books	
1	Rao, M.A., S.S.H. Rizvi, and A.K. Datta ―Engineering Properties of Rood¦, 3rd Edition, Taylor & Francis,2005
2	Majumdar, A.S. ―Dehydration of Products of Biological Origin¦, Oxford & IBH Publication,2004
3	Fellows, P.J. Food processing technology: Principle and Practice. 2nd Ed. CRC Publishers, 2005
Reference Books	
1	Desrosier NW & James N. Technology of food preservation. AVI. Publishers, 2007
2	Das, H. ―Food Processing Operations Analysis¦, Asian Books, 2005

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

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

*S-Strong; M-Medium; L-Low

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

Course code	U23FNE1C	NUTRITIONAL COUNSELLING	L	T	P	C
Elective I (DepartmentalSpecific)			4	-	-	3
Pre-requisite		Basic knowledge on counseling	Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. To learn the basic concept of nutrition counselling
2. To enrich the different types of counseling and the importance of diet counselling

Expected Course Outcomes:

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

CO1	To gain knowledge about the role of dietician in nutritional counselling	K2
CO2	To learn about types of dietician roles.	K2
CO3	Planning of diet in Diabetes mellitus.	K3
CO4	Planning of diet in Pregnant women.	K3
CO5	Create skill development in planning diets using food exchange lists	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1 **Nutritional counselling**

Nutritional counselling: Meaning, needs, and types of nutritional counseling planning of diet and their importance, techniques, and qualities of nutritional counseling. Nutritional counselling in health management, technology in nutritional counselling, applications of video, posters telephonic conversation in online diet counselling.

Unit:2 **Dietician roles**

The Dietician a) Classification b) Code of ethics c) Responsibility d) The dietician in India e) Indian dietetic association f) Technology in diet counselling- usage of mobile applications in diet counselling.

Unit:3 **Disease specific diet counselling**

Nutritional counseling for cardiovascular patients, diabetes mellitus, malnourished pregnant women, obese person, anemic person: counselling based on disease, age of the patient, educational status of the patient, stages of disease condition, complications of disease condition, new diet adaptation, and other issues.

Unit:4 **Assessment needs of patients**

Assessment – Assessment of needs of patients, Communication process, Patient Education. Anthropometrical profile of the patient, biochemical parameters of the patients, clinical status, and their type of dietary pattern also assessed the previous nutritional status of the patient screening.

Unit:5 **Community-based counselling**

Counseling for communities: definition, objectives of community-based counselling, the importance of counselling to the community, planning, and Organizing counseling Camps for a specific disease, counselling for nutritional deficiencies, counselling for vulnerable groups, tools used for counselling to the community.

Text Books

1	Srilakshmi, Dietetics Eight Edition, New age international (p) Ltd .2014
2	Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indian foods, NIN, Hyderabad, 2010

Reference Books	
1	Ruth A. Roth, Nutrition Diet therapy sixth Edition, New age international (p) Ltd.2013
2	Kaveri Chakravarthy. A. S Text book of Nutrition in health anddisease.2016
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

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

CO/PO	PO1	PO2	PO3	PO4	PO 5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	M	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	S	

*S-Strong; M-Medium; L-Low

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

Course code	U23FNS11	ENTREPRENEURSHIP DEVELOPMENT	L	T	P	C
Skill Enhancement Course–1-SEC-1 (Subject based)			2	-	-	2
Pre-requisite		Basic knowledge about entrepreneurship	Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Create awareness about entrepreneurship as an effective to a "White-collar job".
2. Students can acquire knowledge by taking them to trade fairs to collect information on industrial products of interest.

Expected Course Outcomes:

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

CO1	Have an ability to discern and distinct entrepreneurial traits.	K2
CO2	Understand the systematic process to select and screen a business idea.	K4
CO3	to assess opportunities and constraints for new business ideas	K4
CO4	Design strategies for successful entrepreneurs.	K5
CO5	Write a business plan.	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1	Entrepreneurship	

Entrepreneurship – meaning, importance, types – the role of entrepreneurs in economic development, need, the transition from income generation to self-employment, and Entrepreneurship. Qualities of a good entrepreneur. Problems of entrepreneurs, qualities of an entrepreneur – entrepreneur as a career.

Unit:2	Factors influencing entrepreneurial development	

Factors influencing entrepreneurial development – Economic, legal, social and psychological factors. How to start a business – production, selection – a form of ownership plant location – land, building, water, and power – raw materials – machinery – manpower – other infrastructural facilities– Licensing, registration, and local bye-laws.

Unit:3	Agencies supporting Entrepreneurial Development Programme	

Agencies supporting Entrepreneurial Development Programme Institutional Arrangement for Entrepreneurship development – D.I.C., TIIC, S.I.D.C.O, N.S.I.C., S.I.S.I – Institutional Finance to Entrepreneurs – T.I.I.C., S.I.D.B.I.
Commercial Banks – Incentives to small-scale industries.

Unit:4	Project proposal	

Project proposal – Proposal format and content steps in its preparation, Feasibility testing, SWOT analysis. Project report – Meaning and Importance – Project Identification – Contents of a project report – (as per requirements of Financial Feasibility and Economic Feasibility – Break-Even Analysis.

Unit:5	Entrepreneurship in food product development	

Entrepreneurship developments in food product developments, functions, significance. Case histories of successful entrepreneurs – Entrepreneurship development in India – Women Entrepreneurship in India -Sickness in small scale industries and their remedial measures.

Text Books	
1	Chaiwallah S.A. Sales Management, Himalayan Publishing House New Delhi, 1999.
2	Dr.N.Rajan Nair, Sajith R. Nair Marketing, Sutanch and Sons, New Delhi, 2002

Reference Books	
1	Vasant Desai, Project Management and entrepreneurship, Himalaya Publishing House, New Delhi, 2000
2	David H. Moll, Entrepreneurship, prentice Hall of India, New Delhi 1999.
3	Frank Jerkins, Advertising, prentice Hall of India, New Delhi, 2000.

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

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

*S-Strong; M-Medium; L-Low

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

Course code	U23FNF11	FOOD SAFETY AND QUALITY CONTROL	L	T	P	C
Foundation Course (Subject based)			2	-	-	2
Pre-requisite		Basic knowledge on food safety and quality control	Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Acquire knowledge on food safety and food laws
   Study about quality control and common food standards.

Expected Course Outcomes:

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

CO1	Discuss different food safety and quality aspects.	K2
CO2	gain knowledge on food safety and food laws and study about quality	K2
CO3	Identify objectives, Importance, functions of quality control stages of quality control.	K4
CO4	Apply safety principles related to the food industry.	K3
CO5	Analyze basic principles of HACCP, SQF, and ISO and sanitation.	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1	Food safety concept	15 hours

Importance of food safety in the food processing industry Risk classification, National and international food regulatory agencies, General food laws and food safety regulations, Nutritional labeling regulation (mandatory and optional nutrients, nutritional descriptors, and approved health claims); Microbial contamination (including cross-contamination/indirect contamination) Chemical contamination, Physical contamination, Allergen contamination.

Unit:2	Food Safety Programs	15 hours

Definitions and importance, Good Manufacturing Practices, (GMPs), 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 Maintenance Program, Education and Training Program.

Unit:3	Food adulteration	15 hours

Adulteration of food - common adulterants and tests to detect common adulterants. Cereals and products - bread, biscuits, cakes products. Fruits Products: Jam, juices, squashes, ketchup, sauce. Oils and Fats: Coconut oil, groundnut oil, palm oil, sunflower oil, Vanaspati. Milk and Products: Skimmed milk powder, partly skimmed milk powder, condensed sweetened milk. Other products - coffee, tea, sugar, honey, toffees.

Unit:4	Hygiene and Sanitary Practices	15 hours

Personal Hygiene - Health Requirements - Location and Surroundings of Food Industry - Slaughter House - Good Manufacturing Practices - Good Food Hygiene Practices -

Storage. The food safety concepts, importance, and its significance, food safety, and hygiene in different foods.		
Unit:5	**National and International laws**	**15 hours**
FAO/WHO, FSSAI Codex Alimentarius commission, fair average quality (FAQ) specification for food grains, ISO 22000 series. HACCP: Background, current status, structured approach, principles, benefits, and limitations. Consumer Protection Act(CPA).		
	Total Lecture hours	**75 hours**

Text Books	
1	Sather A.Y A first course in food analysis, New Age Publications, New Delhi 1999
2	2. Redman, Nina. Food safety: a reference handbook. ABC-CLIO, 2007.
Reference Books	
1	Motarjemi, Yasmine, Gerald Moy, and Ewen Todd, eds. Encyclopedia of food safety. Academic Press, 2013.
2	Roberts, Cynthia A. The food safety information handbook. Greenwood Publishing Group, 2001
3	Motarjemi, Yasmine, and Huub Lelieveld, eds. Food safety management: a practical guide for the food industry. Academic Press, 2013

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

CO / PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO 6**	**PO7**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO2	M	**S**	S	**S**	**S**	**S**	S	**S**	S	**M**	**S**	S
CO3	S	**S**	S	**S**	**M**	**S**	S	**S**	S	**S**	**S**	S
CO4	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**M**	S
CO5	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S

*S-Strong; M-Medium; L-Low

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

SEMESTER II

Course code	U23FNT22	FUNDAMENTALS OF NUTRITION	L	T	P	C
Core III			5	-	-	5
Pre-requisite		Basic Knowledge About nutrients and their functions	Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Enable the students to learn the basic nutrients and their functions.
2. Enrich the students to familiarize the RDA and deficiency of nutrients.
3. Understand the sources of nutrients, the role of nutrients in the maintenance of good health.

Expected Course Outcomes:

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

CO1	Understand the role of food and nutrients in health and disease prevention.	K1
CO2	Develop competence to carry out investigations in nutrition.	K2
CO3	Development of a balanced diet to improve the general wellness of an individual.	K3
CO4	Understand functions of physiological systems as related to nutrition.	K4
CO5	Evaluate nutrition information based on scientific reasoning for clinical and community application.	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1	Energy	

Energy – a unit of energy, determination of energy, Contents of food, Basal Metabolic Rate (BMR), energy requirement (ICMR) of various age groups and sources.

Carbohydrates – classification, functions in the body, digestion, absorption and utilization, sources, requirements. Dietary fibre - Classification, sources, Requirements, and physiological importance.

Unit:2	Protein	

Protein – classification, functions in the body, digestion, absorption, utilization, sources, and requirements. Essential and non-essential amino acids, Protein Energy Malnutrition (PEM) –causes, prevention, and treatment.

Unit:3	Lipids	

Lipids – simple lipids, compound lipids, derived lipids, classification, functions, digestion, essential fatty acids, absorption, utilization, sources, and requirements. Lipids in our daily diet, the role of lipids in various diseases.

Unit:4	Fat-soluble vitamins	

Fat-soluble vitamins: A, D, E, K: Functions, digestion and absorption, RDA, food sources, and deficiency diseases.

Water-soluble vitamins: Vitamin B1, B2, B4, B6, B12, and C: Functions, digestion and absorption, RDA, food sources, and deficiency diseases.

Unit:5	Micro and Macro minerals	

Macro minerals: Calcium, phosphorus, magnesium, sodium, and potassium: functions, requirements, deficiency and toxicity.

Micro minerals: Iron, copper, zinc, manganese, iodine, fluoride: Function, Requirements, Deficiency &toxicity

Text Books	
1	Srilakshmi B Nutrition Science, New Age International Pvt Ltd.2017
Reference Books	
1	Paul S Bio Nutrition, Fundamental, and Management, RBSA Publishers, 2003
2	Kango m Normal Nutrition, Curing disease through diet, Third Edition, CBS Publication, 2005
3	Benjamin Caballero et.al Encyclopedia of Human Nutrition, Second Edition, Elsevier Limited, 2005
4	Mahtab S, Bamji, Kamala et.al Text Book of Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi, 2015
5	Sumati R Mudambi et.al Fundamentals of Foods, Nutrition and Diet Therapy, New age International (P)Ltd, 2020

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO2	PSO3	PSO4	PSO5
CO1	S	**S**	M	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO2	S	**S**	S	**S**	**S**	**S**	M	**S**	S	**S**	**S**	S
CO3	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**M**	S
CO4	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO5	M	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S

*S-Strong; M-Medium; L-Low

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

Course code	U23FNT23	HUMAN PHYSIOLOGY	L	T	P	C
Core IV			5	-	-	5
Pre-requisite		Basic Knowledge About human physiology	Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. Enable students to understand the structure and physiology of various organs in the body.
2. Help students to obtain a better understanding of the principles of nutrition and dietetics through the study of physiology.

Expected Course Outcomes:

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

CO1	Understand the Structure and Functions of the various organ systems of the body.	K2
CO2	Compare the digestive and excretory systems and infer the mechanisms of digestion and excretion in human beings.	K2
CO3	Relate the Structure with Functions of the tissues and organs.	K3
CO4	Comprehend the Mechanism of Action of Organs.	K4
CO5	Discuss the role of hormones and functions of human reproductive System.	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1	Cell	

Cell – structure, types of tissue, cell functions.
Digestive system –mouth, tongue, salivary glands, esophagus, stomach, small intestine, large intestine: Structure, functions, movements (Deglutition, peristalsis) and secretion of the gastrointestinal tract (Various enzymes and indigestion).

Unit:2	Respiratory system	

Respiratory system external organs of the respiratory system- nasal cavity, respiratory organ, parts of the respiratory system, structure, functions of the respiratory system, mechanism of the respiratory system, transport of gases.

Unit:3	Circulatory system	

Circulatory system – Composition of blood – the structure of the heart and its working mechanism – conduction of heartbeat.
Excretion organ – general organization (including the structure of kidney, nephron, mechanism of urine formation).

Unit:4	Sense Organs	

Sense Organs – tongue, nose Eye, Ear, Skin: structure, functions, and its importance. Nervous system – Central nervous system – autonomic nervous system: structure of the brain, the role of the spinal cord.

Unit:5	Endocrine gland	

Endocrine gland: definition, functions, hormones, Pituitary, Adrenal, Thyroid, ACTH, Parathyroid, and sex glands - Structure. Functions of ductless glands, location, hormone secretion, hyper, and hyposecretion its effect

Text Books	
1	M. Arumugam, Human physiology, Saras Publication, 2016
Reference Books	
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 Devananda V, Textbook of Physiology, First edition, CBS Publishers and Distributors Pvt Ltd, New Delhi, 2013
5	Boron WF and Boulais EL, Medical Physiology, IIedition, Saunders Elsevier, 2009

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

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

*S-Strong; M-Medium; L-Low

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

Course code	U23FNE2A	DIET FOR DISEASES	L	T	P	C
Elective II (Departmental Specific)			4	-	-	3
Pre-requisite		Basic Knowledge About disease and its diet	Syllabus Version		2023-2024	

Course Objectives:

1. To develop capacity and aptitude in taking up dietetics as a profession.
2. Understanding the consequences of nutritional problems in the society.
3. Create awareness on community nutrition-based programmes.

Expected Course Outcomes:

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

CO1	Plan and prepare a standardized hospital diet for the needed patients.	K2
CO2	Understand the concept, purpose, and principles of diet therapy and the role and types of dieticians.	K2
CO3	Apply various deficiency disorders concerning their prevalence, causes, symptoms, and preventive measures.	K3
CO4	Discuss the kinds of commercial formulas available for oral and enteral feedings.	K4
CO5	Compare the food exchange list in the control of diabetes and complications.	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1 **Concept of diet therapy**

Concept of diet therapy: Purpose and principle of therapeutic diets, modification of normal diet, classification of therapeutic diets, routine hospital diets: clear fluid, full fluid, semi-fluid, semi-solid, solid. Different feeding techniques - oral feeding, tube feeding, parenteral feeding, the role of dieticians in nutritional care.

Unit:2 **Fever diet**

Fever: Causes, symptoms, dietary management: Febrile disease acute – Typhoid, influenza, malaria, chronic – tuberculosis: epidemiology, causes microorganism involved in fever, symptoms, complications, diagnosis, dietary recommendations and foods included and avoided.

Unit:3 **Gastro intestinal diseases**

Diseases of upper-gastrointestinal tract: Causes, pathogenesis, dietary modification, and diet planning for Gastritis, Peptic ulcer, Diseases of lower-intestinal tract: Causes, pathogenesis, dietary modification, and diet planning for diarrhoea, dysentery, Constipation Haemorrhoids, Surgery of colon – gastrostomy, jejunostomy, and cancer of the colon
The disease of liver – hepatitis, cirrhosis, gall bladder diseases

Unit:4 **Life style associated diseases**

a. Diabetes mellitus: Causes symptoms and food exchange list, dietary treatment for Diabetes mellitus.
b. Cardio vascular diseases – hypertension, atherosclerosis, congestive cardiac failure, and sodium-restricted diet in causes symptoms and dietary treatment.
c. Obesity and leanness – causes symptoms and dietary treatment.

Unit:5 **Renal diseases and others**

Diseases of the excretory system– nephritis, nephrotic syndrome, urinary calculi, renal failure.
Diet in allergy – definition, classification, food allergies. Test for allergy, dietetic treatment.

Cancer – causes symptoms of dietary treatment.	
Text Books	
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.
Reference Books	
1.	Stacy N, William's Basic Nutrition and Diet Therapy, 12th edition, Elsevier publications, UK, 2005.
2.	Elia M, Ljunggvist O, Stratton RJ, Lanham SA, Clinical Nutrition (The Nutrition Society Textbook), 2nd edition, Wiley Blackwell Publishers, 2013
3.	Mahan LK, Stump SE, and Raymond JL, Krause's Food and Nutrition Care Process, 13th Edition, Elsevier Saunders, 2004

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	M	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	M	S	S	S

*S-Strong; M-Medium; L-Low

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

Course code	U23FNE2B	CHILDREN WITH SPECIAL NEEDS	L	T	P	C
Elective II (Departmental Specific)			4	-	-	3
Pre-requisite		**Basic Knowledge in Child Care**	**Syllabus Version**		**2023-2024**	

Course Objectives:

The main objectives of this course are to:

1. Acquire knowledge about the special needs of exceptional children and the methods of satisfying their needs
2. Acquire skills in guiding the parents of exceptional children.

Expected Course Outcomes:

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

CO1	empathize the needs of exceptional children	K3
CO2	familiarize with the educational provisions of exceptional children	K2
CO3	Gain skills in identifying children with special needs.	K4
CO4	Understand the special needs of exceptional children	K2
CO5	Identifying the methods to satisfy the need of exceptional children.	K3

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1	**Children with special needs**	

Children with Special needs: Meaning, Types, Characteristics, History of Education of Exceptional Children. Special educators – their qualities and qualifications. Defining disabilities, Models of disability Classifying disabilities, the social construction of disability, Demography, Rights of Children with Disabilities.

Unit:2	**Common childhood disabilities**	

Common Childhood Disabilities –definition, methods of identification, assessment methods, and etiology with reference to Locomotor disability, Visual disability, Auditory and speech disability, Intellectual disability, Autism, and Learning Disability.

Unit:3	**Children with disabilities**	

Children with Disabilities and Society - Families of children with disability, Prevention, and management of different disabilities, physically Challenged Children: Orthopedically Handicapped – types, educational practices- Special education and inclusion, Policy and programmes and Policies for children with disabilities.

Unit:4	**Programmes**	

Programmes and Policies for children with disabilities -The Indian Constitution, National Policy for Persons with Disabilities 2006, The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act 1995, The Rehabilitation Council of India Act 1992, The National Trust for Welfare of Persons with Autism, Cerebral Palsy, Mental Retardation, and Multiple Disabilities Act 1999. Legal Rights of the Disabled in India, Role of Important Institutions laws.

Unit:5	**Characteristics and educational needs**	

Characteristics and educational needs– types, characteristics, and educational needs, Speech challenged – types, characteristics, and educational needs, Assistive technology - meaning, need, types benefits - the barriers to assistive technology. Scheme of Assistance to Disabled Persons for Purchase/ Fitting of Aids & Appliances (ADIP).	
Text Books	
1	Mangal S.K., "Educating Exception Children", PHI Learning Private Limited, New Delhi, 2009
2	Reddy G.L, and Sujatha J., "Children with Disabilities" Discovery Publishing House, New Delhi,2006
3	Reddy S.K.," Educating of Children with Special Needs" Discovery publishing House, New Delhi 2007
Reference Books	
1	Reddy L., Ramar R., and Kusuma A. "Hearing Impairment-An Educational Consideration", Discovery Publications, New Delhi 2004
2	Relakar S., Delvi U., and Kaut A. "Fundamentals of speech and speech teaching" 2006
3	Sharma K., "Rehabilitation of Hearing-Impaired Children", Sarup and Sons, New Delhi, 2006

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

CO/PO	PO 1	PO2	PO 3	PO4	PO5	PO6	PO 7	PSO 1	PSO 2	PSO 3	PSO 4
CO1	S	**S**	M	**S**	**S**	**S**	S	**S**	S	**S**	**M**
CO2	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**M**	**M**
CO3	S	**S**	S	**M**	**S**	**S**	S	**S**	S	**S**	**S**
CO4	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**
CO5	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**

*S-Strong; M-Medium; L-Low

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

Course Code	U23FNE2C	NUTRITION AND FITNESS	L	T	P	C
Elective II (Departmental Specific)			4	-	-	3
Pre-requisite		**Basic knowledge health and wellness**	**Syllabus Version**		**2023-2024**	

Course Objectives:

The main objectives of this course are to:

1. Learn about the importance of Nutrition in sports personnel.
2. find out the sources of generation of energy for muscle and force generation.

Expected Course Outcomes:

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

CO1	Outline the self-responsibility for personal health and wellness.	K2
CO2	Analyze the role ole of nutrition in sports.	K4
CO3	Discuss the various parameters used to find health status.	K2
CO4	Evaluate the effect of exercise on various nutrient metabolisms.	K3
CO5	Compare different exercise methods and learn their application.	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1	**Body composition**	

Body composition and fitness Body Composition- classification (Fat mass and fat-free mass) and its components, factors influencing body mass composition. Techniques for measuring body composition Fitness-definition, parameters of fitness- cardiovascular endurance, muscular strength, muscular endurance, flexibility, and body composition

Unit:2	**Assessment of exercise**	

Assessment and benefit of exercise- physiological, psychological, and sociological. Physical activity guidelines. Assessing personal fitness- pre-participation, screening, and risk assessment. Role of exercise in disease prevention – diabetes, cardiovascular disease, obesity, bone health, and cancer**.**

Unit:3	**Energy system**	

Energy systems and electrolyte balance Reviews of different energy systems for endurance and power activity- Fuels and nutrients to support physical activity. Shifts in carbohydrate and fat metabolism, mobilization of fat stores during exercise. Water and electrolyte balance- Losses and their replenishment during exercise and sports events, the effect of dehydration, sports drinks

Unit:4	**Nutrition for sportspersons**	

Nutrition for sports person Definition, physiological and significant changes during exercise, types of stress faced by sports persons, nutrition needs of sports persons-macro and micronutrient needs, the role of water and electrolytes. Role of nutrition and recommendations – pre-exercise, during, and post-exercise Nutrition supplement and ergogenic aids**.**

Unit:5	**Yoga and fitness**	

Yoga and nutrition fitness in special conditions 5.1 Yoga and fitness- effects on general vitality and immune, endocrine, neurons, digestion, and muscular systems, dietary pattern. Awareness about the alternative systems for health and fitness like Ayurveda, yoga, vegetarianism, and traditional diets.	
Text Books	
1	Bean A, The Complete Guide to Sports Nutrition, 7th edition, Bloomsbury, London, 2013.
2	Srilakshmi B, Suganthi V, Ashok CK. Exercise physiology, fitness and Sports Nutrition. New
Reference Books	
1	Dunford M, Fundamentals of Sports and Exercise Nutrition, Human Kinetics, Illinois, 2010
2	Maughan RJ, Burke LM, Handbook of Sports Medicine & Science- Sports Nutrition, Blackwell Science publications, 2002
3	Jeukendrup A and Gleeson M, Sports Nutrition: An introduction to energy production and performance, Human Kinetics publishers, 2004

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

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

*S-Strong; M-Medium; L-Low

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

Course code	U23FNS23	FOOD HYGIENE AND SANITATION	L	T	P	C
Skill Enhancement Course - SEC-3 (SubjectBased)			2	-	-	2
Pre-requisite		Basic knowledge in food hygiene and sanitation	Syllabus Version		2023-2024	

Course Objectives:

The main objectives of this course are to:

1. study the Introduction to sanitation and public health related to the foodservice industry which includes potential hazards that may occur in the operation and production of food.

Expected Course Outcomes:

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

CO1	Classify the common kinds of physical/chemical contamination and simple measures to prevent food poisoning.	K1
CO2	Explain how high standards of personal hygiene for food handlers can be achieved.	K2
CO3	Define integrates practices for economic control of pests	K1
CO4	Design food hygiene and sanitation measures to control the spread of microorganisms.	K6
CO5	Criteria to fulfil water safety and environmental requirements.	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1 Food hygiene

Food hygiene: Importance of food safety in the food processing industry, Risk classification, Microbial contamination (including cross-contamination/indirect contamination) Chemical contamination, Physical contamination, Allergen contamination. Sanitation Overview Sanitary Regulations: Definition, Types of Hygiene and sanitation.

Unit:2 Personal hygiene

Personal hygiene: General principle of food hygiene and food handling habits, Importance of worker hygiene, health status, illness and injuries, Personal cleanliness and behavior, visitors, hygiene verification, Hand washing procedure. Personal hygiene of the food handler, Program of Good Health For Food handlers, oots of Contamination, safety measures for food service personnel. • Care maintenance of Protective Clothing.

Unit:3 Insect and pest control

Insect and pest control: Importance of Pest Control in the food industry, Pest

Classification (insects, rodents, and birds), Problems caused by pests, Prevention and effective control measures, Integrated pest management system, and tools. Food Storage Sanitation; Food Transport Sanitation, Pest Control, Packaging Sanitation, Waste Product Disposal.

Unit:4 Cleaning and sanitation

Cleaning and sanitation: Importance of cleaning technology, general cleaning and sanitary considerations, sanitation principle and the requirements for a food sanitation program, cleaning agents: different types of cleaning agents, Sanitizing agents, Equipment and systems, Evaluation of sanitation efficacy.

Unit:5 Water supply and Infrastructure

Water supply and Infrastructure: Sanitary aspects of building, Plant layout and design, Water in the food industry, water sources, water uses, Water quality, Purification and disinfection of water, water treatments, water quality standards, Drinking water specifications, Pollution Control, Waterborne diseases, airborne diseases preventing measure for diseases.	
Text Books	
1	Bryan, F.L. Hazard Analysis Critical Control Point Evaluations A Guide to Identifying Hazards and Assessing Risks Associated with Food Preparation and Storage. World Health Organization, Geneva, 2000.
2	Frazier. W., Food Microbiology, McGraw-Hill co Ltd, New Delhi.2015
3	Adams M, R and Moss M, O., Food Microbiology, New Age International (P) Ltd., New Delhi, 2015.
Reference Books	
1	Vijaya Ramesh, Food Microbiology, MJP Publications, 2007.
2	David, A. Shapton, and Naroh F. Shapton Principles and Practices for the Safe Processing of Foods, Heineman Ltd., Oxford, 2011.

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	M	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S
CO3	M	S	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	S	S	S	S	S	S

*S-Strong; M-Medium; L-Low

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