

B.Sc., FOOD SCIENCE & NUTRITION

Syllabus

Program Code: UFN

2023 - Onwards



MANNAR THIRUMALAI NAICKER COLLEGE

(AUTONOMOUS)

Re-accredited with "A" Grade by NAAC

PASUMALAI, MADURAI – 625 004

**GUIDLINES FOR OUTCOME BASED EDUCATION WITH CHOICE BASED
CREDIT SYSTEM**

(FOR UG PROGRAM FROM 2023 -2024 ONWARDS)

ELIGIBILITY FOR ADMISSION

Candidates seeking admission to the UG Degree program must have passed the Higher Secondary Education (respective groups – Arts / Science) of the Government of Tamil Nadu or any other state or its equivalent qualification.

DURATION OF THE COURSE

The duration of the course shall be three academic years comprising six semesters with two semesters in each academic year.

Subjects of Study

Part I : Tamil / Hindi /

Part II : English

Part III:

- 1.Core Subjects
- 2.Allied Subjects
- 3.Electives

Part IV:

- 1.Non Major Electives (I Year)
- 2.Skill Based Subjects
- 3.Environmental Studies - Mandatory Subject
- 4.Value Education - Mandatory Subject

Part V :

Extension Activities

ARTS & SCIENCE

CBCS COURSE STRUCTURE FOR UG PROGRAMS

Sem I	Credit	Sem II	Credit	Sem III	Credit	Sem IV	Credit	Sem V	Credit	Sem VI	Credit
1.1. Language - Tamil	3	2.1. Language - Tamil	3	3.1. Language - Tamil	3	4.1. Language - Tamil	3	5.1 Core Course - \CC IX	4	6.1 Core Course - CC XIII	4
1.2 English	3	2.2 English	3	3.2 English	3	4.2 English	3	5.2 Core Course - CC X	4	6.2 Core Course - CC XIV	4
1.3 Core Course - CC I	4	2.3 Core Course - CC III	4	3.3 Core Course - CC V	4	4.3 Core Course - CC VII Core Industry Module	4	5.3. Core Course - CC -XI	4	6.3 Core Course - CC XV	4
1.4 Core Course - CC II	4	2.4 Core Course - CC IV	4	3.4 Core Course - CC VI	4	4.4 Core Course - CC VIII	4	5.3. Core Course - / Project with viva-voce CC - XII	4	6.4 Elective -VII Generic/ Discipline Specific	3
1.5 Elective I Generic/ Discipline Specific	3	2.5 Elective II Generic/ Discipline Specific	3	3.5 Elective III Generic/ Discipline Specific	3	4.5 Elective IV Generic/ Discipline Specific	3	5.4 Elective V Generic/ Discipline Specific	3	6.5 Elective VIII Generic/ Discipline Specific	3
1.6 Skill Enhancement Course SEC-1 (NME)	2	2.6 Skill Enhancement Course SEC-2 (NME)	2	3.6 Skill Enhancement Course SEC-4, (Entrepreneurial Skill)	1	4.6 Skill Enhancement Course SEC-6	2	5.5 Elective VI Generic/ Discipline Specific	3	6.6 Extension Activity	1
1.7 Ability Enhancement Compulsory Course (AECC) Soft Skill-1	2	2.7 Skill Enhancement Course - SEC-3(NME)	2	3.7 Skill Enhancement Course SEC-5	2	4.7 Skill Enhancement Course SEC-7	2	5.6 Value Education	2	6.7 Professional Competency Skill	2
1.8 Skill Enhancement - (Foundation Course)	2	2.8 Ability Enhancement Compulsory Course (AECC) Soft Skill-2	2	3.7 Ability Enhancement Compulsory Course (AECC) Soft Skill-3	2	4.7 Ability Enhancement Compulsory Course (AECC) Soft Skill-4	2	5.5 Summer Internship /Industrial Training	2		
				3.8 E.V.S	-	4.8 E.V.S	2				
	23		23		22		25		26		21
Total Credit Points											140

**QUESTION PAPER PATTERN FOR THE CONTINUOUS INTERNAL
ASSESSMENT**

Note: Duration – 1 hour

(FOR PART I, PART II & PART III)

The components for continuous internal assessment are:

Part –A

Four multiple choice questions (answer all) 4 x 01= 04 Marks

Part –B

Two questions ('either or 'type) 2 x 05= 10 Marks

Part –C

Two questions ('either or 'type) 2 x 08=16 Marks

Total 30 Marks

THE COMPONENTS FOR CONTINUOUS INTERNAL ASSESSMENT ARE:

(60 Marks of two continuous internal assessments will be converted to 15 marks)

Two tests and their average --15 marks

Seminar /Group discussion / Quiz Test --5 marks

Assignment --5 marks

Total 25 Marks

QUESTION PAPER PATTERN FOR THE SUMMATIVE EXAMINATIONS:

Note: Duration- 3 hours

Part –A

Ten multiple choice questions 10 x 01 = 10 Marks

No Unit shall be omitted: not more than two questions from each unit.)

Part –B

Five Paragraph questions ('either or 'type) 5 x 05 = 25 Marks

(One question from each Unit)

Part –C

Five Paragraph questions ('either or 'type) 5 x 08 = 40 Marks

(One question from each Unit)

Total -----
75 Marks

PART-IV- SKILL BASED PAPERS / NME:

The Scheme of Examination for Skill Based Papers: (Except Practical Lab Subjects)

QUESTION PAPER PATTERN FOR THE CONTINUOUS INTERNAL ASSESSMENT (SKILL BASED AND NME COURSES) DURATION – 1 HOUR

- ❖ 50 MCQs will be asked for each internal assessment tests (50 x 1=50 Marks) and converted for 15 marks

THE COMPONENTS FOR CONTINUOUS INTERNAL ASSESSMENT ARE:

Two tests and their average	--15 marks
Seminar /Group discussion / Quiz Test	-- 5 marks
Assignment	-- 5 marks

Total	25 Marks

SUMMATIVE EXAMINATION PATTERN (SKILL BASED AND NME COURSES) DURATION – 3 HOURS

Pattern of the Question Paper for Skill Based and Non-Major Elective courses
(External)

75 Multiple choice questions will be asked from five units (75 x 1=75 Marks)
(15MCQ's from each unit)

PART-IV- ENVIRONMENTAL STUDIES AND VALUE EDUCATION
QUESTION PAPER PATTERN (INTERNAL ASSESSMENT)

Pattern of the Question Paper for Environmental Studies & Value Education
(Internal)

50 MCQs will be asked for each internal assessment tests (50 x 1=50 Marks) and
converted for 15 marks

Two tests and their average	--	15 marks
Project	--	10 marks

Total		25 Marks

* The students as Individual or Group must visit a local area to document environmental assets – river / forest / grassland / hill / mountain – visit a local polluted site – urban / rural / industrial / agricultural – study of common plants, insects, birds – study of simple ecosystem – pond, river, hill slopes, etc.

SUMMATIVE EXAMINATION PATTERN

Pattern of the Question Paper for Environmental Studies & Value Education only) (External)

75 Multiple choice questions will be asked from five units (75 x 1=75 Marks)
(15MCQ's from each unit)

PART V EXTENSION ACTIVITIES: (MAXIMUM MARKS: 100)

1. NCC
2. NSS
3. Physical Education
4. YRC
5. RRC
6. Health & Fitness Club
7. Eco Club
8. Human Rights Club

Internal Examinations - - 25 Marks

Summative Examinations - - 75 Marks

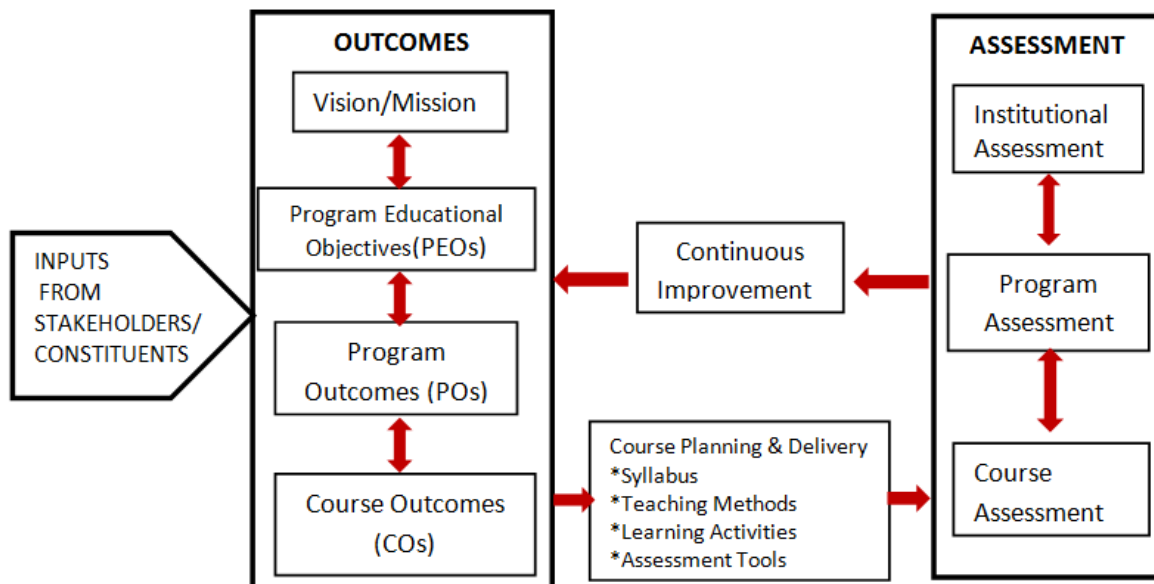
100

OUTCOME BASED EDUCATION:

OBE starts with the identification and articulation of clear and measurable learning outcomes for each course or program. These outcomes describe the skills, knowledge, and abilities that students are expected to acquire. The curriculum, instructional methods, and assessments are aligned with the defined learning outcomes. This ensures that everything taught and evaluated is directly related to what students are expected to learn.

The Learning Outcomes-Based Approach to curriculum planning and transaction in our institution ensures whether the teaching-learning processes are oriented towards enabling students to attain the defined learning outcomes relating to the courses within a programme. The outcome based approach, particularly in the context of undergraduate studies, requires a significant shift from teacher-centric to learner-centric pedagogies and from passive to active/participatory pedagogies.

Assessment Method: The students are assessed with 2 internal examination and the summative examination which includes problem based assignments; practical assignment laboratory reports; observation of practical skills; individual project reports ,case-study reports; team project reports; oral presentations, including seminar presentation; viva voce interviews; computerized adaptive testing; etc. and any other pedagogic approaches as per the context.



INSTITUTIONAL VISION

To Mould the learners into accomplished individuals by providing them with a stimulus for social change through character, confidence and competence.

INSTITUTIONAL MISSION

1. Enlightening the learners on the ethical and environmental issues.
2. Extending holistic training to shape the learners in to committed and competent citizens.
3. Equipping them with soft skills for facing the competitive world.
4. Enriching their employability through career oriented courses.
5. Ensuring accessibility and opportunity to make education affordable to the underprivileged.

Highlights of the Revamped Curriculum:

- Student-centric, meeting the demands of industry & society, incorporating industrial components, hands-on training, skill enhancement modules, industrial project, project with viva-voce, exposure to entrepreneurial skills, training for competitive examinations, sustaining the quality of the core components and incorporating application oriented content wherever required.
- The Core subjects include latest developments in the education and scientific front, advanced programming packages allied with the discipline topics, practical training, devising mathematical models and algorithms for providing solutions to industry / real life situations. The curriculum also facilitates peer learning with advanced mathematical topics in the final semester, catering to the needs of stakeholders with research aptitude.
- The General Studies and Mathematics based problem solving skills are included as mandatory components in the 'Training for Competitive Examinations' course at the final semester, a first of its kind.
- The curriculum is designed so as to strengthen the Industry-Academia interface and provide more job opportunities for the students.

- The Industrial Statistics course is newly introduced in the fourth semester, to expose the students to real life problems and train the students on designing a mathematical model to provide solutions to the industrial problems.
- The Internship during the second year vacation will help the students gain valuable work experience that connects classroom knowledge to real world experience and to narrow down and focus on the career path.
- Project with viva-voce component in the fifth semester enables the student, application of conceptual knowledge to practical situations. The state of art technologies in conducting a Explain in a scientific and systematic way and arriving at a precise solution is ensured. Such innovative provisions of the industrial training, project and internships will give students an edge over the counterparts in the job market.
- State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and inter disciplinary nature are incorporated as Elective courses, covering conventional topics to the latest - Artificial Intelligence.

MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS),

MADURAI – 625 004

B.SC FOOD SCIENCE AND NUTRITION CURRICULUM

(For the student admitted during the academic year 2023-2024 onwards)

Course Code	Title of the Course	Hrs	Credits	Maximum Marks		
				Int	Ext	Total
FIRST SEMESTER						
Part – I	Tamil / Alternative Course					
23UTAGT11	தமிழ் இலக்கிய வரலாறு - I	6	3	25	75	100
Part – II	English					
23UENGE11	GENERAL ENGLISH - I	6	3	25	75	100
Part - III	Core Courses					
23UFNCC11	FOOD SCIENCE	5	5	25	75	100
23UFNCP11	BASIC COOKERY - PRACTICAL	5	5	25	75	100
Part - III	Elective Course					
23UFNEC11	NUTRITION ASSESSMENT AND DIET COUNSELLING	4	3	25	75	100
Part IV	Non Major Elective					
23UFNNM11	FOOD PRODUCT DEVELOPMENT	2	2	25	75	100
Part IV	Foundation Course					
23UFNFC11	PRINCIPLES OF RESOURCE MANAGEMENT	2	2	25	75	100
Total		30	23	175	525	700
SECOND SEMESTER						
Part – I	Tamil / Alternative Course					
23UTAGT21	தமிழ் இலக்கிய வரலாறு – II	6	3	25	75	100
Part – II	English					
23UENGE21	GENERAL ENGLISH - II	6	3	25	75	100
Part - III	Core Courses					
23UFNCC21	HUMAN PHYSIOLOGY	5	5	25	75	100
23UFNCC22	BASICS OF FOOD MICROBIOLOGY	3	3	25	75	100
23UFNCP21	BASICS OF FOOD MICROBIOLOGY - PRACTICAL	2	2	25	75	100
Part - III	Elective Course					
23UCHEA21	CHEMISTRY FOR BIOLOGICAL SCIENCES	4	3	25	75	100
Part IV	Non Major Elective					
23UFNNM21	FOUNDATIONS OF BAKING AND CONFECTIONERY	2	2	25	75	100
Part IV	Skill Enhancement course					
23UFNSC21	FUNDAMENTALS OF ART & DESIGN	2	2	25	75	100
Total		30	23	200	600	800

FIRST SEMESTER



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	FOOD SCIENCE			
Course Code	23UFNCC11	L	P	C
Category	CORE	5	-	5

COURSE OBJECTIVES:

- ❖ To enable the students to:
- ❖ Understand the science of food and factors that affect its quality, Nutritive value and shelf life.
- ❖ Understand the physical, biological and chemical characteristics of various foods and their uses.
- ❖ Apply knowledge of foods in planning diets and preparing meals that are safe, nutritious and
- ❖ Palatable.

UNIT - I Nutrient content of foods and Cooking Methods 10

Classification of foods according to nutrient content. Food groups for balanced diets. Study of the different cooking methods- dry heat, moist and combination methods, solar cooking, microwave cooking – merits and demerits, dishes prepared by these methods

UNIT - II Cereals, Millets, Pulses, Legumes and Nuts 10

Cereals - Classification of Cereals, Structure, nutrient composition, storage, processing, milling, parboiling, scientific methods of preparation and cooking, acceptability and palatability of rice, wheat, maize and millets Cooking of starches Dextrinization and gelatinization, retrogradation and resistant starch.

Pulses and legumes - Types, nutritive value, methods of cooking, effect of soaking and germination, judicious combination of cereals and pulses- complementary effect, soya beans, fava beans and kesari dhal methods to inactivate /remove toxins; storage. Nuts - types, composition, market forms, roasting, steaming of nuts, nuts butters; uses in sweets, baking, and confectionery; Storage. Oilseeds – types, methods of processing, uses and shelf life

UNIT - III Vegetables and Fruits 10

Vegetables: Classification, nutritive value, effect of cooking on colour, texture, flavour, appearance and nutritive value, Purchase - storage and preservation

Fruits: Classification, nutritive value, changes during ripening, enzymatic browning, uses, preservation

UNIT - IV Flesh foods, Eggs, and Milk**15**

Meats – structure, nutritive value, selection of meat, postmortem changes in meat, ageing, factors affecting tenderness of meat, methods of cooking and storage.

Poultry-types, nutritive value, selection and cooking

Fish - classification, nutritive value, selection, storage, cooking and preservation.

Eggs - Structure, nutritive value, methods of cooking, storage, preservation and uses in cookery; foam formation and factors affecting foam. formation

Milk and milk products - Nutritive value, kinds of milk, pasteurization, and homogenization, coagulation of milk, fermentation of milk; milk products - whole and skimmed milk, milk powders and yogurt, ghee, butter, cheese. Storage and preservation

UNIT - V Fats and oils, sugars, food adjuncts and beverages**15**

Fats and Oils: Types, sources-animal fats and vegetable fats, functions, processing difference between cold pressed and regular cooking oils, hydrogenated fat, emulsification, rancidity, smoking point. Factors affecting absorption of oils while frying foods, harmful effects of reheated oils.

Sugars: Types and market forms of sugars; stages of sugar cookery, crystallization, factors affecting crystallization, uses in confectionery.

Food adjuncts and food additives

Spices and condiments: classification, source, use in food preparation, Leavening agents, stabilizers, thickeners, anticaking agents, enzymes, shortenings, stabilizers, flavouring agents, colouring agents, sweeteners-use and abuse.

Food adulteration Definition, common adulterants in food

Beverages Classification-fruit based beverages; milk-based beverages nutritive. value and uses, alcoholic beverages, coffee, tea and cocoa, malted. beverages. Sources, manufacture, processing, and service; methods of preparation of coffee and tea

Total Lecture Hours**60****BOOKS FOR STUDY:**

- Srilakshmi B (2019) Food Science, (7th Ed.) New Age International Publishers

BOOKS FOR REFERENCES:

- Manay, S. and Shadaksharaswamy, M. (1987) Foods Facts and Principles. New Age International Publishers, New Delhi.
- Peckham, G.C. and Freeland-Graves, J.H. (1979) Foundations of Food Preparation, 4th edition, Macmillan Publishing Co. Inc., New York.
- Shewfelt R.L. (2015) Introducing Food Science. CRC Press, Taylor and Francis Group. Boca Raton
- Srilakshmi B (2019) Food Science, (7th Ed.) New Age International Publishers

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	2	3	3
CO 2	3	3	2	3	3
CO 3	3	3	2	3	3
CO 4	3	3	2	3	3
CO 5	3	2	2	3	3
WEITAGE	15	15	10	15	15
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	3	3	2	3	3

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	Nutrient content of foods and Cooking Methods	10	PPT, CHALK& TALK, VIDEOS
II	Cereals, Millets, Pulses, Legumes and Nuts -	10	PPT, CHALK& TALK, GOOGLE CLASS
III	Vegetables and Fruits	10	PPT, CHALK& TALK
IV	Flesh foods, Eggs, and Milk	15	PPT, CHALK& TALK
V	Fats and oils, sugars, food adjuncts and beverages Fats and Oils	15	PPT, CHALK& TALK

**Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)**

Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of Questions	K - Level		
CI	CO1	K1 – K4	2	K1,K2	2 (K2 OR K2)	2(K3 OR K3)
AI	CO2	K1 – K4	2	K1,K2	2 (K2 OR K2)	2 (K4 OR K4)
CI	CO3	K1 – K4	2	K1,K2	2 (K2 OR K2)	2(K3 OR K3)
AII	CO4	K1 – K4	2	K1,K2	2 (K3 OR K3)	2 (K4 OR K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II

	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	21.43	-
	K2	2	20		22	21.43	
	K3			16	16	28.57	42.86
	K4			16	16	28.57	57.14
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.57	-
	K2	2	10		12	21.43	
	K3		10	16	26	46.43	25.00
	K4			16	16	28.57	75.00
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K – LEVEL
			No. of Questions	K – Level		
1	CO1	K1,K2	2	K1,K2	2 (K1,K1)	2 (K2,K2)
2	CO2	K1,K2	2	K1,K2	2 (K2,K2)	2 (K2,K2)
3	CO3	K1,K2	2	K1,K2	2(K2,K2)	2 (K3,K3)
4	CO4	K1,K2	2	K1,K2	2 (K3,K3)	2 (K3,K3)
5	CO5	K1,K2	2	K1,K2	2 (K4,K4)	2 (K4,K4)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5	10		15	10.72	51.43
K2	5	20	32	57	40.71	
K3		10	32	42	30.00	30.00
K4		10	16	26	18.57	18.57
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions			PART – A		(10 x 1 = 10 Marks)
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K2		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K1		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K2		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K2		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K1		
OR					
11. b)	Unit - I	CO1	K1		
12. a)	Unit - II	CO2	K2		
OR					
12. b)	Unit - II	CO2	K2		
13. a)	Unit - III	CO3	K2		
OR					
13. b)	Unit - III	CO3	K2		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K4		
OR					
15. b)	Unit - V	CO5	K4		

Answer ALL the questions				PART – C	(5 x 8 = 40 Marks)
16. a)	Unit - I	CO1	K2		
OR					
16. b)	Unit - I	CO1	K2		
17. a)	Unit - II	CO2	K2		
OR					
17. b)	Unit - II	CO2	K2		
18. a)	Unit - III	CO3	K3		
OR					
18. b)	Unit - III	CO3	K3		
19. a)	Unit - IV	CO4	K3		
OR					
19. b)	Unit - IV	CO4	K3		
20. a)	Unit - V	CO5	K4		
OR					
20. b)	Unit - V	CO5	K4		



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DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	BASIC COOKERY - PRACTICAL			
Course Code	23UFNCP11	L	P	C
Category	CORE COURSES	-	5	5

COURSE OBJECTIVES:

- To Remember the processing and preparation of food products
- To apply different methods of cooking.
- To Analyze skills in handling appliances in laboratories
- To give training on different types of cooking methods.
- To create new recipes in different methods.

Course Content:

1. Different Cooking methods
2. Use of standard measuring cups and spoons
3. Methods of cooking by using Cereals
4. Methods of cooking by Wheat
5. Preparation of sprouted legumes and malt powder
6. Preparation of nuts based dishes
7. Effect of cooking on Vegetables
8. Evaluation of meat quality
9. Evaluation of egg quality
10. Evaluation of sugar cookery

BOOKS FOR STUDY:

- Martland, R.E. and Welsby, D.A. (1980) Basic Cookery, Fundamental Recipes and Variations. William Heinemann Ltd., London.
- Krishna Arora (2008) Theory of cookery, Frank Brothers & Co.,
- Negi J (2013) Fundamentals of Culinary Art, S.Chand and Co.

BOOKS FOR REFERENCES:

- Peckham, G.C. and Freeland-Graves, J.H. (1987) Foundation of food preparation. 4th ed. Macmillan Publishing co, New York
- Penfield MP and Ada Marie C (2012), Experimental Food Science, Academic Press, San Diego

WEB RESOURCES:

- ❖ <http://154.68.126.6/library/Food%20Science%20books/batch1/The%20Food%20Chemistry>
- ❖ https://www.ihmnotes.in/assets/Docs/Books/Theory_of_Cookery.pdf
- ❖ <http://staffnew.uny.ac.id/upload/132318572/pendidikan/buku-esp.pdf>

Nature of Course	EMPLOYABILITY		SKILL ORIENTED		✓	ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL		GLOBAL	✓
Changes Made in the Course	Percentage of Change		20 %	No Changes Made			New Course	

*** Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.**

COURSE OUTCOMES:	K LEVEL
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After studying this course, the students will be able to:		
CO1	Identify appropriate methods for weighing dry and wet food ingredients and for cooking different foods	K1
CO2	Select suitable methods for cooking cereals, pulses, vegetables, meat, fish and Poultry	K2
CO3	Apply the principles of cookery, cooking techniques and suitable ingredients in preparing dishes	K2
CO4	Explain the reasons behind the changes that occur during food preparation.	K3
CO5	Justify the best preparation and cooking methods for acceptability and retention of nutrients in different dishes	K4

MAPPING WITH PROGRAM OUTCOMES:										
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CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	1	3	2	3	1	2	2	2	2
CO2	3	1	3	3	3	2	3	2	3	2
CO3	3	2	3	3	3	2	3	2	3	2
CO4	3	3	3	3	3	2	1	1	1	1
CO5	3	3	3	3	3	1	3	3	3	3

S- STRONG

M – MEDIUM

L – LOW

CO / PO MAPPING:					
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COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	1	3	3
CO 2	3	3	1	3	3
CO 3	3	3	1	3	3
CO 4	3	3	2	3	3
CO 5	3	3	1	3	3
WEITAGE	15	15	6	15	15
WEIGHTED PERCENTAGE OF COURSE	3	3	1	3	3

CONTRIBUTION TO POS						
LESSON PLAN:						
UNIT	COURSE NAME				HRS	PEDAGOGY
1.	Different Cooking methods				5	Lab
2.	Use of standard measuring cups and spoons				5	Lab
3.	Methods of cooking by using Cereals				7	Lab
4.	Methods of cooking by Wheat				8	Lab
5.	Preparation of sprouted legumes and malt powder				10	Lab
6.	Preparation of nuts based dishes				10	Lab
7.	Effect of cooking on Vegetables				7	Lab
8.	Evaluation of meat quality				8	Lab
9.	Evaluation of egg quality				7	Lab
10.	Evaluation of sugar cookery				8	Lab

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)							
INTERNAL	COs	K LEVEL	MAJOR	MINOR	SPOTTERS	RECORD	VIVA
CIAI	CO1	K1					5
	CO2	K2				5	
	CO3	K3			5		
	CO4	K4		5			
	CO5	K4	5				
Question Pattern	No. of Questions to be asked		2 (A-Written B-Practical Demo)	2 (A-Written B-Practical Demo)	2	1	5
	No. of Questions to be answered		2	2	2	1	5
	Marks for each question		A-3 B-2	A-3 B-2	5	10	1
	Total Marks for each section		5	5	5	5	5

Distribution of Marks with K Level									
	K Level	Major	Minor	Spotters	Record	Viva	Total Marks	% of Marks without choice	Consolidated %
CIA	K1	-	-	-	-	5	5	6.66	6.66
	K2	-	-	-	5	-	5	6.66	6.66
	K3	-	-	5	-	-	5	6.66	6.66
	K4	-	5	-	-	-	5	6.66	6.66
	K4	5					5	6.66	6.66

Summative Examination – Blue Print							
Articulation Mapping – K Levels with Course Outcomes (COs)							
EXTERNAL	COs	K LEVEL	MAJOR	MINOR	SPOTTERS	RECORD	VIVA
CIAI	CO1	K1					5
	CO2	K2				5	
	CO3	K3			20		
	CO4	K4		20			
	CO5	K4	25				
Question Pattern		No. of Questions to be asked	2 (A-Written B-Practical Demo)	2 (A-Written B-Practical Demo)	2	1	5
		No. of Questions to be answered	2	2	2	1	5
		Marks for each question	A-20 B-5	A-15 B-5	5	10	1
		Total Marks for each section	25	20	20	5	5

Distribution of Marks with K Level CIA

	K Level	Major	Minor	Spotters	Record	Viva	Total Marks	% of Marks without choice	Consolidated %
CIA	K1					5	5	6.6	6.6
	K2				5		5	6.6	6.6
	K3			20			20	26.6	26.6
	K4		20				20	26.6	26.6
	K4	25					25	33.3	33.3
	Marks	25	20	20	20	5	5	75	100



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	NUTRITIONAL ASSESSMENT AND DIET COUNSELING			
Course Code	23UFNEC11	L	P	C
Category	ELECTIVE COURSE	4	-	3
COURSE OBJECTIVES:				
<ul style="list-style-type: none">➤ To enable the students to :➤ Learn the different methods and techniques available to assess nutritional status.➤ Use age and gender specific techniques to assess nutritional status.➤ Learn the significance of assessment parameters in conditions of health and disease				
UNIT - I Nutritional screening				10
Nutritional screening - Nutritional assessment and Identification of at-risk groups using SGA/ MNA Estimation of total energy requirement using factorial method Plotting growth chart for infants and identifying growth faltering, suggesting suitable nutritional remedies				
UNIT - II Anthropometric assessment				10
Anthropometric assessment - Measurements of height, weight, mid arm circumference, waist circumference Measurement of Body fat using skin fold calipers, body fat analyzer etc. Conduct anthropometric assessment and nutritional diagnosis on a select group of subjects				
UNIT - III Clinical and Biochemical assessment				15
Clinical and Biochemical assessment - Use clinical examination schedule and conduct clinical examination under the guidance of medical supervisor to identify nutrient deficiencies (preferably preschool children) Learn the biochemical tests to be conducted to analyse nutritional deficiencies; analyse available biochemical reports for nutritional adequacy				
UNIT - IV Dietary Assessment				15
Dietary assessment - Estimate nutrient intake using 24-hour recall, food frequency questionnaire. Estimate nutrient intake using appropriate software. Conduct diet survey and suggest alterations in food intake to improve nutrient adequacy				
UNIT - V Diet counseling				10
Diet counseling - Preparing a nutritional assessment sheet for the given patient Planning a diet counseling program with components such as assessment of needs, education of the patient, follow up and establishing rapport with the patient and family member.				
Total Lecture Hours				60

BOOKS FOR STUDY:

- Srilakshmi, B. (1997) Dietetics New Age International (P) Ltd,
- The Atlas of Food by Erik Millstone; Tim Lang; Marion Nestle.
- Dietary Reference Intakes by Jennifer J.
- Handbook of Nutrition and Food, Third Edition by Carolyn D.
- Manual of Nutritional Therapeutics by David H.
- Srilakshmi, B. Nutrition Science (2000). New Age International (P) Ltd,

BOOKS FOR REFERENCES:

- Gelso Charles, J. and Fretz Bruce, R. (1995) Counselling Psychology, a PRISM Indian edition Harcourt Brace College Publishers
- 2. Gibney, M.J., Margetts, B.M., Kearney, J.M. and Arab, L. (2013). Public Health Nutrition. John Wiley & Sons Inc., New Delhi.
- 3. Guthrie H.A. (1983) Introductory Nutrition C.V. Mosby Co. St. Louis. 4. Insel, P., Ross, D., McMahon, K. And Bernstein, M. (2014).
- 4. Nutrition, 15th edition. Jones & Bartlett Learning, USA.
- 5. Maurice E. Shils, James A. Olson, Moshe Shike (1994) "Modern Nutrition in health and disease", eighth edition, Vol. I & II Lea & Febiger Philadelphia, A Waverly Company.
- 6. Schlenker, E.D. and Long, S. (2007). Williams' Essentials of Nutrition & Diet Therapy, 9th edition. Mosby Elsevier, Canada.
- 7. Srilakshmi, B. (1997) Dietetics New Age International (P) Ltd,
- 8. Wardlaw, G.M. Insel, P.H. (1990) Perspectives in Nutrition, Times Mirror / Mosby College Publishing Co. St. Louis, Toronto, Boston.

WEB RESOURCES:

- ❖ <https://guides.emich.edu/c.php?g=187834&p=6723105>
- ❖ <https://netid.emich.edu/cas/login?service=http%3a%2f%2fproxyp>.

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED		ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL	✓	GLOBAL	
Changes Made in the Course	Percentage of Change			No Changes Made			New Course	✓

*** Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.**

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	Screen the nutritional status of subjects using appropriate tools.	K1 to K4
CO2	Use anthropometric methods of assessment to classify subjects a belonging to normal, under nutrition, overweight or obesity.	K1 to K4
CO3	Evaluate micronutrient adequacy using clinical and biochemical assessment techniques.	K1 to K4
CO4	Determine adequacy of nutrient intake employing suitable dietary assessment Techniques.	K1 to K4
CO5	Acquire skills in diet counseling using nutritional techniques.	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	1	3	2	3	1	1	3	3	3
CO2	3	3	3	3	2	3	3	2	2	3
CO3	3	3	3	3	2	3	3	2	2	3
CO4	3	3	3	3	2	3	3	2	2	3
CO5	3	3	3	3	2	3	3	2	2	3
S- STRONG			M – MEDIUM				L - LOW			

CO / PO MAPPING:					
COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3
CO 2	3	3	3	3	3
CO 3	3	3	3	3	3
CO 4	3	3	3	3	3
CO 5	3	3	3	3	3
WEITAGE	15	15	15	15	15
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	3	3	3	3	3

LESSON PLAN:			
UNIT	COURSE NAME	HRS	PEDAGOGY
I	Nutritional screening	10	PPT, Chalk & Talk, Videos
II	Anthropometric assessment	10	PPT, Chalk & Talk, Animated Videos
III	Clinical and Biochemical assessment	15	PPT, Chalk & Talk, Google class

IV	Dietary Assessment	15	PPT, Chalk & Talk, Flash cards
V	Diet counseling	10	PPT, Chalk & Talk, Pictures Drawing charts display in the class rooms

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)						
Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of Questions	K - Level		
CI	CO1	K1 – K4	2	K1,K2	2 (K2 OR K2)	2(K3 OR K3)
AI	CO2	K1 – K4	2	K1,K2	2 (K2 OR K2)	2 (K4 OR K4)
CI	CO3	K1 – K4	2	K1,K2	2 (K2 OR K2)	2(K3 OR K3)
AI	CO4	K1 – K4	2	K1,K2	2 (K3 OR K3)	2 (K4 OR K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II							
	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	21.43	-
	K2	2	20		22	21.43	
	K3			16	16	28.57	
	K4			16	16	28.57	
	Marks	4	20	32	56	100	
CIA II	K1	2			2	3.57	-
	K2	2	10		12	21.43	
	K3		10	16	26	46.43	
	K4			16	16	28.57	
	Marks	4	20	32	56	100	

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K – LEVEL
			No. of Questions	K – Level		
1	CO1	K1,K2	2	K1,K2	2 (K1,K1)	2 (K2,K2)
2	CO2	K1,K2	2	K1,K2	2 (K2,K2)	2 (K2,K2)
3	CO3	K1,K2	2	K1,K2	2(K2,K2)	2 (K3,K3)
4	CO4	K1,K2	2	K1,K2	2 (K3,K3)	2 (K3,K3)
5	CO5	K1,K2	2	K1,K2	2 (K4,K4)	2 (K4,K4)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5	10		15	10.72	51.43
K2	5	20	32	57	40.71	
K3		10	32	42	30.00	30.00
K4		10	16	26	18.57	18.57
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions			PART – A		(10 x 1 = 10 Marks)
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K2		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K1		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K2		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K2		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K1		
OR					
11. b)	Unit - I	CO1	K1		
12. a)	Unit - II	CO2	K2		
OR					
12. b)	Unit - II	CO2	K2		
13. a)	Unit - III	CO3	K2		
OR					
13. b)	Unit - III	CO3	K2		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K4		
OR					
15. b)	Unit - V	CO5	K4		

Answer ALL the questions				PART – C	(5 x 8 = 40 Marks)
16. a)	Unit - I	CO1	K2		
OR					
16. b)	Unit - I	CO1	K2		
17. a)	Unit - II	CO2	K2		
OR					
17. b)	Unit - II	CO2	K2		
18. a)	Unit - III	CO3	K3		
OR					
18. b)	Unit - III	CO3	K3		
19. a)	Unit - IV	CO4	K3		
OR					
19. b)	Unit - IV	CO4	K3		
20. a)	Unit - V	CO5	K4		
OR					
20. b)	Unit - V	CO5	K4		



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	FOOD PRODUCT DEVELOPMENT			
Course Code	23UFNNM11	L	P	C
Category	SKILL ENHANCEMENT	2	-	2

COURSE OBJECTIVES: To enable the students to

- Understand the steps involved in new food product development.
- Learn about consumer preferences and market trends.
- Understand concepts about subjective and objective evaluation of new product.

UNIT - I Introduction to New Food Product Development 7

Introduction to New Food Product development

Food products definition, Classification,

Characterization Reasons for new food product development

Factors shaping new product development-Social concerns, health concerns impact of technology and marketplace influence.

Utilizing traditional foods, unconventional sources, functional, nutraceuticals foods for new product development

Market Survey to identify the new product

UNIT - II Product development 8

Product Development:

- a) New Product Development Team
- b) Sources of New Product ideas
- c) Designing new product
- d) Stages of product development
- e) Causes of product failure/ success in product development

UNIT - III Product Evaluation and quality control quality Attributes 15

Product Evaluation and Quality Control

Quality attributes – physical, chemical, nutritional, microbial, and sensory indicators Principles and types of assessment of quality. Subjective and objective methods of evaluation of product quality. Role of sensory evaluation in consumer product acceptance; requirements for sensory analysis - Sensory panel Evaluation of New Product: Nutritional evaluation (estimation of relevant parameters) Evaluation of shelf-life of the product (testing for appropriate quality parameters- physical, chemical, microbiological and nutrient content acceptability studies)

Food safety standards and regulations: Domestic regulations FSSAI, AGMARK, BIS Quality management systems in India; (ISO9001ISO22000); Global Food safety Initiative; International food standards Various national and international organizations dealing with inspection, traceability and authentication, certification, and quality assurance.

UNIT - IV Packaging and labeling**10****Packaging and labelling**

Packaging Material-types;

factors affecting type of packaging material used;

Aseptic packaging, modified atmosphere packaging,

Controlled Atmosphere Packaging and active packaging.

Packaging and Labelling of the product – Packaging design, graphics and labelling – FSSAI regulations for food labeling.

UNIT - V Marketing the product**10****Marketing the product**

Product life cycle

Costing the product and determining the sales price

Advertising and test marketing the product

Total Lecture Hours**50****BOOKS FOR STUDY:**

- An Integrated approach to New Food Product Development. ed. New York, NY: CRC Press 5. Paine FA, Paine HY (Eds.) (1992)
- A handbook of Food Packaging (2nd ed.), Blackie Academic and Professional. 6. Sharma A (2018).
- Food product Development. CBS Publishers & Distributors Pvt Ltd.
- New Food Product development. Gordon W. Fuller. CRC Publication. 1994.
- Food Product Development: Maximizing success, Woodhead Publishing Ltd,

BOOKS FOR REFERENCES:

- Earle M., Earle RL. and Anderson A. (2001)
- Food Product Development: Maximizing success, Woodhead Publishing Ltd,
- Food Series, No. 64, 2001. 2. Fuller, GW (2011). New food product development: From concept to marketplace. 3rd ed. New York, NY: CRC Press 3.
- Lawless HT and Klein BP (1991) Sensory Science Theory and Applications in Foods. Marcel Dekker Inc. 4. Moskowitz HR, Saguy IS and Straus T (2009).

WEB RESOURCES:

- ❖ <https://www.destechpub.com/wp-content/uploads/2015/01/Methods-for-Developing-New-Food-Products-preview.pdf>
- ❖ <https://www.youtube.com/watch?v=iL0iIGpa4vg>
- ❖ <https://www.youtube.com/watch?v=5kOXUH8kaCs>

Nature of Course	EMPLOYABILITY		SKILL ORIENTED		✓	ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL	REGIONAL	NATIONAL		✓	GLOBAL		
Changes Made in the Course	Percentage of Change		35 %	No Changes Made		New Course		✓

*** Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.**

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	Define the basic concepts in food product development, packaging, costing advertising and marketing.	K1 to K2
CO2	Explain the need, characteristics and factors influencing the new product; testmarketing, packaging and quality attributes.	K1 to K2
CO3	Illustrate the quality attributes, food safety, packaging and labelling regulations, and marketing tools for a food product.	K1 to K2
CO4	Analyze the significance of packaging, labelling, advertising, costing and quality concepts for the new food product	K1 to K2
CO5	Develop a new food product and evaluate its quality and acceptability..	K1 to K2

MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	1	3	2	3	2	2	2
CO2	3	3	3	1	3	2	3	2	2	2
CO3	3	3	3	1	3	2	2	3	2	2
CO4	3	3	3	3	1	3	2	3	2	2
CO5	3	3	3	3	1	3	2	3	2	2
S- STRONG			M – MEDIUM				L – LOW			

CO / PO MAPPING:					
COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	2	3	3
CO 2	3	3	2	3	3
CO 3	3	3	2	3	3
CO 4	3	3	2	3	3
CO 5	3	2	2	3	3
WEITAGE	15	15	10	15	15
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	3	3	2	3	3

LESSON PLAN:			
UNIT	COURSE NAME	HRS	PEDAGOGY
I	Product Development	8	PPT, CHALK & TALK, VIDEOS
II	Product Evaluation and quality control quality Attributes	15	PPT, CHALK & TALK, GOOGLE CLASS

III	Product Evaluation and quality control quality Attributes	15	PPT,CHALK & TALK
IV	Packaging and Labeling	10	PPT,CHALK & TALK
V	Marketing the Product	10	PPT,CHALK & TALK

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)				
Internal	Cos	K Level	Section A	
			MCQs	
			No. of. Questions	K - Level
CI	CO1	K1 – K2	25	K1,K2
AI	CO2	K1 – K2	25	K1,K2
CI	CO3	K1 – K2	25	K1,K2
AII	CO4	K1 – K2	25	K1,K2
Question Pattern CIA I & II		No. of Questions to be asked	50	
		No. of Questions to be answered	50	
		Marks for each question	1	
		Total Marks for each section	50	

* Two Formative examinations will be conducted as a part of Continuous Internal Assessment under which, 50 MCQ's will be asked [50X1=50 marks] from any 4 CO's. (Ist Test-2 CO's & IInd Test-2 CO's) in equal weightage

Distribution of Marks with K Level CIA I & CIA II					
	K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	100	100
CIA II	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)				
S. No	COs	K - Level	Section A (MCQs)	
			No. of Questions	K – Level
1	CO1	K1-K2	15	K1,K2
2	CO2	K1-K2	15	K1,K2
3	CO3	K1-K2	15	K1,K2
4	CO4	K1-K2	15	K1,K2
5	CO5	K1-K2	15	K1,K2
No. of Questions to be Asked			75	
No. of Questions to be answered			75	
Marks for each question			1	
Total Marks for each section			75	
(Figures in parenthesis denotes, questions should be asked with the given K level)				

In summative examinations, 75 MCQ's will be asked [75X1=75 marks] from all 5 CO's in equal weightage.

Distribution of Marks with K Level				
K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidated %
K1	40	40	53	100
K2	35	35	47	
K3				
K4				
Marks		75	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.				



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	PRINCIPLES OF RESOURCE MANAGEMENT			
Course Code	23UFNFC11	L	P	C
Category	FOUNDATION COURSE	2	-	2

COURSE OBJECTIVES: To enable students to:

- Recognize and use appropriate resources to achieve one's goal.
- Develop skills in utilizing the available resources in day-to-day life.
- Gain knowledge about work simplification and effective management of Time, Energy and Money

UNIT - I INTRODUCTION TO MANAGEMENT 15

Introduction to Management - Management Concepts - Definition, Concept, Micro and Macro environment. Principles of Management Process - Planning, Controlling, Evaluating. Qualities of a Good Manager. Motivational factors - Values, Goals and Standards.

Activity: Identification of personal and family values and goals – their interrelationship.

UNIT - II RESOURCES 10

Resources - Meaning and classification, optimizing the use of family resources, Factors affecting the use of resources.

Activity: List out the resources optimizing the goal.

UNIT - III TIME MANAGEMENT 10

Time Management - Tools in time management - Time norms, Peak loads, Work Curves and rest periods, Time management process - Planning - Steps in making time plans - Controlling the planning action - Evaluation.

Energy Management- the efforts required in home making activities , energy required for house hold activities

Activity: Preparation of a time schedule and Evaluate time schedule using Gantt chart.

UNIT - IV WORK SIMPLIFICATION 15

Work Simplification - Definition, Importance, Techniques – Formal and Informal Techniques - Mundel's Classes of change - Planning efficient work areas in kitchen.

Body Mechanics - Posture, Gravity, Rhythmic movement, Proper use of Muscle and to take advantage of Momentum.

Fatigue - Concepts, Types - Physiological and Psychological fatigue and Managerial process applied to energy.

Activity: Study on work heights based on anthropometric measurement on vertical and horizontal planes.

UNIT - V MONEY MANAGEMENT**15**

Money Management - Family Income - Types, sources and methods of augmenting family income.

Family Expenditure - Budget - Meaning - Types of budgets, Planning a budget for a family of a fixed income, Hotel / Restaurant, advantages of budgeting, Factors affecting family budget, Engel's law of consumption, methods of handling money - Family financial records, Savings- importance and types.

Activity: Preparation of family budget. Study of a saving institution and its scheme.

Total Lecture Hours**75****BOOKS FOR STUDY:**

- ❖ Varghese, M.A., Ogale, N.N and Srinivasan K (2017), "Home Management" second edition, New age International publishers.
- ❖ [Sylvia M. Asay](#) (2021) "Family resource management", SAGE Publications Inc; Fourth edition
- ❖ Gary Dessler & Biju Varrkey (2020) "Human Resource Management" Pearson Education publication.
- ❖ Ruth E. Deacon (1975) Home Management: Context and Concepts Houghton Mifflin publication
- ❖ Verma (2018) Fundamentals of Home Management: Context and Concepts Lambert publication

BOOKS FOR REFERENCES:

- Bela Bhargava (2005), "Family resource Management & Interior Decoration", university book house pvt ltd, ISBN-13: 978-8187339229
- Marion Giordan (2016), "Consumer Education: A handbook for Teachers", Routledge; 1st edition, ISBN-13: 978-1138839151
- Nickell & Dorsey (2002), "Management in Family Living", CBS; 4th edition, ISBN-13: 978-8123908519
- Pushpa Chakravorty (2007), Home Management, New Delhi: Pointer Publishers.
- Rao (2020), "Taxmann's Human Resource Management", Taxmann Publications Pvt. Ltd.; 2nd edition, ISBN-13: 978-9390128396
- Ready GB (2021), "EBC consumer Protection Act", LAW BOOKS, ASIN: B097TQ64QV
- Steven, D.S, (2016). Consumer Economics: A Practical Overview", New York: Routledge Taylor and Francis group.
- Sudhir Dixit (2018), "Time Management", Manjul Publishing House, ISBN-13: 978-9388241106

WEB RESOURCES:

- ❖ <http://www.yourarticlelibrary.com/decision-making/decision-making-in-management-definition-and-features-explained/25657/>
- ❖ <http://www.familyresourcemanagement.org/services/goals/>
- ❖ [http://www.nios.ac.in/media/documents/sechmscicour/english/home%20science%20\(eng\)%20ch-15.pdf](http://www.nios.ac.in/media/documents/sechmscicour/english/home%20science%20(eng)%20ch-15.pdf)
- ❖ <https://books.google.co.in/books?id=NJkrzK3CgisC&pg=PA149&lpg=PA149&q=ti>

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Nature of Course	EMPLOYABILITY		SKILL ORIENTED		✓	ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL	REGIONAL		NATIONAL		✓	GLOBAL	
Changes Made in the Course	Percentage of Change		No Changes Made			New Course		✓

*** Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.**

COURSE OUTCOMES:	K LEVEL
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After studying this course, the students will be able to:

CO1	Apply the principles of management process in day-to-day life	K1 to K2
CO2	Identify and analyze the need for resources	K1 to K2
CO3	Utilize tools of time management effectively in day-to-day life	K1 to K2
CO4	Apply work simplification techniques while managing work.	K1 to K2
CO5	Develop good decision-making skills and plan a budget within the available income and to maintain accounts.	K1 to K2

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	S	s	M	S	S	M
CO2	S	S	S	S	M	s	s	M	S	S
CO3	S	M	S	S	S	s	S	S	S	M
CO4	S	S	S	S	S	s	M	S	S	M
CO5	S	S	S	S	S	M	S	S	S	S

S- STRONG

M - MEDIUM

L - LOW

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3
CO 2	3	3	3	3	3
CO 3	3	3	3	3	3
CO 4	3	3	3	3	3
CO 5	3	3	3	3	3
WEITAGE	15	15	15	15	15
WEIGHTED PERCENTAGE	3	3	3	3	3

OF COURSE CONTRIBUTION TO POS						
LESSON PLAN:						
UNIT	COURSE NAME				HRS	PEDAGOGY
I	Introduction to Management - Management Concepts - Definition, Concept, Micro and Macro environment. Principles of Management Process - Planning, Controlling, Evaluating. Qualities of a Good Manager. Motivational factors - Values, Goals and Standards.				15	Lecturing PowerPoint Seminar
II	Resources - Meaning and classification, optimizing the use of family resources, Factors affecting the use of resources.				10	Lecturing PowerPoint Seminar
III	Time Management - Tools in time management - Time norms, Peak loads, Work Curves and rest periods, Time management process - Planning - Steps in making time plans - Controlling the planning action - Evaluation.				10	Lecturing PowerPoint Seminar
IV	Work Simplification - Definition, Importance, Techniques – Formal and Informal Techniques - Mundel's Classes of change - Planning efficient work areas in kitchen. Body Mechanics - Posture, Gravity, Rhythmic movement, Proper use of Muscle and to take advantage of Momentum. Fatigue - Concepts, Types - Physiological and Psychological fatigue and Managerial process applied to energy.				17	Lecturing PowerPoint Seminar
V	Money Management - Family Income - Types, sources and methods of augmenting family income. Family Expenditure - Budget - Meaning - Types of budgets, Planning a budget for a family of a fixed income, Hotel / Restaurant, advantages of budgeting, Factors affecting family budget, Engel's law of consumption, methods of handling money - Family financial records, Savings- importance and types.				15	Lecturing PowerPoint Seminar

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)				
Internal	Cos	K Level	Section A	
			MCQs	
			No. of. Questions	K - Level
CI AI	CO1	K1 – K2	25	K1,K2
	CO2	K1 – K2	25	K1,K2
CI AII	CO3	K1 – K2	25	K1,K2
	CO4	K1 – K2	25	K1,K2
Question Pattern CIA I & II		No. of Questions to be asked	50	
		No. of Questions to be answered	50	
		Marks for each question	1	
		Total Marks for each section	50	

* Two Formative examinations will be conducted as a part of Continuous Internal Assessment under which, 50 MCQ's will be asked [50X1=50 marks] from any 4 CO's. (Ist Test-2 CO's & IInd Test-2 CO's) in equal weightage

Distribution of Marks with K Level CIA I & CIA II					
	K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	100	100
CIA II	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)				
S. No	COs	K - Level	Section A (MCQs)	
			No. of Questions	K – Level
1	CO1	K1-K2	15	K1,K2
2	CO2	K1-K2	15	K1,K2
3	CO3	K1-K2	15	K1,K2
4	CO4	K1-K2	15	K1,K2
5	CO5	K1-K2	15	K1,K2
No. of Questions to be Asked			75	
No. of Questions to be answered			75	
Marks for each question			1	
Total Marks for each section			75	
(Figures in parenthesis denotes, questions should be asked with the given K level)				

In summative examinations, 75 MCQ's will be asked [75X1=75 marks] from all 5 CO's in equal weightage.

Distribution of Marks with K Level				
K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidated %
K1	40	40	53	100
K2	35	35	47	
K3				
K4				
Marks		75	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.				

SECOND SEMESTER



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	HUMAN PHYSIOLOGY			
Course Code	23UFNCC21	L	P	C
Category	CORE COURSES	5	-	5

COURSE OBJECTIVES:

- Gain basic understanding of human anatomy and physiology
- Learn the integrated functioning of cells, tissues, organs and systems.
- Apply the principles of nutrition and dietetics on the basis of thorough understanding of human physiology.

UNIT - I CELL AND TISSUES ,BLOOD, IMMUNE SYSTEM 12

Cell and tissues - Structure of Cell and functions of different of different organelles.

Classification, structure and functions of tissues.

Blood- Constituents of blood- RBC, WBC and Platelets and its functions. Erythropoiesis, Blood clotting, Blood groups and his to compatibility

Immune system- Antigen, Antibody, Cellular and Humoral Immunity (in brief)

UNIT - II NERVOUS SYSTEM , SENSE ORGANS 12

Nervous system

General anatomy of nervous system, functions of the different parts

Sense organs

Structure and functions of Eye, Ear, Skin. Physiology of Taste and Smell-in Brief

UNIT - III HEART AND CIRCULATION, RESPIRATORY SYSTEM 10

Heart and circulation

Anatomy of the heart and blood vessels, properties of cardiac muscle, origin and conduction of heartbeat, cardiac cycle, cardiac output, blood pressure - definition and factors affecting blood pressure, and description of ECG.

Respiratory system

Anatomy and physiology of respiratory organs. Gaseous exchange in the lungs and tissues, Mechanism of respiration

UNIT - IV DIGESTIVE SYSTEM , EXCRETORY SYSTEM**12****Digestive system**

Anatomy of Gastro-intestinal tract, Structure and functions of Liver and Pancreas. Digestion and absorption of carbohydrates, proteins and fats.

Excretory system

Structure of kidney, functions of Nephron

UNIT - V ENDOCRINE SYSTEM, REPRODUCTIVE SYSTEM**12****Endocrine system**

Functions of hormones secreted by Pancreas, Pituitary gland, thyroid, parathyroid and adrenal glands. Effects of hypo and hyper secretion of these glands.

Reproductive system

Anatomy of male and female reproductive organs, Ovarian and Uterine cycle, influence of hormones on pregnancy and lactation.

Total Lecture Hours 58**BOOKS FOR STUDY:**

- Guyton, A.C. (1979) Physiology of the Human Body. 5th ed. Saunders College of Publishing, Philadelphia.
- Subramaniam, S. and Madhavan Kutty, K. (1971) The Text Book of Physiology. Orient Longman Ltd., Madras.
- ❖ Wilson, K. J. W. (1987) Anatomy and Physiology in Health and Illness. 6th ed. ELBS, Churchill Livingstone, London.

BOOKS FOR REFERENCES:

- Beck, W.S. (1971) Human Design. Harcourt Brace Jovanovich Inc., New York.
- Best, C. H. and Taylor, N. B. (1980) Living Body. 4th ed. BIP, Bombay.
- Creager, J. G. (1992) Human Anatomy and Physiology. 2nd ed. WMC Brown Publishers, England.
- Guyton, A.C. (1979) Physiology of the Human Body. 5th ed. Saunders College of Publishing, Philadelphia.
- Subramaniam, S. and Madhavan Kutty, K. (1971) The Text Book of Physiology. Orient Longman Ltd., Madras.
- Tortora G. J. Anagnostakos N.P. (1984) Principles of Anatomy and Physiology, 4th edition, Harper and Row Publishers, New York.
- Waugh A and Grant A. (2012) Ross and Wilson Anatomy and Physiology in Health and Illness. 11th ed. Churchill and Livingstone, Elsevier
- Wilson K. J. W. (1987) Anatomy and Physiology in Health and Illness. 6th ed. ELBS, Churchill Livingstone, London.

WEB RESOURCES:

- ❖ <https://youtu.be/uFf0zxQ3rBU>

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED		ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL	✓	GLOBAL	
Changes Made in the Course	Percentage of Change			No Changes Made			New Course	✓

*** Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.**

COURSE OUTCOMES:	K LEVEL
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After studying this course, the students will be able to:	
CO1	Describe the structure and functions of a cell, various tissues, primary organs and systems in the body
CO2	Explain the interrelationship between systems for maintenance of equilibrium
CO3	Evaluate the role of the nervous and endocrine system in regulating the activities of other systems
CO4	Identify the microscopic structure of basic tissues, label the parts of primary physiological systems in the body such as nervous, respiratory, digestive, endocrine and reproductive systems
CO5	Perform hematological study of blood such as blood smear, blood count and blood grouping, record pulse, blood pressure and interpret a normal ECG.

MAPPING WITH PROGRAM OUTCOMES:										
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CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	1	3	2	3	2	2	2
CO2	3	3	3	1	3	2	3	2	2	2
CO3	3	3	3	1	3	2	2	3	2	2
CO4	3	3	3	3	1	3	2	3	2	2
CO5	3	3	3	3	1	3	2	3	2	2

S- STRONG

M – MEDIUM

L – LOW

CO / PO MAPPING:					
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COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	2	3	3
CO 2	3	3	2	3	3
CO 3	3	3	2	3	3
CO 4	3	3	2	3	3
CO 5	3	2	2	3	3
WEITAGE	15	15	10	15	15

WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	3	3	2	3	3
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LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	CELL AND TISSUES ,BLOOD, IMMUNE SYSTEM	12	PPT, Chalk & Talk, VIDEOS
II	NERVOUS SYSTEM , SENSE ORGANS	12	PPT, Chalk & Talk, Demo videos
III	HEART AND CIRCULATION, RESPIRATORY SYSTEM	10	PPT, Chalk & Talk, animated videos
IV	DIGESTIVE SYSTEM , EXCRETORY SYSTEM	12	PPT, Chalk & Talk
V	ENDOCRINE SYSTEM, REPRODUCTIVE SYSTEM	12	PPT, Chalk & Talk

**Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)**

Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of Questions	K - Level		
CI	CO1	K1 – K4	2	K1,K2	2 (K2 OR K2)	2(K3 OR K3)
AI	CO2	K1 – K4	2	K1,K2	2 (K2 OR K2)	2 (K4 OR K4)
CI	CO3	K1 – K4	2	K1,K2	2 (K2 OR K2)	2(K3 OR K3)
AII	CO4	K1 – K4	2	K1,K2	2 (K3 OR K3)	2 (K4 OR K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II							
	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	21.43	-
	K2	2	20		22	21.43	
	K3			16	16	28.57	42.86
	K4			16	16	28.57	57.14
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.57	-
	K2	2	10		12	21.43	
	K3		10	16	26	46.43	25.00
	K4			16	16	28.57	75.00
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K – LEVEL
			No. of Questions	K – Level		
1	CO1	K1,K2	2	K1,K2	2 (K1,K1)	2 (K2,K2)
2	CO2	K1,K2	2	K1,K2	2 (K2,K2)	2 (K2,K2)
3	CO3	K1,K2	2	K1,K2	2(K2,K2)	2 (K3,K3)
4	CO4	K1,K2	2	K1,K2	2 (K3,K3)	2 (K3,K3)
5	CO5	K1,K2	2	K1,K2	2 (K4,K4)	2 (K4,K4)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5	10		15	10.72	51.43
K2	5	20	32	57	40.71	
K3		10	32	42	30.00	30.00
K4		10	16	26	18.57	18.57
Marks	10	50	80	140	100	100

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions			PART – A		(10 x 1 = 10 Marks)
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K2		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K1		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K2		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K2		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K1		
OR					
11. b)	Unit - I	CO1	K1		
12. a)	Unit - II	CO2	K2		
OR					
12. b)	Unit - II	CO2	K2		
13. a)	Unit - III	CO3	K2		
OR					
13. b)	Unit - III	CO3	K2		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K4		
OR					
15. b)	Unit - V	CO5	K4		

Answer ALL the questions				PART – C	(5 x 8 = 40 Marks)
16. a)	Unit - I	CO1	K2		
OR					
16. b)	Unit - I	CO1	K2		
17. a)	Unit - II	CO2	K2		
OR					
17. b)	Unit - II	CO2	K2		
18. a)	Unit - III	CO3	K3		
OR					
18. b)	Unit - III	CO3	K3		
19. a)	Unit - IV	CO4	K3		
OR					
19. b)	Unit - IV	CO4	K3		
20. a)	Unit - V	CO5	K4		
OR					
20. b)	Unit - V	CO5	K4		



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	BASICS OF FOOD MICROBIOLOGY			
Course Code	23UFNCC22	L	P	C
Category	ELECTIVE COURSE	3	-	3

COURSE OBJECTIVES: To enable the students to :

- Gain knowledge on the characteristics of micro-organisms in food and environment.
- Understand the role of microorganisms in food spoilage, health and illness.
- Familiarize with the methods of controlling microorganisms.

UNIT - I Introduction to Microbes in Foods 15

Introduction to Microbes in Foods:

History and Development of Food Microbiology Classification of microorganisms. General morphological characteristics of bacteria, yeast, algae, mold, virus.

Characteristics of predominant microorganisms in food, sources of microorganisms in foods.

UNIT - II Microbial spoilage and contamination of food 10

Microbial spoilage and contamination of common food

Factors affecting growth of microorganisms- intrinsic and extrinsic. Sources of contamination and spoilage of common foods -Cereal and cereal products, fruits and vegetables, egg, meat and fish, milk and milk products.

UNIT - III Beneficial uses of microorganisms in food and health 15

Beneficial uses of microorganisms in food and health

Microorganisms used in fermented products - Alcoholic drinks, Dairy products, Bread, Vinegar, Pickled foods. Single-cell protein Food Bio preservatives of microbial origin. Intestinal Bacteria and Probiotics.

UNIT - IV Food poisoning and Food borne disease 15

Food poisoning and Food borne disease

Food poisoning/ intoxication and food infection- definition. Bacterial food poisoning – Staphylococcus aureus, Clostridium botulinum, Clostridium perfringens, Bacillus cereus

Food Infection- Salmonellosis, Shigellosis, Cholera, Gastroenteritis.

Measures to prevent food poisoning and food borne infection.

UNIT - V Microorganisms found in water, soil and sewage and control of microorganisms in food 20

Microorganisms found in water, soil, air and sewage-

List of microorganisms and diseases caused; Test for sanitary quality of water, Purification of water

Control of Microorganisms in food

Control of Access of Microorganisms: sanitation, sterilization and disinfection Control by Heat (Thermal Processing), Low Temperature, Reduced Water Activity and Drying, Low pH and Organic Acids, Modified Atmosphere, Reducing O-R Potential) Antimicrobial Preservatives and Bacteriophages Irradiation, Novel Processing Technologies, Combination of Methods (Hurdle Concept)

Total Lecture Hours 75

BOOKS FOR STUDY:

- Ananthanarayan and Paniker. (2017). Text book of Microbiology, Tenth Edition, OrientLongman Limited, Hyderabad
- Ramesh. V. (2007). Food Microbiology, MJP publishers, Chennai.
- Gerald McDonell. (2020). Block's Disinfection, Sterilization and Preservation. 6th edition. Lippincott Williams and Wilkins, Philadelphia.
- Virendra Kumar Pandey. (2021). Text book of Food Microbiology ISBN - 13:978
- WM Foster. (2021). Food Microbiology. CBS Publishers and Distributors.

BOOKS FOR REFERENCES:

- Parija SC. (2012) Textbook of Microbiology and Immunology, 2nd edition, Elsevier India.
- Garbutt J. (1997) Essentials of Food Microbiology, 2nd edition, Arnold publication, New York, 1997
- Adams M.R, Moss M.O and Peter.M (2016). Food Microbiology. 4th edition. Royal Society of Chemistry, United Kingdom.
- Frazier W.C and Westhoff D.C. (1995). Food Microbiology. 5th edition. Tata Mc Graw Hill Publishing Company Ltd, New Delhi. Jay J.M, Loessner MJ and Golden D.A. (2005).
- Modern Food Microbiology. 7th edition, CBS Publishers and Distributors, New Delhi.

WEB RESOURCES:

- ❖ <http://people.uleth.ca/~selibl/Biol3200/CourseNotes/MicroTaxonomyCh10.pdf>
- ❖ <https://www.cdc.gov/vaccines/hcp/conversations/downloads/vacsafe-understand-color-office.pdf>
- ❖ <https://www.who.int/news-room/fact-sheets/detail/food-safety>
- ❖ <https://epi.dph.ncdhhs.gov/cd/diseases/food.html>
- ❖ <http://vikaspedia.in/health/nutrition/food-borne-diseases-or-food-poisoning>
- ❖ <https://www.microrao.com/micronotes/sterilization.pdf>
- ❖ <https://ehs.colorado.edu/resources/disinfectants-and-sterilization-methods/>

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED		ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL			NATIONAL	✓	GLOBAL
Changes Made in the Course	Percentage of Change		50 %	No Changes Made			New Course	
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.								

COURSE OUTCOMES:	K LEVEL
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After studying this course, the students will be able to:

CO1	Comprehend the characteristics of microorganisms in food and its environment and apply the knowledge to control them	K1 to K4
CO2	Differentiate between organisms that are beneficial from those causing spoilage	K1 to K4
CO3	Explain the causes and prevention of food poisoning and food borne infections.	K1 to K4
CO4	Identify the microscopic structure of algae, molds, yeast, virus and bacteria	K1 to K4
CO5	Perform appropriate tests to identify the size, shape, arrangement and motility of organisms.	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	3	2	3	2	2	3
CO2	3	3	3	3	1	3	2	2	2	3
CO3	3	3	3	3	2	3	2	2	2	3
CO4	3	3	3	3	2	3	2	2	2	3
CO5	3	3	3	3	M	2	2	2	2	3

S- STRONG

M – MEDIUM

L – LOW

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3
CO 2	3	3	3	3	3
CO 3	3	3	3	3	3
CO 4	3	3	3	3	3
CO 5	3	3	3	3	3
WEITAGE	15	15	15	15	15
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	3	3	3	3	3

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	Introduction to Microbes in Foods	15	PPT, CHALK & TALK, videos
II	Microbial spoilage and contamination of food	15	PPT, CHALK & TALK, Google class
III	Beneficial uses of microorganisms in food and health	10	PPT, CHALK & TALK
IV	Food poisoning and Food borne disease	15	PPT, CHALK & TALK
V	Microorganisms found in water, soil and sewage and control of microorganisms in food	15	PPT, CHALK & TALK

**Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)**

Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of Questions	K - Level		
CI	CO1	K1 – K4	2	K1,K2	2 (K2 OR K2)	2(K3 OR K3)
AI	CO2	K1 – K4	2	K1,K2	2 (K2 OR K2)	2 (K4 OR K4)
CI	CO3	K1 – K4	2	K1,K2	2 (K2 OR K2)	2(K3 OR K3)
AII	CO4	K1 – K4	2	K1,K2	2 (K3 OR K3)	2 (K4 OR K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II							
	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	21.43	-
	K2	2	20		22	21.43	
	K3			16	16	28.57	42.86
	K4			16	16	28.57	57.14
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.57	-
	K2	2	10		12	21.43	
	K3		10	16	26	46.43	25.00
	K4			16	16	28.57	75.00
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K – LEVEL
			No. of Questions	K – Level		
1	CO1	K1,K2	2	K1,K2	2 (K1,K1)	2 (K2,K2)
2	CO2	K1,K2	2	K1,K2	2 (K2,K2)	2 (K2,K2)
3	CO3	K1,K2	2	K1,K2	2(K2,K2)	2 (K3,K3)
4	CO4	K1,K2	2	K1,K2	2 (K3,K3)	2 (K3,K3)
5	CO5	K1,K2	2	K1,K2	2 (K4,K4)	2 (K4,K4)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5	10		15	10.72	51.43
K2	5	20	32	57	40.71	
K3		10	32	42	30.00	30.00
K4		10	16	26	18.57	18.57
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions			PART – A		(10 x 1 = 10 Marks)
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K2		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K1		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K2		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K2		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K1		
OR					
11. b)	Unit - I	CO1	K1		
12. a)	Unit - II	CO2	K2		
OR					
12. b)	Unit - II	CO2	K2		
13. a)	Unit - III	CO3	K2		
OR					
13. b)	Unit - III	CO3	K2		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K4		
OR					
15. b)	Unit - V	CO5	K4		

Answer ALL the questions				PART – C	(5 x 8 = 40 Marks)
16. a)	Unit - I	CO1	K2		
OR					
16. b)	Unit - I	CO1	K2		
17. a)	Unit - II	CO2	K2		
OR					
17. b)	Unit - II	CO2	K2		
18. a)	Unit - III	CO3	K3		
OR					
18. b)	Unit - III	CO3	K3		
19. a)	Unit - IV	CO4	K3		
OR					
19. b)	Unit - IV	CO4	K3		
20. a)	Unit - V	CO5	K4		
OR					
20. b)	Unit - V	CO5	K4		



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	BASICS OF FOOD MICROBIOLOGY – PRACTICAL			
Course Code	23UFNCP21	L	P	C
Category	ELECTIVE COURSE	-	2	2

COURSE OBJECTIVES: To enable the students to :

- To enable the students to :
- To Study of different equipment's in a microbiology lab.
- To learn the Safety practices in microbiology laboratory.
- To study the Microscopy- principles, parts, function and operation
- To Microscopic structure of algae, molds, yeast, virus and bacteria.
- To examine the organisms using simple staining, gram staining and hanging drop technique.
- To demonstrate the sterilization, media preparation and culture streak, pour plate technique.

Course content

1. Study of different equipments in a microbiology lab.
2. Safety practices in microbiology laboratory.
3. Microscopy- principles, parts, function and operation.
4. Microscopic structure of algae, molds, yeast, virus and bacteria.
5. Examination of organisms using simple staining technique.
6. Examination of organisms using gram staining technique.
7. Examination of motility of bacteria using hanging drop technique.
8. Demonstration of sterilization of glassware using hot air oven, autoclave.
9. Demonstration of media preparation-Broth, deep, slant and plates.
10. Demonstration of culture techniques-streak, pour plate.

Visit (at least one) to food processing units or any other organization dealing with advanced methods in food microbiology

BOOKS FOR STUDY:

- Ananthanarayan and Paniker. (2017). Text book of Microbiology, Tenth Edition, Orient Longman Limited, Hyderabad
- Ramesh. V. (2007). Food Microbiology, MJP publishers, Chennai.
- Gerald McDonell. (2020). Block's Disinfection, Sterilization and Preservation. 6th edition. Lippincott Williams and Wilkins, Philadelphia.
- Virendra Kumar Pandey. (2021). Text book of Food Microbiology ISBN -13:978
- WM Foster. (2021). Food Microbiology. CBS Publishers and Distributors.

BOOKS FOR REFERENCES:

- Parija SC. (2012) Textbook of Microbiology and Immunology, 2nd edition, Elsevier India.
- Garbutt J. (1997) Essentials of Food Microbiology, 2nd edition, Arnold publication, New York, 1997
- Adams M.R, Moss M.O and Peter.M (2016). Food Microbiology. 4th edition. Royal Society of Chemistry, United Kingdom.
- Frazier W.C and Westhoff D.C. (1995). Food Microbiology. 5th edition. Tata Mc Graw Hill Publishing Company Ltd, New Delhi. Jay J.M, Loessner MJ and Golden D.A. (2005).
- Modern Food Microbiology. 7th edition, CBS Publishers and Distributors, New Delhi.

WEB RESOURCES:

- ❖ <http://people.uleth.ca/~selibl/Biol3200/CourseNotes/MicroTaxonomyCh10.pdf>
- ❖ <https://www.cdc.gov/vaccines/hcp/conversations/downloads/vacsafe-understand-color-office.pdf>
- ❖ <https://www.who.int/news-room/fact-sheets/detail/food-safety>
- ❖ <https://epi.dph.ncdhs.gov/cd/diseases/food.html>
- ❖ <http://vikaspedia.in/health/nutrition/food-borne-diseases-or-food-poisoning>
- ❖ <https://www.microrao.com/micronotes/sterilization.pdf>

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED		ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL	✓	GLOBAL	
Changes Made in the Course	Percentage of Change			No Changes Made			New Course	✓

*** Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.**

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	Comprehend the characteristics of microorganisms in food and its environment and apply the knowledge to control them	K1 to K4
CO2	Differentiate between organisms that are beneficial from those causing spoilage	K1 to K4
CO3	Explain the causes and prevention of food poisoning and food borne infections.	K1 to K4
CO4	Identify the microscopic structure of algae, molds, yeast, virus and bacteria	K1 to K4
CO5	Perform appropriate tests to identify the size, shape, arrangement and motility of organisms.	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	3	2	3	2	2	3
CO2	3	3	3	3	1	3	2	2	2	3
CO3	3	3	3	3	2	3	2	2	2	3
CO4	3	3	3	3	2	3	2	2	2	3
CO5	3	3	3	3	M	2	2	2	2	3

S- STRONG		M – MEDIUM			L – LOW	
CO / PO MAPPING:						
COS	PSO1	PSO2	PSO3	PSO4	PSO5	
CO 1	3	3	3	3	3	
CO 2	3	3	3	3	3	
CO 3	3	3	3	3	3	
CO 4	3	3	3	3	3	
CO 5	3	3	3	3	3	
WEITAGE	15	15	15	15	15	
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	3	3	3	3	3	

LESSON PLAN:

SL.NO	COURSE NAME	HRS	PEDAGOGY
1.	Study of different equipment's in a microbiology lab.	8	Lab
2.	Safety practices in microbiology laboratory.	7	Lab
3.	Microscopy- principles, parts, function and operation.	7	Lab
4.	Microscopic structure of algae, molds, yeast, virus and bacteria.	8	Lab
5.	Examination of organisms using simple staining technique.	5	Lab
6.	Examination of organisms using gram staining technique.	5	Lab
7.	Examination of motility of bacteria using hanging drop technique.	8	Lab
8.	Demonstration of sterilization of glassware using hot air oven, autoclave.	7	Lab
9.	Demonstration of media preparation-Broth, deep, slant and plates.	7	Lab
10	Demonstration of culture techniques-streak, pour plate.	7	Lab
11.	Visit (at least one) to food processing units or any other organization dealing with advanced methods in food microbiology.	6	Lab

**Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)**

INTERNAL	COs	K LEVEL	MAJOR	MINOR	SPOTTERS	RECORD	VIVA
CI AI	CO1	K1					5
	CO2	K2				5	
	CO3	K3			5		
	CO4	K4		5			
	CO5	K4	5				
Question Pattern		No. of Questions to be asked	2 (A-Written B-Practical Demo)	2 (A-Written B-Practical Demo)	2	1	5
		No. of Questions to be answered	2	2	2	1	5
		Marks for each question	A-3 B-2	A-3 B-2	5	10	1
		Total Marks for each section	5	5	5	5	5

Distribution of Marks with K Level

	K Level	Major	Minor	Spotters	Record	Viva	Total Marks	% of Marks without choice	Consolidated %
CIA	K1	-	-	-	-	5	5	6.66	6.66
	K2	-	-	-	5	-	5	6.66	6.66
	K3	-	-	5	-	-	5	6.66	6.66
	K4	-	5	-	-	-	5	6.66	6.66
	K4	5					5	6.66	6.66

**Summative Examination – Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)**

EXTERNAL	COs	K LEVEL	MAJOR	MINOR	SPOTTERS	RECORD	VIVA
CI AI	CO1	K1					5
	CO2	K2				5	
	CO3	K3			20		
	CO4	K4		20			
	CO5	K4	25				
Question Pattern	No. of Questions to be asked	2 (A-Written B-Practical Demo)	2 (A-Written B-Practical Demo)		2	1	5
	No. of Questions to be answered	2	2		2	1	5
	Marks for each question	A-20 B-5	A-15 B-5		5	10	1
	Total Marks for each section	25	20		20	5	5

Distribution of Marks with K Level CIA

	K Level	Major	Minor	Spotters	Record	Viva	Total Marks	% of Marks without choice	Consolidated %
CIA	K1					5	5	6.6	6.6
	K2				5		5	6.6	6.6
	K3			20			20	26.6	26.6
	K4		20				20	26.6	26.6
	K4	25					25	33.3	33.3
	Marks	25	20	20	5	5	75	100	100



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	CHEMISTRY FOR BIOLOGICAL SCIENCES			
Course Code	23UCHEA21	L	P	C
Category	ELECTIVE COURSE	4	-	3
COURSE OBJECTIVES: To enable the students to :				
This course aims to provide knowledge on				
<ul style="list-style-type: none">➤ Nomenclature of carbohydrates.➤ Amino Acids and Essential elements of bio system➤ Provide fundamentals of photo chemistry➤ Importance of specialty drugs and➤ Separation and purification techniques.				
UNIT - I CARBOHYDRATES		12		
Classification, preparation and properties of glucose and fructose. Discussion of open chain ring structures of glucose and fructose. Glucose-fructose interconversion. Preparation and properties of sucrose, starch and cellulose.				
UNIT - II AMINO ACIDS AND ESSENTIAL ELEMENTS OF BIOSYSTEM		12		
Classification - preparation and properties of alanine, preparation of dipeptides using Bergmann method - Proteins- classification – structure - Colour reactions – Biological functions – nucleosides -nucleotides – RNA and DNA – structure. Essentials of trace metals in biological system-Na, Cu, K, Zn, Fe, Mg.				
UNIT - III PHOTOCHEMISTRY		12		
Grothus - Drapper's law and Stark-Einstein's law of photochemical equivalence, Quantum yield - Hydrogen -chloride reaction. Phosphorescence, fluorescence, chemiluminescence and photosensitization and photosynthesis (definition with examples).				
UNIT - IV ANALYTICAL CHEMISTRY		12		
Introduction qualitative and quantitative analysis. Principles of volumetric analysis. Separation and purification techniques: extraction, distillation and crystallization. Chromatography: principle and application of column, paper and thin layer chromatography.				
UNIT - V DRUGS AND SPECIALITY CHEMICALS		12		
Definition, structure and uses: Antibiotics viz., Penicillin, Chloramphenicol and Streptomycin; Anaesthetics viz., Chloroform and ether; Antipyretics viz., aspirin, paracetamol and ibuprofen; Artificial Sweeteners viz., saccharin, Aspartame and cyclamate; Organic Halogen compounds viz., Freon, Teflon.				
Total Lecture Hours				60

BOOKS FOR STUDY:

- V.Veeraiyan, Textbook of Ancillary Chemistry; High mount publishing house, Chennai, first edition,2009.
- S.Vaithyanathan, Text book of Ancillary Chemistry; Priya Publications, Karur,2006.
- ArunBahl, B.S.Bahl, Advanced Organic Chemistry; S.Chand and Company, New Delhi, twenty third edition,2012.

BOOKS FOR REFERENCES:

- Jayashree gosh, Fundamental Concepts of Applied Chemistry; Sultan & Chand, Edition 2006.
- P.L.Soni, H.M.Chawla, Text Book of Organic Chemistry; Sultan Chand & sons, New Delhi, twenty ninth editions, 2007.

WEB RESOURCES:

- ❖ <https://archive.nptel.ac.in/content/storage2/courses/104103071/pdf/mod11.pdf>
- ❖ <https://nptel.ac.in/courses/104105038>
- ❖ <https://archive.nptel.ac.in/noc/courses/noc21/SEM2/noc21-cy28/>

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED		ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL	✓	GLOBAL	
Changes Made in the Course	Percentage of Change		60 %	No Changes Made		New Course		
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.								

COURSE OUTCOMES:**K LEVEL**

After studying this course, the students will be able to:

CO1	Explain the preparation and property of carbohydrate.	K1 to K4
CO2	Enlighten the biological role of transition metals, amino acids and nucleic acids.	K1 to K4
CO3	Outline the various type of photochemical process.	K1 to K4
CO4	Analyzevariousmethodstoidentifyanappropriatemethodfortheseparationof chemicalcomponents.	K1 to K4
CO5	Demonstrate the structure and uses of antibiotics, anesthetics, antipyretics and artificial sugars.	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	2	2	2	1	2	2	3
CO2	3	3	3	2	2	2	1	2	2	3
CO3	3	3	3	2	2	2	1	2	2	3

CO4	3	3	3	2	2	2	1	2	2	3
CO5	3	3	3	2	2	2	1	2	2	3

S- STRONG

M – MEDIUM

L – LOW

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3
CO 2	3	3	3	3	3
CO 3	3	3	3	3	3
CO 4	3	3	3	3	3
CO 5	3	2	3	2	2
WEITAGE	15	15	15	15	15
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	3	3	3	3	3

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	CARBOHYDRATES Classification, preparation and properties of glucose and fructose. Discussion of open chain ring structures of glucose and fructose. Glucose-fructose interconversion. Preparation and properties of sucrose, starch and cellulose.	12	Lecturing PowerPoint Seminar
II	AMINO ACIDS AND ESSENTIAL ELEMENTS OF BIOSYSTEM Classification - preparation and properties of alanine, preparation of dipeptides using Bergmann method - Proteins- classification – structure - Colour reactions – Biological functions – nucleosides -nucleotides – RNA and DNA – structure. Essentials of trace metals in biological system-Na, Cu, K, Zn, Fe, Mg.	12	
III	PHOTOCHEMISTRY Grothus - Drapper's law and Stark-Einstein's law of photochemical equivalence, Quantum yield - Hydrogen - chloride reaction. Phosphorescence, fluorescence, chemiluminescence and photosensitization and photosynthesis (definition with examples).	12	

IV	ANALYTICAL CHEMISTRY Introduction qualitative and quantitative analysis. Principles of volumetric analysis. Separation and purification techniques: extraction, distillation and crystallization. Chromatography: principle and application of column, paper and thin layer chromatography.	12	
V	DRUGS AND SPECIALITY CHEMICALS Definition, structure and uses: Antibiotics viz., Penicillin, Chloramphenicol and Streptomycin; Anaesthetics viz., Chloroform and ether; Antipyretics viz., aspirin, paracetamol and ibuprofen; Artificial Sweeteners viz., saccharin, Aspartame and cyclamate; Organic Halogen compounds viz., Freon, Teflon.	12	

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)						
Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of Questions	K - Level		
CI	CO1	K1 – K4	2	K1,K2	2 (K2 OR K2)	2(K3 OR K3)
AI	CO2	K1 – K4	2	K1,K2	2 (K2 OR K2)	2 (K4 OR K4)
CI	CO3	K1 – K4	2	K1,K2	2 (K2 OR K2)	2(K3 OR K3)
AII	CO4	K1 – K4	2	K1,K2	2 (K3 OR K3)	2 (K4 OR K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II							
	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	21.43	-
	K2	2	20		22	21.43	
	K3			16	16	28.57	42.86
	K4			16	16	28.57	57.14
	Marks	4	20	32	56	100	100
CIA II	K1	2			2	3.57	-
	K2	2	10		12	21.43	
	K3		10	16	26	46.43	25.00
	K4			16	16	28.57	75.00
	Marks	4	20	32	56	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K – LEVEL
			No. of Questions	K – Level		
1	CO1	K1,K2	2	K1,K2	2 (K1,K1)	2 (K2,K2)
2	CO2	K1,K2	2	K1,K2	2 (K2,K2)	2 (K2,K2)
3	CO3	K1,K2	2	K1,K2	2(K2,K2)	2 (K3,K3)
4	CO4	K1,K2	2	K1,K2	2 (K3,K3)	2 (K3,K3)
5	CO5	K1,K2	2	K1,K2	2 (K4,K4)	2 (K4,K4)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5	10		15	10.72	51.43
K2	5	20	32	57	40.71	
K3		10	32	42	30.00	30.00
K4		10	16	26	18.57	18.57
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions			PART – A		(10 x 1 = 10 Marks)
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K2		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K1		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K2		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K2		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K2		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K1		
OR					
11. b)	Unit - I	CO1	K1		
12. a)	Unit - II	CO2	K2		
OR					
12. b)	Unit - II	CO2	K2		
13. a)	Unit - III	CO3	K2		
OR					
13. b)	Unit - III	CO3	K2		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K4		
OR					
15. b)	Unit - V	CO5	K4		

Answer ALL the questions				PART – C	(5 x 8 = 40 Marks)
16. a)	Unit - I	CO1	K2		
OR					
16. b)	Unit - I	CO1	K2		
17. a)	Unit - II	CO2	K2		
OR					
17. b)	Unit - II	CO2	K2		
18. a)	Unit - III	CO3	K3		
OR					
18. b)	Unit - III	CO3	K3		
19. a)	Unit - IV	CO4	K3		
OR					
19. b)	Unit - IV	CO4	K3		
20. a)	Unit - V	CO5	K4		
OR					
20. b)	Unit - V	CO5	K4		



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	FOUNDATIONS OF BAKING AND CONFECTIONERY			
Course Code	23UFNNM21	L	P	C
Category	SKILL ENHANCEMENT	2	-	2
COURSE OBJECTIVES:				
<ul style="list-style-type: none">➤ To Gain insight into the planning and operation of bakery unit.➤ To Familiarize with the equipments and tools, hygienic practices relating to baking➤ To Understand the role of various ingredients used in the making of breads, cakes, cookies, pastries and various confectioneries➤ To Acquire skills in baking and confectionery with an emphasis on special dietary needs❖ To develop skill around different bakery and confectionery				
UNIT - I	An Overview of Bakery Industry			10
Current status and growth of bakery industry in India. Baking – principles, process. Layout and organization of a bakery unit. Equipment and tools used in baking and confectionery. Bakery sanitation and personnel hygiene.				
UNIT - II	Ingredients in Bakery and Confectionery			10
Ingredients - Flour, Sugar, Shortenings, Egg, Leavening agents-yeast, baking soda, baking powder, chocolates, cocoa powder. Other ingredients- salt, milk and milk derivatives, malt products, dough improver, oxidizing agents, flavours and colors, nuts, spices and condiments, preserved and candied fruit peels.				
UNIT-III	Breads and Cakes			15
Bread - ingredients, types of breads, faults and its prevention Cakes – ingredients, types of cakes, cake judging, faults and remedies. Different types and techniques of cake decoration -icings and fillings.				
UNIT - IV	Pastries, Cookies and Biscuits			15
Pastries - types of pastries- puff pastry, short crust, phyllo pastry, flaky pastry, choux pastry Cookies & biscuits – ingredients, types and processing.				
UNIT - V	Confectionery and Marketing of Baked Products			10
Chocolates- production, types, chocolate decorations Sugar based confectionery – fudge, fondant, sugar candies. Marketing and sales promotion - costing, packaging and labeling.				
Total Lecture Hours				60

BOOKS FOR STUDY:

- Dubey. S.C (2002) Basic Baking.4th Edition. Published by the Society of Indian Bakers, New Delhi.
- Sarah R. Lebensky, Pricilla et al., (2004) Textbook of Baking and Pastry Fundamentals, third edition, Pearson Education Ltd.
- The Culinary Institute of America, Baking & Pastry: Mastering the Art and Craft, John Wiley & Sons, Inc New Jersey. 2009.

BOOKS FOR REFERENCES:

- John Kingslee (2006) A Professional Text book to Bakery and Confectionary. New Age International Pvt Limited Publisher, New Delhi.
- Uttam K Singh (2011). Theory of Bakery and Confectionary- An Operational Approach. Kanishka Publishers and Distributors, New Delhi.

WEB RESOURCES:

- ❖ <https://www.youtube.com/watch?v=dfvkplBBO2g>
- ❖ <https://www.lifestyleasia.com/ind/food-drink/dining/bookmark-the-best-baking-youtube-channels-to-bake-like-a-pro/>
- ❖ www.bakels.in

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED		ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL		GLOBAL	✓
Changes Made in the Course	Percentage of Change			No Changes Made			New Course	✓
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.								

COURSE OUTCOMES:								K LEVEL	
After studying this course, the students will be able to:									
CO1	Understand the principles and process of baking and confectionery							K1 to K2	
CO2	Acquire knowledge on role of various ingredients used in baking and confectionery.							K1 to K2	
CO3	Develop skills to design baked goods using alternative healthy ingredients to cater to special dietary needs							K1 to K2	
CO4	Identify and control faults in baking							K1 to K2	
CO5	Enhance entrepreneurial skills in bakery and confectionery to establish a bakery unit.							K1 to K2	

MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	2	3	2	2	2	2
CO2	3	3	3	3	2	2	3	2	3	2
CO3	3	3	3	3	3	3	3	2	3	2
CO4	3	3	3	2	2	2	1	1	1	1

CO5	3	3	3	3	3	2	3	3	3	3	
S- STRONG			M – MEDIUM				L – LOW				
CO / PO MAPPING:											
COS	PSO1	PSO2	PSO3	PSO4	PSO5						
CO 1	3	3	3	3	3						
CO 2	3	3	3	3	3						
CO 3	3	3	3	3	3						
CO 4	3	3	3	3	3						
CO 5	3	3	3	3	3						
WEITAGE	15	15	15	15	15						
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	3	3	3	3	3						
LESSON PLAN:											
UNIT	COURSE NAME						HRS	PEDAGOGY			
I	An Overview of Bakery Industry Current status and growth of bakery industry in India. Baking – principles, process. Layout and organization of a bakery unit. Equipment and tools used in baking and confectionery. Bakery sanitation and personnel hygiene.						10	Lecturing PowerPoint Seminar			
II	Ingredients in Bakery and Confectionery Ingredients - Flour, Sugar, Shortenings, Egg, Leavening agents- yeast, baking soda, baking powder, chocolates, cocoa powder. Other ingredients- salt, milk and milk derivatives, malt products, dough improver, oxidizing agents, flavours and colors, nuts, spices and condiments, preserved and candied fruit peels.						10	Lecturing PowerPoint Seminar			
III	Breads and Cakes Bread - ingredients, types of breads, faults and its prevention Cakes – ingredients, types of cakes, cake judging, faults and remedies. Different types and techniques of cake decoration -icings and fillings.						15	Lecturing PowerPoint Seminar			
IV	Pastries, Cookies and Biscuits Pastries - types of pastries- puff pastry, short crust, phyllo pastry, flakypastry, choux pastry						15	Lecturing PowerPoint Seminar			
V	Confectionery and Marketing of Baked Products Chocolates- production, types, chocolate decorations Sugar based confectionery – fudge, fondant, sugar candies.						10	Lecturing PowerPoint Seminar			

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)				
Internal	Cos	K Level	Section A	
			MCQs	
			No. of. Questions	K - Level
CI AI	CO1	K1 – K2	25	K1,K2
	CO2	K1 – K2	25	K1,K2
CI AII	CO3	K1 – K2	25	K1,K2
	CO4	K1 – K2	25	K1,K2
Question Pattern CIA I & II		No. of Questions to be asked	50	
		No. of Questions to be answered	50	
		Marks for each question	1	
		Total Marks for each section	50	

* Two Formative examinations will be conducted as a part of Continuous Internal Assessment under which, 50 MCQ's will be asked [50X1=50 marks] from any 4 CO's. (Ist Test-2 CO's & IInd Test-2 CO's) in equal weightage

Distribution of Marks with K Level CIA I & CIA II					
	K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	100	100
CIA II	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)				
S. No	COs	K - Level	Section A (MCQs)	
			No. of Questions	K – Level
1	CO1	K1-K2	15	K1,K2
2	CO2	K1-K2	15	K1,K2
3	CO3	K1-K2	15	K1,K2
4	CO4	K1-K2	15	K1,K2
5	CO5	K1-K2	15	K1,K2
No. of Questions to be Asked			75	
No. of Questions to be answered			75	
Marks for each question			1	
Total Marks for each section			75	
(Figures in parenthesis denotes, questions should be asked with the given K level)				

In summative examinations, 75 MCQ's will be asked [75X1=75 marks] from all 5 CO's in equal weightage.

Distribution of Marks with K Level				
K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidated %
K1	40	40	53	100
K2	35	35	47	
K3				
K4				
Marks		75	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.				



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	FUNDAMENTALS OF ART AND DESIGN			
Course Code	23UFNSC21	L	P	C
Category	SKILL ENHANCEMENT COURSE	2	-	2
COURSE OBJECTIVES: To enable students to:				
<ul style="list-style-type: none">➤ Understand the elements, principles of design and principles of housing.➤ Learn the concepts of colour and create colour scheme for interiors.➤ Learn the application of art principles, elements of design, colour schemes and housing principles in creating aesthetic interiors.				
UNIT - I INTRODUCTION TO ART AND DESIGN				8
Introduction to art and design - Importance of design, Application of good taste and Role of good designer. Types of design- Structural and Decorative design. Classification of Decorative Design - Naturalistic Stylized, Abstract and Geometrical Design. Practical: Sketching different types of designs.				
UNIT - II ELEMENTS OF DESIGN				8
Elements of design - Line and its types – horizontal, vertical, diagonal, curved, zigzag; Shape; Form – 2D&3D, Size, Texture- tactile and visual; light, pattern, Space- positive & negative and Colour-warm and cool. Application of elements to form design. Practical: Creating Optical illusion in Interiors.				
UNIT - III PRINCIPLES OF DESIGN				15
Principles of Design - Harmony – harmony of line, shape, size, texture and ideas. Balance – symmetrical, asymmetrical and radial. Proportion – proportional relationships, Greek oblong and Scale. Emphasis – emphasis through grouping of objects, use of contrast color, decoration, plain background space, unusual lines, shapes, and sizes. Rhythm – achieving rhythm through repetition of shapes, progression of size, continuous line movement, radiation, and gradation. Practical: Application of Art Principles in arranging areas in interiors.				
UNIT - IV COLOUR				8
Colour - Definition, Qualities of colour, Hue, Value, Intensity. Tints and Shades. The colour wheel/systems - Prang colour system, Physicist's Theory, Psychologist's Theory, Harmonies of related colors- Monochromatic, Analogous and Accented Neutral; Harmonies of contrasting colours – Direct, double, split and triad. Practical: Painting different rooms with various colour harmonies.				
UNIT - V HOUSING				8
Housing - Selection of site and functions of house. Basic principles of planning a life space - Orientation, Grouping, Roominess, Lighting, Circulation, Storage Facilities and Privacy. Creating a life space- Factors in planning different rooms – Living Room, Bedroom, Dressing Room, Dining, Kitchen, Study Room, Store room, Bathroom, Utility space, Staircase and Verandah. Practical: Planning layout for different areas in interiors.				
Total Lecture Hours				60

BOOKS FOR STUDY:

- ❖ Varghese, M.A., Ogale, N.N and Srinivasan K (2017), “Home Management” second edition, New age International publishers.
- ❖ [Sylvia M. Asay](#) (2021) “Family resource management”, SAGE Publications Inc; Fourth edition
- ❖ Gary Dessler & Biju Varrkey (2020) “Human Resource Management” Pearson Education publication.
- ❖ Verma (2018) Fundamentals of Home Management: Context and Concepts Lambert publication

BOOKS FOR REFERENCES:

- Andal. A and Parimalam.P, (2008), “A Text Book of Interior Decoration”, Satish SerialPublishing House.
- Chaudhari, S.N. (2006), “Interior Design”, Aavishkar Publishers, Jaipur.
- Goldstein, (1976), “Art in Every Day Life”, Oxford and IBH Publishing House.
- Kasu, A.A. 2005, “Interior Design”, Ashish Book centre Delhi.
- P.C. Varghese (2013), “Building Construction”, PHI Learning Private Limited.
- Premavathy Seetharaman and Parveen Pannu, (2009), “Interior Design and Decoration”, CBSPublishers and Distributors Pvt Ltd. New Delhi.

WEB RESOURCES:

- ❖ <https://www.apartmenttherapy.com/modern-vs-contemporary-vs-minimalist-design-261783>
- ❖ https://www.google.co.in/?gfe_rd=cr&ei=oJE8VvucFM0l8wfe0ZnICw#tbn=vid&q=principlesofdesignininteriordesign
- ❖ <http://www.docstoc.com/docs/108663367/The-Munsell-and-Prang-Color-Systems>
- ❖ <https://www.decorilla.com/online-decorating/transitional-interior-design/>

Nature of Course	EMPLOYABILITY		SKILL ORIENTED		✓	ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL	REGIONAL	NATIONAL		✓	GLOBAL		
Changes Made in the Course	Percentage of Change		No Changes Made			New Course		✓

*** Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.**

COURSE OUTCOMES:										K LEVEL
After studying this course, the students will be able to:										
CO1	Classify design types like structural and decorative design									K1 to K2
CO2	Use different elements of design appropriately in creating design objects.									K1 to K2
CO3	Apply the Art principles in Interior Design.									K1 to K2
CO4	Apply colour harmonies in various rooms.									K1 to K2
CO5	Explain the principles in planning a life space									K1 to K2

MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	1	3	3	3	3	3	2	2	3	3
CO2	3	3	3	3	3	3	3	3	3	3
CO3	3	2	3	3	2	3	3	2	3	3
CO4	3	3	3	3	3	3	2	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3
S- STRONG			M – MEDIUM				L – LOW			

CO / PO MAPPING:					
COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3
CO 2	3	3	3	3	3
CO 3	3	3	3	3	3
CO 4	3	3	3	3	3
CO 5	3	3	3	3	3
WEITAGE	15	15	15	15	15
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	3	3	3	3	3

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	<p>Introduction to art and design - Importance of design, Application of good taste and Role of good designer.Types of design- Structural and Decorative design. Classification of Decorative Design - Naturalistic Stylized, Abstract and Geometrical Design.</p> <p>Practical: Sketching different types of designs.</p>	10	Lecturing PowerPoint Seminar
II	<p>Elements of design - Line and its types – horizontal, vertical, diagonal, curved, zigzag; Shape; Form – 2D&3D, Size, Texture- tactile and visual; light, pattern, Space- positive & negative and Colour-warm and cool.</p> <p>Application of elements to form design.</p> <p>Practical: Creating Optical illusion in Interiors.</p>	10	Lecturing PowerPoint Seminar
III	<p>Principles of Design - Harmony – harmony of line, shape, size, texture and ideas.Balance – symmetrical, asymmetrical and radial. Proportion – proportional relationships, Greek oblong and Scale.</p> <p>Emphasis – emphasis through grouping of objects, use of contrast color, decoration,plain background space, unusual lines, shapes, and sizes.</p> <p>Rhythm – achieving rhythm through repetition of shapes, progression of size,continuous line movement, radiation, and gradation.</p> <p>Practical: Application of Art Principles in arranging areas in interiors</p>	20	Lecturing PowerPoint Seminar
IV	<p>Colour - Definition, Qualities of colour, Hue, Value, Intensity. Tints and Shades. The colour wheel/systems - Prang colour system, Physicist’s Theory, Psychologist’s Theory, Harmonies of related colors- Monochromatic, Analogous and Accented Neutral; Harmonies of contrasting colours – Direct, double, split and triad.</p> <p>Practical: Painting different rooms with various colour harmonies.</p>	10	Lecturing PowerPoint Seminar
V	<p>Housing - Selection of site and functions of house. Basic principles of planning a life space - Orientation, Grouping, Roominess, Lighting, Circulation, Storage Facilities and Privacy. Creating a life space- Factors in planning different rooms – Living Room, Bedroom, Dressing Room, Dining, Kitchen, Study Room, Store room, Bathroom, Utility space, Staircase and Verandah.</p> <p>Practical: Planning layout for different areas in interiors.</p>	10	Lecturing PowerPoint Seminar

**Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)**

Internal	Cos	K Level	Section A	
			MCQs	
			No. of. Questions	K - Level
CI	CO1	K1 – K2	25	K1,K2
AI	CO2	K1 – K2	25	K1,K2
CI	CO3	K1 – K2	25	K1,K2
AII	CO4	K1 – K2	25	K1,K2
Question Pattern CIA I & II		No. of Questions to be asked	50	
		No. of Questions to be answered	50	
		Marks for each question	1	
		Total Marks for each section	50	

* Two Formative examinations will be conducted as a part of Continuous Internal Assessment under which, 50 MCQ's will be asked [50X1=50 marks] from any 4 CO's. (Ist Test-2 CO's & IInd Test-2 CO's) in equal weightage

Distribution of Marks with K Level CIA I & CIA II					
	K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	100	100
CIA II	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)				
S. No	COs	K - Level	Section A (MCQs)	
			No. of Questions	K – Level
1	CO1	K1-K2	15	K1,K2
2	CO2	K1-K2	15	K1,K2
3	CO3	K1-K2	15	K1,K2
4	CO4	K1-K2	15	K1,K2
5	CO5	K1-K2	15	K1,K2
No. of Questions to be Asked			75	
No. of Questions to be answered			75	
Marks for each question			1	
Total Marks for each section			75	
(Figures in parenthesis denotes, questions should be asked with the given K level)				

In summative examinations, 75 MCQ's will be asked [75X1=75 marks] from all 5 CO's in equal weightage.

Distribution of Marks with K Level				
K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidated %
K1	40	40	53	100
K2	35	35	47	
K3				
K4				
Marks		75	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.				

B.Sc., FOOD SCIENCE & NUTRITION

Syllabus

Program Code: UFN

2023 - Onwards



MANNAR THIRUMALAI NAICKER COLLEGE

(AUTONOMOUS)

Re-accredited with "A" Grade by NAAC

PASUMALAI, MADURAI – 625 004

**MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS),
MADURAI – 625 004**

B.SC FOOD SCIENCE AND NUTRITION CURRICULUM

(For the students admitted from the academic year 2023-2024 onwards)

Course Code	Title of the Course	Hrs	Credits	Maximum Marks		
				Int	Ext	Total
THIRD SEMESTER						
Part – I	Tamil / Alternative course					
23UTAGT31	தமிழக வரலாறும் பண்பாடும்	6	3	25	75	100
Part – II	English					
23UENGE31	GENERAL ENGLISH - III	6	3	25	75	100
Part - III	Core course					
23UFNCC31	HUMAN NUTRITION	5	5	25	75	100
Part - III	Elective courses					
23UCHEA32	CHEMISTRY FOR BIOLOGICAL SCIENCES – II	5	5	25	75	100
23UFNEC31	FOOD SAFETY AND QUALITY CONTROL	4	4	25	75	100
Part - IV	Skill Based courses					
23UFNSP31	FOOD PRESERVATION – PRACTICAL	2	2	25	75	100
23UFNSC31	CHANGING TRENDS IN EXTENSION EDUCATION	1	1	25	75	100
Part - IV	Mandatory course					
23UEVSG41	ENVIRONMENTAL STUDIES	1	-	-	-	-
Total		30	23	175	525	700
FOURTH SEMESTER						
Part – I	Tamil / Alternative course					
23UTAGT41	தமிழும் அறிவியலும்	6	3	25	75	100
Part – II	English					
23UENGE41	GENERAL ENGLISH - IV	6	3	25	75	100
Part - III	Core courses					
23UFNCC41	NUTRITIONAL BIOCHEMISTRY	5	5	25	75	100
23UFNCP41	NUTRITION AND NUTRITIONAL BIOCHEMISTRY – PRACTICAL	4	4	25	75	100
Part - III	Elective course					
23UFNEC41	HUMAN DEVELOPMENT	4	3	25	75	100
Part - IV	Skill Based courses					
23UFNSC41	FOUNDATIONS OF ENTREPRENEURSHIP	2	2	25	75	100
23UCSSP41	COMPUTER APPLICATIONS IN HOME SCIENCE	2	2	25	75	100
Part - IV	Mandatory course					
23UEVSG41	ENVIRONMENTAL STUDIES	1	2	25	75	100
Total		30	24	200	600	800

THIRD SEMESTER



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	HUMAN NUTRITION			
Course Code	23UFNCC31	L	P	C
Category	CORE COURSE	5	-	5

COURSE OBJECTIVES:

- ❖ Understand the importance of various macronutrients in relation to health.
- ❖ Highlight dietary guidelines for various nutrients and contribute towards a better lifestyle for prevention of non-communicable diseases.

UNIT - I INTRODUCTION TO NUTRITION 15

History of Nutrition – Development of Nutrition as a Science Food as a source of nutrients, definition of nutrients, Balanced diets and dietary guidelines- current concepts

Signs and symptoms of adequate, optimum and good nutrition, malnutrition (Under Nutrition, and over Nutrition), Assessment of Nutritional status- Anthropometric, Biochemical, Clinical and Dietary aspects.

Activity- Plan meals based on My- Plate concepts, Record Height, Bodyweight, and calculate Body Mass Index (BMI) in a small sample, and categorize according to BMI.

UNIT - II CARBOHYDRATES, PROTEINS 15

Carbohydrates

Classification, Food Sources, Requirements and Functions of carbohydrates in the body. Review of digestion, absorption and metabolism. Physiological significance of Monosaccharides, Disaccharides and Polysaccharides Glycemic Index, Glycemic load of Foods, and factors affecting it, Hormonal control of Blood sugar. Role of fibre in prevention of non-communicable diseases.

Proteins

Amino acids - Indispensable and dispensable amino acids. Classification, Sources, Requirements and functions of protein. Mutual supplementation of proteins.

Protein deficiency-Protein Energy Malnutrition- Kwashiorkor and Marasmus –etiology, clinical features, treatment and prevention Evaluation of protein quality- PER, BV, NPU and NPR, chemical score. Protein Supplements and Novel Protein sources - Benefits and Health concerns.

Activity-List foods based on their GI and Protein supplements available in the market.

UNIT - III Lipids**15****Lipids**

Classification, Sources, Requirements and functions, **Essential fatty acids**- deficiency, food sources and **functions**, Healthy and Unhealthy Fats in the diets, Dietary lipids and its relation to cardiovascular diseases.

Energy

Determination of energy value of foods using Bomb calorimeter,

Physiological value of foods, relation between oxygen used and calorific value.

Direct and Indirect calorimetry direct calorimetry, Respiratory quotient Components of Energy expenditure- Basal metabolism, factors affecting BMR, Food related thermogenesis, Physical activity

Energy requirements for different age groups, and for various types of activities.

Activity-List healthy and unhealthy sources of fats in one's diet. Learn to estimate BMR.

UNIT - IV VITAMINS**15****Fat Soluble Vitamins**

Food sources, Requirements, Functions, Effects of deficiency or Toxicity (wherever applicable).

Water Soluble Vitamins

Food sources, Requirements, Functions, Effects of deficiency. Antioxidant role of certain Vitamins in Health promotion

UNIT - V MINERALS**15****Macro minerals**

Calcium, Phosphorous, Magnesium, Potassium, Sodium and Chloride- Distribution in the body, functions, food sources, requirements, effects of deficiency and toxicity.

Micro/Trace minerals

Iron, Zinc, Iodine, Selenium, Manganese, Chromium, Fluoride and Copper Distribution in the body; functions, effects of deficiency, food sources and requirements, Role of Antioxidant minerals

Water

As a nutrient, functions, sources, requirements. Distribution of water in the body, exchange of water in the body, composition of body fluids.

Water balance, factors regulating it, dehydration, water intoxication.

Total Lecture Hours**75**

BOOKS FOR STUDY:

- Anderson J. J. B., Root M. M., Garner S. C. (2015) Human Nutrition: Healthy Options for Life. Jones & Bartlett Learning, Massachusetts, USA.
- Mahan K and Sylvia E. Stump (2000) Krause's Food Nutrition and Diet Therapy, 26 Saunders, USA
- Guthrie, H.A. (1989) Introductory Nutrition. 7th ed. Times Mirror / Mosby College Publishing, St. Louis
- Medeiros D. M., and Wildman R. E. C. (2019) Advanced Human Nutrition. 4th Ed., Jones & Bartlett Learning, Massachusetts, USA

BOOKS FOR REFERENCES:

- Anderson J. J. B., Root M. M., Garner S. C. (2015) Human Nutrition: Healthy Options for Life. Jones & Bartlett Learning, Massachusetts, USA
- Guthrie, H.A. (1989) Introductory Nutrition. 7th ed. Times Mirror / Mosby College Publishing, St. Louis
- Insel P., Ross D., McMahon K., Bernstein M. (2016) Discovering Nutrition. 5th Ed., Jones & Bartlett Learning, Massachusetts, USA
- Mahan K and Sylvia E. Stump (2000) Krause's Food Nutrition and Diet Therapy, 26 Saunders, USA.
- Medeiros D. M., and Wildman R. E. C. (2019) Advanced Human Nutrition. 4th Ed., Jones & Bartlett Learning, Massachusetts, USA..
- Ross A. C., Caballero B., Cousins R. J., Tucker K. L., Ziegler T. R. (2014) Modern Nutrition in Health and Disease. 11th Ed., Wolters Kluwer | Lippincott Williams & Wilkins, Philadelphia, USA..
- Sizer F. S. and Whitney E. (2014) Nutrition: Concepts & Controversies. 13th Ed., Wadsworth, Cengage Learning, USA.
- Whitney, E.R. and Rolfes S.R. (1996) Understanding nutrition. 7th Ed., West Publishing Company, USA.

WEB RESOURCES:

- ❖ <http://www.merck.com/mmhe/seciz/ch155/ch155a.html>
- ❖ <http://www.whereincity/medical/vitamins>

Nature of Course	EMPLOYABILITY		SKILL ORIENTED		✓	ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL		GLOBAL	✓
Changes Made in the Course	Percentage of Change		55 %	No Changes Made			New Course	
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.								

COURSE OUTCOMES:	K LEVEL
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After studying this course, the students will be able to:		
CO1	Define nutrients and terms related to nutrition.	K1 to K4
CO2	Describe the sources, recommended allowances of macronutrients, micronutrients, and water.	K1 to K4
CO3	Interpret the significance of macro and micronutrients, and water for maintenance of optimum health.	K1 to K4
CO4	Explain the functions, deficiency or toxicity of macro and micronutrients, and water.	K1 to K4
CO5	Evaluate the role of macronutrients, micronutrients, and water in health and disease.	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	2	2	2	1	1	2	3
CO2	3	3	3	2	2	2	1	1	2	3
CO3	3	3	3	2	2	2	3	2	2	3
CO4	3	3	3	2	2	2	1	2	2	3
CO5	3	3	3	2	2	2	1	2	2	3

S- STRONG

M – MEDIUM

L – LOW

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3
CO 2	3	3	3	3	3
CO 3	3	3	3	3	3
CO 4	3	3	3	3	3
CO 5	3	2	3	2	2
WEITAGE	15	15	15	15	15
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	3	3	3	3	3

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	INTRODUCTION TO NUTRITION	15	PPT, Chalk , lectures, Demonstration videos, & Google class room
II	CARBOHYDRATES ,PROTEINS	15	PPT, Chalk , lectures, Demonstration videos, & Google class room
III	LIPIDS,ENERGY	15	PPT, Chalk , lectures, Demonstration videos, & Google class room
IV	VITAMINS	15	PPT, Chalk , lectures, Demonstration videos, & Google class room
V	MINERALS	15	PPT, Chalk , lectures, Demonstration videos, & Google class room

**Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)**

Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of Questions	K - Level		
CI	CO1	K1 – K4	2	K1	2 (K2,K3)	2(K3,K4)
AI	CO2	K1 – K4	2	K1	2 (K2,K3)	2 (K3,K4)
CI	CO3	K1 – K4	2	K1	2 (K2,K3)	2(K3,K4)
AII	CO4	K1 – K4	2	K1	2 (K2,K3)	2 (K3,K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II							
	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	6.66	46.66
	K2	2	10		12	40	
	K3			8	8	26.66	26.66
	K4			8	8	26.66	26.66
	Marks	4	10	16	30	100	100
CIA II	K1	2			2	6.66	46.66
	K2	2	10		12	40	
	K3			8	8	26.66	26.66
	K4			8	8	26.66	26.66
	Marks	4	10	16	30	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K – LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1-K2	2 K2	2 K3
2	CO2	K1-K4	2	K1-K2	2 K2	2 K3
3	CO3	K1-K4	2	K1-K2	2 K2	2 K3
4	CO4	K1-K4	2	K1-K2	2 K2	2 K4
5	CO5	K1-K4	2	K1-K2	2 K2	2 K4
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.57	43
K2	5	50		55	39.28	
K3			48	48	34.28	34
K4			32	32	22.85	23
Marks	10	50	80	140	100	100

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions				PART – A	
				(10 x 1 = 10 Marks)	
1.	Unit - I	CO1	K1	a)	b)
				c)	d)
2.	Unit - I	CO1	K1	a)	b)
				c)	d)
3.	Unit - II	CO2	K1	a)	b)
				c)	d)
4.	Unit - II	CO2	K1	a)	b)
				c)	d)
5.	Unit - III	CO3	K1	a)	b)
				c)	d)
6.	Unit - III	CO3	K1	a)	b)
				c)	d)
7.	Unit - IV	CO4	K1	a)	b)
				c)	d)
8.	Unit - IV	CO4	K1	a)	b)
				c)	d)
9.	Unit - V	CO5	K1	a)	b)
				c)	d)
10.	Unit - V	CO5	K1	a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K2		
OR					
11. b)	Unit - I	CO1	K2		
12. a)	Unit - II	CO2	K2		
OR					
12. b)	Unit - II	CO2	K2		
13. a)	Unit - III	CO3	K2		
OR					
13. b)	Unit - III	CO3	K2		
14. a)	Unit - IV	CO4	K2		
OR					
14. b)	Unit - IV	CO4	K2		
15. a)	Unit - V	CO5	K2		
OR					
15. b)	Unit - V	CO5	K2		

Answer ALL the questions				PART – C	(5 x 8 = 40 Marks)
16. a)	Unit - I	CO1	K3		
OR					
16. b)	Unit - I	CO1	K3		
17. a)	Unit - II	CO2	K3		
OR					
17. b)	Unit - II	CO2	K3		
18. a)	Unit - III	CO3	K3		
OR					
18. b)	Unit - III	CO3	K3		
19. a)	Unit - IV	CO4	K4		
OR					
19. b)	Unit - IV	CO4	K4		
20. a)	Unit - V	CO5	K4		
OR					
20. b)	Unit - V	CO5	K4		



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	CHEMISTRY FOR BIOLOGICAL SCIENCES – II			
Course Code	23UCHEA32	L	P	C
Category	GENERIC ELECTIVE	5	-	5

COURSE OBJECTIVES:

This course aims at providing knowledge on

- ❖ basics of atomic orbitals, chemical bonds, hybridization and fundamentals of organic chemistry
- ❖ nuclear chemistry and industrial chemistry
- ❖ nomenclature of coordination compounds
- ❖ understand the concepts of kinetics and catalysis
- ❖ provide fundamentals of electrochemistry

UNIT - I Chemical Bonding and Nuclear Chemistry 15

Chemical Bonding: Molecular Orbital Theory-bonding, antibonding and non-bonding orbitals. M. O diagrams for Hydrogen, Helium, Nitrogen; discussion of bond order and magnetic properties.

Nuclear Chemistry: Fundamental particles - Isotopes, Isobars, Isotones and Isomers-Differences between chemical reactions and nuclear reactions- group displacement law. Nuclear fission and nuclear fusion - differences – Applications of radioisotopes – carbon dating medicinal applications.

UNIT - II Industrial Chemistry 15

Fuels: Fuel gases: Natural gas, water gas, semi water gas, carbureted water gas, producer gas, CNG, LPG and oil gas (manufacturing details not required).

Fertilizers: Urea, potassium nitrate NPK fertilizer, superphosphate.

UNIT - III Fundamental Concepts in Organic Chemistry 15

Hybridization: Orbital overlap hybridization and geometry of CH_4 , C_2H_4 , C_2H_2 and C_6H_6 . Polar effects: Inductive effect and consequences on K_a and K_b of organic acids and bases, electromeric, mesomeric, hyper conjugation and steric-examples and explanation.

Reaction mechanisms: Types of reactions- aromaticity-aromatic electrophilic substitution; nitration, halogenation, Friedel-Craft's alkylation

UNIT - IV Co-ordination Chemistry and Water Technology 15

Co-ordination Chemistry: Definition of terms - Werner's theory - Chelation - Biological role of Hemoglobin and Chlorophyll (elementary idea).

Water Technology: Hardness of water, determination of hardness of water using EDTA method, zeolite method-Purification techniques – BOD and COD.

UNIT - V Electrochemistry**15**

Galvanic cells – three electrode system - Standard hydrogen electrode - calomel electrode - standard electrode potentials -electrochemical series. Strong and weak electrolytes - ionic product of water -pH, pKa, pKb. Conductometric titrations - pH determination by colorimetric method – buffer solutions and its biological applications – Types of cells –microbial fuel cells-corrosion and its prevention.

Total Lecture Hours**75****BOOKS FOR STUDY:**

- V.Veeraiyan, Textbook of Ancillary Chemistry; High mount publishing house, Chennai, first edition, 2009.
- S.Vaithyanathan, Text book of Ancillary Chemistry; Priya Publications, Karur, 2006.
- Arun Bahl, B.S.Bahl, Advanced Organic Chemistry; S.Chand and Company, New Delhi, twenty third edition, 2012.

BOOKS FOR REFERENCES:

- P.L.Soni, Mohan Katyal, Text book of Inorganic chemistry; Sultan Chand and Company, New Delhi, twentieth edition, 2007.
- B.R.Puri, L.R.Sharma, M.S.Pathania, Text book Physical Chemistry; Vishal Publishing Co., New Delhi, forty seventh edition, 2018.
- B.K,Sharma, Industrial Chemistry; GOEL publishing house, Meerut, sixteenth edition, 2014.

WEB RESOURCES:

- ❖ <https://archive.nptel.ac.in/noc/courses/noc22/SEM1/noc22-cy36/>
- ❖ https://onlinecourses.nptel.ac.in/noc23_me76/preview
- ❖ https://onlinecourses.nptel.ac.in/noc19_cy19/preview

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED		ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL	✓	GLOBAL	
Changes Made in the Course	Percentage of Change			No Changes Made			New Course	✓

*** Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.**

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	state the theories of chemical bonding, nuclear reactions and its applications.	K1 to K4
CO2	evaluate the efficiencies and uses of various fuels and fertilizers	K1 to K4
CO3	explain the type of hybridization, electronic effect and mechanism involved in the organic reactions.	K1 to K4
CO4	write the IUPAC name for complex, different theories to explain the bonding in coordination compounds and water technology.	K1 to K4
CO5	apply/demonstrate the electrochemistry principles in corrosion, electroplating and fuel cells.	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	2	2	2	1	2	2	3
CO2	3	3	3	2	2	2	1	2	2	3
CO3	3	3	3	2	2	2	1	2	2	3
CO4	3	3	3	2	2	2	1	2	2	3
CO5	3	3	3	2	2	2	1	2	2	3
S- STRONG			M – MEDIUM				L – LOW			

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3
CO 2	3	3	3	3	3
CO 3	3	3	3	3	3
CO 4	3	3	3	3	3
CO 5	3	2	3	2	2
WEITAGE	15	15	15	15	15
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	3	3	3	3	3

LESSON PLAN:

UNIT	CHEMISTRY FOR BIOLOGICAL SCIENCES - II	HRS	PEDAGOGY
I	Chemical Bonding: Molecular Orbital Theory-bonding, antibonding and non-bonding orbitals. M. O diagrams for Hydrogen, Helium, Nitrogen; discussion of bond order and magnetic properties. Nuclear Chemistry: Fundamental particles - Isotopes, Isobars, Isotones and Isomers-Differences between chemical reactions and nuclear	15	Chalk & talk, ppt, Lectures

	reactions- group displacement law. Nuclear fission and nuclear fusion - differences – Applications of radioisotopes – carbon dating medicinal applications.		
II	Fuels: Fuel gases: Natural gas, water gas, semi water gas, carbureted water gas, producer gas, CNG, LPG and oil gas (manufacturing details not required). Fertilizers: Urea, potassium nitrate NPK fertilizer, superphosphate.	15	Chalk & talk, ppt, Lectures
III	Hybridization: Orbital overlap hybridization and geometry of CH ₄ , C ₂ H ₄ , C ₂ H ₂ and C ₆ H ₆ . Polar effects: Inductive effect and consequences on K _a and K _b of organic acids and bases, electromeric, mesomeric, hyper conjugation and steric-examples and explanation. Reaction mechanisms: Types of reactions- aromaticity-aromatic electrophilic substitution; nitration, halogenation, Friedel-Craft's alkylation	15	Chalk & talk, ppt, Lectures
IV	Co-ordination Chemistry: Definition of terms - Werner's theory - Chelation - Biological role of Hemoglobin and Chlorophyll (elementary idea). Water Technology: Hardness of water, determination of hardness of water using EDTA method, zeolite method-Purification techniques – BOD and COD.	15	Chalk & talk, ppt, Lectures
V	Galvanic cells – three electrode system - Standard hydrogen electrode - calomel electrode - standard electrode potentials -electrochemical series. Strong and weak electrolytes - ionic product of water -pH, pK _a , pK _b . Conductometric titrations - pH determination by colorimetric method – buffer solutions and its biological applications – Types of cells – microbial fuel cells-corrosion and its prevention.	15	Chalk & talk, ppt, Lectures

**Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)**

Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of Questions	K - Level		
CI	CO1	K1 – K4	2	K1	2 (K2,K2)	2(K3,K3)
AI	CO2	K1 – K4	2	K2	2(K3,K3)	2(K4,K4)
CI	CO3	K1 – K4	2	K1	2(K2,K2)	2(K3,K3)
AII	CO4	K1 – K4	2	K2	2(K3,K3)	2(K4,K4)
Question Pattern CIA I & II		No. of Questions to be asked	4	4		4
		No. of Questions to be answered	4	4		2
		Marks for each question	1	1		5
		Total Marks for each section	4	4		10

Distribution of Marks with K Level CIA I & CIA II

	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2	-	-	2	3.57	25
	K2	2	10	-	12	21.43	
	K3	-	10	16	26	46.43	
	K4	-	-	16	16	28.57	
	Marks	4	20	32	56	100	
CIA II	K1	2	-	-	2	3.57	25
	K2	2	10	-	12	21.43	
	K3	-	10	16	26	46.43	
	K4	-	-	16	16	28.57	
	Marks	4	20	32	56	100	

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K – LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1&K2	2 (K2)	2 (K3)
2	CO2	K1-K4	2	K1&K2	2 (K3)	2 (K4)
3	CO3	K1-K4	2	K1&K2	2 (K2)	2 (K3)
4	CO4	K1-K4	2	K1&K2	2 (K3)	2 (K4)
5	CO5	K1-K4	2	K1&K2	2 (K4)	2 (K3)
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5	-	-	5	3.57	41.43
K2	5	20	-	25	17.86	
K3	-	20	48	68	48.57	48.57
K4	-	10	32	42	30	30
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions				PART – A	
				(10 x 1 = 10 Marks)	
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K2		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K1		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K2		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K2		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K2		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K2		
OR					
11. b)	Unit - I	CO1	K2		
12. a)	Unit - II	CO2	K3		
OR					
12. b)	Unit - II	CO2	K3		
13. a)	Unit - III	CO3	K2		
OR					
13. b)	Unit - III	CO3	K2		
14. a)	Unit - IV	CO4	K3		
OR					
14. b)	Unit - IV	CO4	K3		
15. a)	Unit - V	CO5	K4		
OR					
15. b)	Unit - V	CO5	K4		

Answer ALL the questions				PART – C	(5 x 8 = 40 Marks)
16. a)	Unit - I	CO1	K3		
OR					
16. b)	Unit - I	CO1	K3		
17. a)	Unit - II	CO2	K4		
OR					
17. b)	Unit - II	CO2	K4		
18. a)	Unit - III	CO3	K3		
OR					
18. b)	Unit - III	CO3	K3		
19. a)	Unit - IV	CO4	K4		
OR					
19. b)	Unit - IV	CO4	K4		
20. a)	Unit - V	CO5	K3		
OR					
20. b)	Unit - V	CO5	K3		



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	FOOD SAFETY AND QUALITY CONTROL			
Course Code	23UFNEC31	L	P	C
Category	ELECTIVE	4	-	4

COURSE OBJECTIVES:

This course aims at providing knowledge on

- Learn the importance of food safety, quality control, food laws and regulations in food industry.
- Get acquainted with the existing food safety quality management system.
- Acquire basic understanding of quality concepts and practice in food companies.
- Gain familiarity with the standards and specifications.

UNIT - I Food safety 12

Food safety - Introduction to concepts of food quality, food safety, food quality assurance. General food laws and food safety regulations. History of Food regulations. Importance of Food safety and quality control concepts applied in the food processing industry. Evaluation of Food safety – Applications of HACCP in the food industry.

Activity - Assignment on the preparation of food safety related risk analysis in food processing industry. Prepare a HACCP Plan for a food processing industry.

UNIT - II Quality assurance 12

Quality assurance - Importance and functions of quality control. Theoretical and practical considerations, description of different systems: GAP, GMP, TQM, ISO. Indian food standards - Voluntary and Obligatory standards (PFA, FPO, MMPO, AGMARK etc) Codex Alimentarius.

Activity - Training on the preparation of Standard Operating Procedure (SOP) and manual for GMP

UNIT - III Food sanitation and safety, Food adulteration**12**

Food sanitation and safety - Factors contributing to physical, chemical and biological contamination in food chain, prevention and control of food borne hazards. Personal hygiene of food handlers, cleaning compounds, sanitation methods, waste disposal strategy (solid and liquid waste) and pest control Activity - Preparing work instructions for the staff in charge of sanitation and the cleaning staff in food industry/food outlets. Food adulteration - Food adulteration, Common adulterants, Simple tests for detection of adulteration and toxic constituents. Functional role and safety issues - Recent trends and challenges in food adulteration Activity - Practical analysis of the detection of adulteration in different types of foods.

UNIT - IV Food safety regulation in India**12**

Food safety regulation in India - An overview of Food Regulation in India; Food Laws and Regulations; Structure, organization and duties of regulatory system; Duties and responsibilities of food business operator; Registration and Licensing process and requirements; Labeling of Food Products; Traceability; Import and Export of Foods; Liability for Defective Products; Food safety management systems and certifications. Activity - Assignment to prepare a PPT to educate the food business operator about FSSAI licensing of their outlet

UNIT - V Standard operating procedure and checklist**12**

Standard operating procedure and checklist - Preparing scope, quality policy and quality objectives of food processing company, Defining Standard operating procedure. SOP for purchasing raw materials, receiving raw materials, storage, cleaning, holding, cooling, freezing, thawing, reheating, personal hygiene, facility and equipments. Preparation of HACCP based SOP checklist - personal hygiene, food preparation, hot holding, cold holding, refrigerator, freezer and milk cooler, food storage and dry storage, cleaning and sanitizing, utensils and equipments, large equipments, garbage storage and disposal and pest control. Activity - Prepare Audit Checklist for various food industries.

Total Lecture Hours**60**

BOOKS FOR STUDY:

- Srilakshmi B (2019) Food Science, (7th Ed.) New Age International Publishers
- Bryan, F.L. (2007) Hazard Analysis Critical Control Point Evaluations A Guide to Identifying Hazards and Assessing Risks Associated with Food Preparation and Storage. World Health Organization, Geneva.

BOOKS FOR REFERENCES:

- AOAC International. (2005) Official methods of analysis of AOAC International. 17th Ed., current through 1st revision. Gaithersburg, MD, USA, Association of Analytical Communities.
- Bhatia, R. and Ichhpujan, R.L (2004), Quality assurance in Microbiology, CBS Publishers and Distributors, New Delhi. 2004.
- Early, R. (2006) Guide to Quality Management Systems for the Food Industry, Blackie, Academic and professional, London.
- FAO (2006) Manuals of Food Quality Control. 2-Additives Contaminants Techniques, Rome.
- Food and Agricultural Organization (1980): Manuals of Food Quality Control. 2 Additives Contaminants Techniques, Rome
- Food safety and standards act 2006, Rules 2011, Regulations 2011, 10th Edition, ILBCO India, Indian Law Book Company, 2013.

WEB RESOURCES:

- ❖ <http://www.fssai.gov.in/>
- ❖ <http://www.medindia.net>
- ❖ <http://www.foodsafety.unl.edu/>

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED		ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL		GLOBAL	✓
Changes Made in the Course	Percentage of Change		85	No Changes Made		New Course		

*** Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.**

COURSE OUTCOMES:	K LEVEL
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After studying this course, the students will be able to:

CO1	Explain the areas in food systems that come under the purview of Food Safety & Quality Assurance.	K1 to K4
CO2	Cite Indian and international food laws and food safety programs	K1 to K4
CO3	Demonstrate familiarity with FSSAI regulations and Licensing	K1 to K4
CO4	Acquire skills to prepare manual and SOP for food industry	K1 to K4
CO5	Demonstrate the ability to detect common adulterants in food	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:										
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CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	2	2	2	3	3	2	3
CO2	3	3	3	2	2	2	3	3	2	3
CO3	3	3	3	2	2	2	3	3	2	3
CO4	3	3	3	2	2	2	3	3	2	3
CO5	3	3	3	2	2	2	3	3	2	3

S- STRONG

M – MEDIUM

L – LOW

CO / PO MAPPING:					
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COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3
CO 2	3	3	3	3	3
CO 3	3	3	3	3	3
CO 4	3	3	3	3	3
CO 5	3	3	3	3	3
WEITAGE	15	15	15	15	15
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	3	3	3	3	3

LESSON PLAN:			
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UNIT	COURSE NAME	HRS	PEDAGOGY
I	Food safety	12	PPT,CHALK& LECTURES, VIDEOS
II	Quality assurance	12	PPT,CHALK& LECTURES
III	Food sanitation and safety, Food adulteration	12	PPT,CHALK& LECTURES
IV	Food safety regulation in India	12	PPT,CHALK& LECTURES

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)						
Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of Questions	K - Level		
CI	CO1	K1 – K4	2	K1	2 (K2,K3)	2(K3,K4)
AI	CO2	K1 – K4	2	K1	2 (K2,K3)	2 (K3,K4)
CI	CO3	K1 – K4	2	K1	2 (K2,K3)	2(K3,K4)
AI	CO4	K1 – K4	2	K1	2 (K2,K3)	2 (K3,K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II							
	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	6.66	46.66
	K2	2	10		12	40	
	K3			8	8	26.66	
	K4			8	8	26.66	
	Marks	4	10	16	30	100	
CIA II	K1	2			2	6.66	46.66
	K2	2	10		12	40	
	K3			8	8	26.66	
	K4			8	8	26.66	
	Marks	4	10	16	30	100	

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K – LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1-K2	2 K2	2 K3
2	CO2	K1-K4	2	K1-K2	2 K2	2 K3
3	CO3	K1-K4	2	K1-K2	2 K2	2 K3
4	CO4	K1-K4	2	K1-K2	2 K2	2 K4
5	CO5	K1-K4	2	K1-K2	2 K2	2 K4
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.57	43
K2	5	50		55	39.28	
K3			48	48	34.28	34
K4			32	32	22.85	23
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions				PART – A	(10 x 1 = 10 Marks)
1.	Unit - I	CO1	K1	a)	b)
				c)	d)
2.	Unit - I	CO1	K1	a)	b)
				c)	d)
3.	Unit - II	CO2	K1	a)	b)
				c)	d)
4.	Unit - II	CO2	K1	a)	b)
				c)	d)
5.	Unit - III	CO3	K1	a)	b)
				c)	d)
6.	Unit - III	CO3	K1	a)	b)
				c)	d)
7.	Unit - IV	CO4	K1	a)	b)
				c)	d)
8.	Unit - IV	CO4	K1	a)	b)
				c)	d)
9.	Unit - V	CO5	K1	a)	b)
				c)	d)
10.	Unit - V	CO5	K1	a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K2		
OR					
11. b)	Unit - I	CO1	K2		
12. a)	Unit - II	CO2	K2		
OR					
12. b)	Unit - II	CO2	K2		
13. a)	Unit - III	CO3	K2		
OR					
13. b)	Unit - III	CO3	K2		
14. a)	Unit - IV	CO4	K2		
OR					
14. b)	Unit - IV	CO4	K2		
15. a)	Unit - V	CO5	K2		
OR					
15. b)	Unit - V	CO5	K2		

Answer ALL the questions				PART – C	(5 x 8 = 40 Marks)
16. a)	Unit - I	CO1	K3		
OR					
16. b)	Unit - I	CO1	K3		
17. a)	Unit - II	CO2	K3		
OR					
17. b)	Unit - II	CO2	K3		
18. a)	Unit - III	CO3	K3		
OR					
18. b)	Unit - III	CO3	K3		
19. a)	Unit - IV	CO4	K4		
OR					
19. b)	Unit - IV	CO4	K4		
20. a)	Unit - V	CO5	K4		
OR					
20. b)	Unit - V	CO5	K4		



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	FOOD PRESERVATION PRACTICAL			
Course Code	23UFNSP31	L	P	C
Category	SKILL ENHANCEMENT	-	2	2
COURSE OBJECTIVES:				
<ul style="list-style-type: none">➤ To enable the students to:➤ Gain knowledge on principles of food preservation of food➤ Understand the techniques used in processing foods to preserve their shelf life➤ Apply skills learnt to develop preserved food product				
COURSE CONTENT				
1. Preparation of jams				
2. Preparation of jellies				
3. Preparation of squashes using seasonal fruits and vegetables.				
4. Preparation of pickles using fruits and vegetables.				
5. Preparation of sauce				
6. Preparation of ketchup.				
7. Visit to Food Processing Industry				
Total Lecture Hours				10

BOOKS FOR STUDY:

- Food preservation techniques (2003) P. Zeuthen and Leif Bugh-Sørensen, Published in North America by CRC Press LLC, 2000 Corporate Blvd, NW, Boca Raton FL 33431 Food Processing Technology: Principles and Practice (2000) Peter J. Fellows, Published by Woodhead Publishing Limited Abington Hall, Abington Cambridge CB1 6AH, England
- Food Science and Technology (2009) Geoffrey Campbell-Platt Professor Emeritus of Food Technology, University of Reading President of IUFOST 2008–2010.

BOOKS FOR REFERENCES:

- Arthey, D and Ashurst, P.R (1996), Fruit processing, Blackie academic and professional. London.
- Fellows, P.J (2016): Food Processing Technology: Principles and Practice, second edition, CRC Wood head publishing Ltd, Cambridge.
- Gould. G.W (1995), New methods of food preservation. Blackie academic and professional. London.
- Rahman M S (2020) Handbook of Food Preservation CRC Press, USA
- Srilakshmi B (2017) Food Science, New Age International Publications, New Delhi.
- Suganthi.V and Subaratinam.R (2021) Textbook on Food preservation, Dipti Press(OPC) Pvt. Ltd, Chennai.8. Winton, A.L. and Winton, K.B. (1999). Techniques of Food Analysis.

WEB RESOURCES:

- ❖ <https://www.sciencedirect.com/topics/agricultural-andbiologicalsciences/food-spoilage>
- ❖ <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=111436>
- ❖ <http://ecoursesonline.iasri.res.in/mod/phage/view.php?id=111435>
- ❖ <http://www.homepreservingbible.com/2247-an-introduction-to-the-drying-foodpreservation-method/>

Nature of Course	EMPLOYABILITY		SKILL ORIENTED		ENTREPRENEURSHIP		✓
Curriculum Relevance	LOCAL	REGIONAL	✓	NATIONAL	GLOBAL		
Changes Made in the Course	Percentage of Change		20	No Changes Made		New Course	

*** Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.**

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	Define and explain the principles of food preservation and relate the role of microorganisms in food spoilage	K1 to K4
CO2	Explain the causes of food spoilage, need and principles of food preservation.	K1 to K4
CO3	Apply the various techniques of food preservation to preserve different foods so as to increase the shelf life of foods.	K1 to K4
CO4	compare the principles and techniques of various food preservation methods and explain the role of packaging in food processing	K1 to K4
CO5	Justify the use of various preservation techniques, and packaging materials describe the terms related to food preservation and classify foods based on the shelf life	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	3	2	2	2	1	2	2	3
CO2	3	3	3	2	2	2	2	2	2	3
CO3	3	3	2	3	2	2	2	2	2	3
CO4	3	3	3	2	2	2	2	2	2	3
CO5	3	3	2	2	2	2	3	2	2	3

S- STRONG

M – MEDIUM

L – LOW

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3
CO 2	3	3	3	3	3
CO 3	3	3	3	3	3
CO 4	3	3	3	3	3
CO 5	3	3	3	3	3
WEITAGE	15	15	15	15	15
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	3	3	3	3	3

LESSON PLAN:

S. No	COURSE NAME	HRS	PEDAGOGY
1.	Preparation of jams	2	lab
2.	Preparation of jellies	2	lab
3.	Preparation of squashes using seasonal fruits and vegetables.	2	lab

4.	Preparation of pickles using fruits and vegetables.	1	lab
5.	Preparation of sauce	1	lab
6.	Preparation of ketchup.	1	lab
7.	Visit to Food Processing Industry	1	lab

Learning Outcome Based Education & Assessment (LOBE)							
Formative Examination - Blue Print							
Articulation Mapping – K Levels with Course Outcomes (COs)							
INTERNAL	COs	K LEVEL	MAJOR	MINOR	SPOTTERS	RECORD	VIVA
CI AI	CO1	K1					5
	CO2	K2				5	
	CO3	K3			5		
	CO4	K4		5			
	CO5	K4	5				
Question Pattern		No. of Questions to be asked	2 (A-Written B-Practical Demo)	2 (A-Written B-Practical Demo)	2	1	5
		No. of Questions to be answered	2	2	2	1	5
		Marks for each question	A-3 B-2	A-3 B-2	5	10	1
		Total Marks for each section	5	5	5	5	5

Distribution of Marks with K Level									
	K Level	Major	Minor	Spotters	Record	Viva	Total Marks	% of Marks without choice	Consolidated %
CIA	K1	-	-	-	-	5	5	6.66	6.66
	K2	-	-	-	5	-	5	6.66	6.66
	K3	-	-	5	-	-	5	6.66	6.66
	K4	-	5	-	-	-	5	6.66	6.66
	K4	5						5	6.66

**Summative Examination – Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)**

EXTERNAL	COs	K LEVEL	MAJOR	MINOR	SPOTTERS	RECORD	VIVA
CI AI	CO1	K1					5
	CO2	K2				5	
	CO3	K3			20		
	CO4	K4		20			
	CO5	K4	25				
Question Pattern		No. of Questions to be asked	2 (A-Written B-Practical Demo)	2 (A-Written B-Practical Demo)	2	1	5
		No. of Questions to be answered	2	2	2	1	5
		Marks for each question	A-20 B-5	A-15 B-5	5	10	1
		Total Marks for each section	25	20	20	5	5

Distribution of Marks with K Level CIA

	K Level	Major	Minor	Spotters	Record	Viva	Total Marks	% of Marks without choice	Consolidated %
CIA	K1					5	5	6.6	6.6
	K2				5		5	6.6	6.6
	K3			20			20	26.6	26.6
	K4		20				20	26.6	26.6
	K4	25					25	33.3	33.3
	Marks	25	20	20	5	5	75	100	100



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	CHANGING TRENDS IN EXTENSION EDUCATION			
Course Code	23UFNSC31	L	P	C
Category	SKILL ENHANCEMENT	1	-	1

COURSE OBJECTIVES:

This course aims at providing knowledge on

- To impart knowledge to the students on concept, objectives, philosophy and principles of extension education as well as pioneering extension efforts and analysis of the extension system of ICAR and SAU. Course also gives exposure to the student on current approaches in extension as well as various development programmes
- To understand the changing concept of extension
- To get acquainted with the trends in extension approaches and models To identify the support system development for extension education.

UNIT - I Home Science Extension Education 3

Extension education – meaning, scope, characteristics, objectives, need, principles, process, models and philosophy Emergence of Home Science Extension Education in India Extension Education as a profession – adult education and distance education. Leadership – role, styles and management grid, Qualities of a good extension manager: Changing role of extension managers caused by globalization in Home Science

UNIT - II Diffusion and Adoption of Innovations 3

Predicting innovativeness: Simulation of innovation, innovation decision process - Types of innovation decision, consequence on innovations, desirable or undesirable, direct or indirect anticipated or unanticipated consequence. Concept of homophily and heterophony and their influence on flow of innovation, Concept of Diffusion and its elements. Adoption Process - concept of stage, shade of agreement, neglected element. Adopter categories - Innovativeness and adopter categories, adopter categories as idea types, characteristics of adopter categories. Diffusion - perceived attributes of innovation and their rate of adoption.

UNIT - III Communication process 3

Communication process – concept, elements and their characteristics Models and theories of communication communication skills – fidelity of communication, communication competence and empathy, communication effectiveness and credibility, feedback in communication, social networks and Development communication – Barriers in communication Message – Meaning, dimensions of a message, characteristics of a good message, Message treatment and effectiveness, distortion of message.

UNIT - IV**3**

Concept of teaching and learning Classification of Extension teaching methods Various extension teaching aids – selection of appropriate methods, features, advantage, limitation of various methods of teaching (mass, group, individual) **Audio visual aids** – planning, selection and **types of visual, audio and audio – visual aids** Contribution of AV Aids in Extension education.

UNIT - V Current approaches in extension education**3**

Current approaches in extension education Farming situation-based extension, market – led – extension, farm field school, ATIC, Kissan Call Centers, and NAIP. Problems in Rural Development. Need for Volunteerism in Rural Development, Role of NGO's Assistance available to Voluntary agencies from different ministries/Departments of Govt. of India. - Details of function in to Central/State Social Welfare Board and CAPART Employments Generation Programmes – NREGP, Women Development Programmes – ICDS, Self Help Groups, MSY, RMK

Total Lecture Hours**15****BOOKS FOR STUDY:**

- Chaubey, B.K. (1979): A Hand Book of Education Extension, Jyoti Prakashan, Allahabad.
- Reddy, A. (1999): Extension Education, Sree Lakshmi Press, Bapatla.
- Waghmare, S.K. (1989): Exploring of Extension Excellence, Multi Tech. Pub. Company

BOOKS FOR REFERENCES:

- Albrecsht, H. et al (1989): Rural Development Series, Agricultural Extension, Vol I & II, Basic concepts and methods, Wiley Eastern Limited, New Delhi.
- Extension Education in Community Development (1981): Ministry of Food and Agriculture, Government of India, New Delhi.
- Pankajam, G. (2000): Extension – Third Dimension of Education, Gyan Publishing House, New Delhi.

WEB RESOURCES:

- ❖ <http://ecoursesonline.iasri.res.in/course/view.php?id=243>
- ❖ https://onlinecourses.swayam2.ac.in/cec19_mg32/previe

Nature of Course	EMPLOYABILITY		SKILL ORIENTED		✓	ENTREPRENEURSHIP	
Curriculum Relevance	LOCAL	REGIONAL	NATIONAL		✓	GLOBAL	
Changes Made in the Course	Percentage of Change		90	No Changes Made		New Course	

*** Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.**

COURSE OUTCOMES:	K LEVEL
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After studying this course, the students will be able to:

CO1	Current approaches in extension education	K1 to K4
CO2	Explain Diffusion and Adoption of Innovations	K1 to K4
CO3	Understand the criteria for Communication process	K1 to K4
CO4	Identify importance and Planning teaching and learning	K1 to K4
CO5	Introduction to Current approaches in extension education	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:										
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CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	2	3	2	3	2	2	3
CO2	3	3	3	2	3	2	3	2	2	3
CO3	3	3	3	2	3	3	3	2	2	3
CO4	3	3	3	2	3	3	3	1	3	3
CO5	3	3	3	2	3	2	3	3	3	3

S- STRONG

M – MEDIUM

L – LOW

CO / PO MAPPING:					
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COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3
CO 2	3	3	3	3	3
CO 3	3	3	3	3	3
CO 4	3	3	3	3	3
CO 5	3	3	3	3	3
WEITAGE	15	15	15	15	15
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	3	3	3	3	3

LESSON PLAN:			
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UNIT	COURSE NAME	HRS	PEDAGOGY
I	<p>Current status and growth of bakery industry in India</p> <p>Extension education – meaning, scope, characteristics, objectives, need, principles, process, models and philosophy Emergence of Home Science Extension Education in India Extension Education as a profession – adult education and distance education. Leadership – role, styles and management grid, Qualities of a goad extension manager: Changing role of extension managers caused by globalization in</p>	10	<p>Lecturing</p> <p>PowerPoint</p> <p>Seminar</p>

	Home Science		
II	<p>Diffusion and Adoption of Innovations</p> <p>Extension education – meaning, scope, characteristics, objectives, need, principles, process, models and philosophy Emergence of Home Science Extension Education in India Extension Education as a profession – adult education and distance education. Leadership – role, styles and management grid, Qualities of a goad extension manager: Changing role of extension managers caused by globalization in Home Science</p>	10	Lecturing PowerPoint Seminar
III	<p>Communication process</p> <p>Communication process – concept, elements and their characteristics Models and theories of communication communication skills – fidelity of communication, communication competence and empathy, communication effectiveness and credibility, feedback in communication, social networks and Development communication – Barriers in communication Message – Meaning, dimensions of a message, characteristics of a good message, Massage treatment and effectiveness, distortion of message.</p>	15	Lecturing PowerPoint Seminar
IV	<p>Teaching and Learning Concept</p> <p>Current approaches in extension education Farming situation-based extension, market – led – extension, farm field school, ATIC, Kissan Call Centers, and NAIP. Problems in Rural Development. Need for Volunteerism in Rural Development, Role of NGO’s Assistance available to Voluntary agencies from different ministries/Departments of Govt. of India. - Details of function in to Central/State Social Welfare Board and CAPART Employments Generation Programmes – NREGP, Women Development Programmes – ICDS, Self Help Groups, MSY, RMK</p>	15	Lecturing PowerPoint Seminar
V	<p>Current approaches in extension education</p> <p>Current approaches in extension education Farming situation-based extension, market – led – extension, farm field school, ATIC, Kissan Call Centers, and NAIP. Problems in Rural Development. Need for</p>	10	Lecturing PowerPoint Seminar

Volunteerism in Rural Development, Role of NGO's Assistance available to Voluntary agencies from different ministries/Departments of Govt. of India. - Details of function in to Central/State Social Welfare Board and CAPART Employments Generation Programmes – NREGP, Women Development Programmes – ICDS, Self Help Groups, MSY, RMK

**Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)**

Internal	Cos	K Level	Section A	
			MCQs	
			No. of. Questions	K - Level
CI	CO1	K1 – K2	25	K1,K2
AI	CO2	K1 – K2	25	K1,K2
CI	CO3	K1 – K2	25	K1,K2
AII	CO4	K1 – K2	25	K1,K2
Question Pattern CIA I & II		No. of Questions to be asked	50	
		No. of Questions to be answered	50	
		Marks for each question	1	
		Total Marks for each section	50	

* Two Formative examinations will be conducted as a part of Continuous Internal Assessment under which, 50 MCQ's will be asked [50X1=50 marks] from any 4 CO's. (Ist Test-2 CO's & IInd Test-2 CO's) in equal weightage

Distribution of Marks with K Level CIA I & CIA II					
	K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	100	100
CIA II	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)				
S. No	COs	K - Level	Section A (MCQs)	
			No. of Questions	K – Level
1	CO1	K1-K2	15	K1,K2
2	CO2	K1-K2	15	K1,K2
3	CO3	K1-K2	15	K1,K2
4	CO4	K1-K2	15	K1,K2
5	CO5	K1-K2	15	K1,K2
No. of Questions to be Asked			75	
No. of Questions to be answered			75	
Marks for each question			1	
Total Marks for each section			75	
(Figures in parenthesis denotes, questions should be asked with the given K level)				

In summative examinations, 75 MCQ's will be asked [75X1=75 marks] from all 5 CO's in equal weightage.

Distribution of Marks with K Level				
K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidated %
K1	40	40	53	100
K2	35	35	47	
K3				100
K4				
Marks		75	100	
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.				

FOURTH SEMESTER



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	NUTITIONAL BIOCHEMISTRY			
Course Code	23UFNCC41	L	P	C
Category	Core Course	5	-	5

COURSE OBJECTIVES:

To enable the students to :

- Study the basic concepts of metabolism of proximate principles and others.
- To learn the metabolic pathways of nutritional significance.

UNIT - I BIOLOGICAL OXIDATION AND ENZYMES 15

Biological oxidation and Enzymes

Biological oxidation, Electron transport chain and Oxidative Phosphorylation. Enzymes – Definition, Types, Mechanism of action, Factors affecting enzyme activity, Coenzyme, Role of b vitamin as coenzyme.

Free radicals – Definition, Formation in biological systems. Antioxidants – definition, Role of antioxidants in prevention of degenerative disorders

UNIT - II METABOLISM OF CARBOHYDRATES 15

Metabolism of Carbohydrates

Classification, Glycolysis, The Citric Acid Cycle Glycogenesis, Glycogenolysis, Gluconeogenesis, The Hexose Monophosphate Shunt and bioenergetics.

UNIT - III METABOLISM OF PROTEIN 15

Metabolism of Protein

Classification of amino acids, Oxidative Deamination, decarboxylation, transamination and transmethylation of amino acids, urea cycle, biosynthesis of non-essential amino acids, catabolism of essential amino acids. Protein biosynthesis.

UNIT - IV METABOLISM OF LIPIDS 15

Metabolism of Lipids

Classification of fatty acid, Biosynthesis of fatty acids, beta oxidation of saturated fatty acids, ketone bodies. Essential fatty acids – types and functions. Lipo proteins – classification and function. Biosynthesis of cholesterol.

UNIT - V	INTERMEDIARY METABOLISM, NUCLEIC ACID & RECENT CONCEPTS	15
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Intermediary Metabolism, Nucleic acid & Recent concepts

Overview of intermediary metabolism of carbohydrates, protein and lipid. Hormonal regulation of carbohydrate protein and fat metabolism Structural components and functions of nucleic acid, Structure of DNA, RNA types and functions. Recombinant DNA technology, Metabolism of Xenobiotics, Nutrigenomics

Total Lecture Hours	75
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BOOKS FOR STUDY:

- Albanese, A. (Ed.). (2012). Newer methods of nutritional biochemistry V3: With applications and interpretations. Elsevier.
- Shanmugham Ambika (1985) Fundamentals of bio-chemistry to medical students. NVA Bharat Printers, and traders 56, Peters Road, Madras-86.
- Lehninger, A.L. (1993) Biochemistry. 3rd ed. CBS Publishers, New Delhi.
- Lieberman, M., & Ricer, R. E. (2009). Lippincott's Illustrated Q&A Review of Biochemistry. Lippincott Williams & Wilkins.

BOOKS FOR REFERENCES:

- Albanese, A. (Ed.). (2012). Newer methods of nutritional biochemistry V3: With applications and interpretations. Elsevier.
- Bettelheim, F. A., Brown, W. H., Campbell, M. K., & Farrell, S. O. (2009). General, Organic & Biochemistry. Brooks/Cole Cengage Learning
- Champe, P. C., Harvey, R. A., & Ferrier, D. R. (2005). Biochemistry. Lippincott Williams & Wilkins, 6th Edition, Wolters Kluwer, London
- Harvey, R. and Ferrier, D., Lippincott's Illustrated Reviews: Biochemistry, 6th edition, Lippincott Williams and Wilkins, Philadelphia
- Lehninger, A.L. (1993) Biochemistry. 3rd ed. CBS Publishers, New Delhi
- Lieberman, M., & Ricer, R. E. (2009). Lippincott's Illustrated Q&A Review of Biochemistry. Lippincott Williams & Wilkins.
- Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2000): 25th Ed. Harpers Biochemistry. Macmillan worth publishers
- Shanmugham Ambika (1985) Fundamentals of bio-chemistry to medical students. NVA Bharat Printers, and traders 56, Peters Road, Madras-86

WEB RESOURCES:

- ❖ <https://www.udemy.com/share/1027yA/>
- ❖ <https://www.classcentral.com/course/swayam-biochemistry-5229>
- ❖ <https://www.classcentral.com/course/edx-biochemistry-biomolecules-methodsand-mechanisms-12585>

- ❖ <https://www.classcentral.com/course/swayam-experimental-biochemistry-12909>
- ❖ <https://youtu.be/y6YGZfcAegw>

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED		ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL		GLOBAL	✓
Changes Made in the Course	Percentage of Change		70%	No Changes Made		New Course		
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.								

COURSE OUTCOMES:	K LEVEL
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After studying this course, the students will be able to:

CO1	Describe the role of enzymes and co enzymes in biological oxidation.	K1 to K4
CO2	Explain metabolism and regulation of carbohydrate, lipids and proteins	K1 to K4
CO3	Analyze the integration of carbohydrate, lipid and protein metabolism	K1 to K4
CO4	Comprehend the significance of recent biochemical concepts namely xenobiotics, recombinant DNA technology and Nutrigenomics.	K1 to K4
CO5	Discuss the structure and functions of nucleic acids.	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	2	2	2	1	1	2	3
CO2	3	3	3	2	2	2	1	1	2	3
CO3	3	3	3	2	2	2	3	2	2	3
CO4	3	3	3	2	2	2	1	2	2	3
CO5	3	3	3	2	2	2	1	2	2	3

S- STRONG

M - MEDIUM

L - LOW

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3
CO 2	3	3	3	3	3
CO 3	3	3	3	3	3
CO 4	3	3	3	3	3
CO 5	3	2	3	2	2
WEITAGE	15	15	15	15	15

WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	3	3	3	3	3
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LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	BIOLOGICAL OXIDATION AND ENZYMES	15	PPT, Chalk , lectures, Demonstration videos, & Google class room
II	METABOLISM OF CARBOHYDRATES	15	PPT, Chalk , lectures, Demonstration videos, & Google class room
III	METABOLISM OF PROTEIN	15	PPT, Chalk , lectures, Demonstration videos, & Google class room
IV	METABOLISM OF LIPIDS	15	PPT, Chalk , lectures, Demonstration videos, & Google class room
V	INTERMEDIARY METABOLISM, NUCLEIC ACID & RECENT CONCEPTS	15	PPT, Chalk , lectures, Demonstration videos, & Google class room

**Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)**

Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of Questions	K - Level		
CI AI	CO1	K1 – K4	2	K1	2 (K2,K3)	2(K3,K4)
	CO2	K1 – K4	2	K1	2 (K2,K3)	2 (K3,K4)
CI AII	CO3	K1 – K4	2	K1	2 (K2,K3)	2(K3,K4)
	CO4	K1 – K4	2	K1	2 (K2,K3)	2 (K3,K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II							
	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	6.66	46.66
	K2	2	10		12	40	
	K3			8	8	26.66	26.66
	K4			8	8	26.66	26.66
	Marks	4	10	16	30	100	100
CIA II	K1	2			2	6.66	46.66
	K2	2	10		12	40	
	K3			8	8	26.66	26.66
	K4			8	8	26.66	26.66
	Marks	4	10	16	30	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K – LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1-K2	2 K2	2 K3
2	CO2	K1-K4	2	K1-K2	2 K2	2 K3
3	CO3	K1-K4	2	K1-K2	2 K2	2 K3
4	CO4	K1-K4	2	K1-K2	2 K2	2 K4
5	CO5	K1-K4	2	K1-K2	2 K2	2 K4
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.57	43
K2	5	50		55	39.28	
K3			48	48	34.28	34
K4			32	32	22.85	23
Marks	10	50	80	140	100	100

NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions				PART – A	
				(10 x 1 = 10 Marks)	
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K1		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K1		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K1		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K2		
OR					
11. b)	Unit - I	CO1	K2		
12. a)	Unit - II	CO2	K2		
OR					
12. b)	Unit - II	CO2	K2		
13. a)	Unit - III	CO3	K2		
OR					
13. b)	Unit - III	CO3	K2		
14. a)	Unit - IV	CO4	K2		
OR					
14. b)	Unit - IV	CO4	K2		
15. a)	Unit - V	CO5	K2		
OR					
15. b)	Unit - V	CO5	K2		

Answer ALL the questions				PART – C	(5 x 8 = 40 Marks)
16. a)	Unit - I	CO1	K3		
OR					
16. b)	Unit - I	CO1	K3		
17. a)	Unit - II	CO2	K3		
OR					
17. b)	Unit - II	CO2	K3		
18. a)	Unit - III	CO3	K3		
OR					
18. b)	Unit - III	CO3	K3		
19. a)	Unit - IV	CO4	K4		
OR					
19. b)	Unit - IV	CO4	K4		
20. a)	Unit - V	CO5	K4		
OR					
20. b)	Unit - V	CO5	K4		



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	NUTRITION AND NUTRITIONAL BIOCHEMISTRY PRACTICAL			
Course Code	23UFNCP41	L	P	C
Category	Core courses	-	4	4
COURSE OBJECTIVES:				
<ul style="list-style-type: none">➤ To enable the students to:➤ Study the basic concepts of metabolism of proximate principles and others.➤ To learn the metabolic pathways of nutritional significance.				
COURSE CONTENT				
<ol style="list-style-type: none">1. Qualitative tests for sugars-glucose, fructose, lactose, maltose and glucose. Use of standard measuring cups and spoons.2. Quantitative estimation of reducing sugar3. Qualitative tests for proteins4. Demonstration Experiments.5. Estimation of total nitrogen in foods (Micro or Macrokjeldahl methods)6. Determination of Iodine value.7. Determination of fat content in food using Soxhlet method.8. Industrial Visit				
Total Lecture Hours				10

BOOKS FOR STUDY:

- Albanese, A. (Ed.). (2012). Newer methods of nutritional biochemistry V3: With applications and interpretations. Elsevier.
- ShanmughamAmbika (1985) Fundamentals of bio-chemistry to medical students. NVA Bharat Printers, and traders 56, Peters Road, Madras-86.
- Lehninger, A.L. (1993) Biochemistry. 3rd ed. CBS Publishers, New Delhi.
- Lieberman, M., & Ricer, R. E. (2009). Lippincott's Illustrated Q&A Review of Biochemistry. Lippincott Williams & Wilkins

BOOKS FOR REFERENCES:

- Albanese, A. (Ed.). (2012). Newer methods of nutritional biochemistry V3: With applications and interpretations. Elsevier.
- 2. Bettelheim, F. A., Brown, W. H., Campbell, M. K., & Farrell, S. O. (2009). General, Organic & Biochemistry. Brooks/Cole Cengage Learning.
- 3. Champe, P. C., Harvey, R. A., & Ferrier, D. R. (2005). Biochemistry. Lippincott Williams & Wilkins, 6th Edition, Wolters Kluwer, London.
- 4. Harvey, R. and Ferrier, D., Lippincott's Illustrated Reviews: Biochemistry, 6th edition, Lippincott Williams and Wilkins, Philadelphia.
- Lehninger, A.L. (1993) Biochemistry. 3rd ed. CBS Publishers, New Delhi.
- Lieberman, M., & Ricer, R. E. (2009). Lippincott's Illustrated Q&A Review of Biochemistry. Lippincott Williams & Wilkins.

WEB RESOURCES:

- ❖ <https://www.udemy.com/share/1027yA/>
- ❖ <https://www.classcentral.com/course/swayam-biochemistry-5229>
- ❖ <https://www.classcentral.com/course/edx-biochemistry-biomolecules-methodsand-mechanisms-12585>
- ❖ <https://www.classcentral.com/course/swayam-experimental-biochemistry-12909>

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED		ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL		GLOBAL	✓
Changes Made in the Course	Percentage of Change		90 %	No Changes Made		New Course		

*** Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.**

COURSE OUTCOMES:										K LEVEL
After studying this course, the students will be able to:										
CO1	Describe the role of enzymes and co enzymes in biological oxidation.									K1 to K4
CO2	Explain metabolism and regulation of carbohydrate, lipids and proteins									K1 to K4
CO3	Analyze the integration of carbohydrate, lipid and protein metabolism									K1 to K4
CO4	Comprehend the significance of recent biochemical concepts namely xenobiotics, recombinant DNA technology and Nutrigenomics.									K1 to K4
CO5	Discuss the structure and functions of nucleic acids.									K1 to K4

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	2	2	2	1	1	2	3
CO2	3	3	3	2	2	2	1	1	2	3
CO3	3	3	3	2	2	2	3	2	2	3
CO4	3	3	3	2	2	2	1	2	2	3
CO5	3	3	3	2	2	2	1	2	2	3
S- STRONG			M – MEDIUM				L – LOW			

CO / PO MAPPING:

COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3
CO 2	3	3	3	3	3
CO 3	3	3	3	3	3
CO 4	3	3	3	3	3
CO 5	3	2	3	2	2
WEITAGE	15	15	15	15	15
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	3	3	3	3	3

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
1.	Qualitative tests for sugars-glucose, fructose, lactose, maltose and glucose. Use of standard measuring cups and spoons.	2	Lab
2.	Quantitative estimation of reducing sugar	2	Lab

3.	Qualitative tests for proteins	2	Lab
4.	Demonstration Experiments.	2	Lab
5.	Estimation of total nitrogen in foods (Micro or Macrokjeldahl methods)	2	Lab
6.	Determination of Iodine value.	2	Lab
7.	Determination of fat content in food using Soxhlet method.	2	Lab
8.	Industrial Visit	1	Lab

**Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)**

INTERNAL	COs	K LEVEL	MAJOR	MINOR	SPOTTERS	RECORD	VIVA
CI AI	CO1	K1					5
	CO2	K2				5	
	CO3	K3			5		
	CO4	K4		5			
	CO5	K4	5				
Question Pattern	No. of Questions to be asked	2 (A-Written B-Practical Demo)	2 (A-Written B-Practical Demo)	2	1	5	
	No. of Questions to be answered	2	2	2	1	5	
	Marks for each question	A-3 B-2	A-3 B-2	5	10	1	
	Total Marks for each section	5	5	5	5	5	

Distribution of Marks with K Level

	K Level	Major	Minor	Spotters	Record	Viva	Total Marks	% of Marks without choice	Consolidated %
CIA	K1	-	-	-	-	5	5	6.66	6.66
	K2	-	-	-	5	-	5	6.66	6.66
	K3	-	-	5	-	-	5	6.66	6.66
	K4	-	5	-	-	-	5	6.66	6.66
	K4	5					5	6.66	6.66

Summative Examination – Blue Print

Articulation Mapping – K Levels with Course Outcomes (COs)

EXTERNAL	COs	K LEVEL	MAJOR	MINOR	SPOTTERS	RECORD	VIVA
CI AI	CO1	K1					5
	CO2	K2				5	
	CO3	K3			20		
	CO4	K4		20			
	CO5	K4	25				
Question Pattern		No. of Questions to be asked	2 (A-Written B-Practical Demo)	2 (A-Written B-Practical Demo)	2	1	5
		No. of Questions to be answered	2	2	2	1	5
		Marks for each question	A-20 B-5	A-15 B-5	5	10	1
		Total Marks for each section	25	20	20	5	5

Distribution of Marks with K Level CIA									
	K Level	Major	Minor	Spotters	Record	Viva	Total Marks	% of Marks without choice	Consolidated %
CIA	K1					5	5	6.6	6.6
	K2				5		5	6.6	6.6
	K3			20			20	26.6	26.6
	K4		20				20	26.6	26.6
	K4	25					25	33.3	33.3
	Marks	25	20	20	5	5	75	100	100



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	HUMAN DEVELOPMENT			
Course Code	23UFNEC41	L	P	C
Category	ELECTIVE COURSE	4	-	3
COURSE OBJECTIVES:				
To enable the students to :				
<ul style="list-style-type: none">➤ Familiarize with the growth process from conception to confinement.➤ Know the development of an individual from infancy to old age.➤ Understand the physical, psychological, and social development of the individual from infancy to old age.➤ Develop an awareness of the problems of children, adolescent, and exceptional children				
UNIT - I Growth and development		20		
Meaning - growth and development, principles of governing growth and development, developmental task of different stages. Methods of study of human development. Practical - preparation of case study - observing various development- physical, motor, cognitive, creative, social, emotional, and intellectual of a particular child.				
UNIT - II Infancy and Childhood		20		
Characteristics, physical, social, and emotional development, cognitive and language development during infancy, early childhood, and late childhood. Children's play – meaning, types, importance stages. Parental disciplinary Techniques – merits and demerits Practical - Socio-metric study of early adolescents. Analysis of various play techniques.				
UNIT - III Adolescence		15		
Adolescence –physical and psychological changes, emotional, moral and social development, Problems of adolescence. Delinquency – causes, prevention, and rehabilitation. Educational and vocational guidance, role of family and schools and colleges in guiding adolescence Practical - A survey on Juvenile Delinquency prevalence				
UNIT - IV Adulthood and Old Age		10		
Adulthood - Characteristics and developmental tasks, all aspects of development and vocational adjustments. Old age - Characteristics of old age, physical changes, psychological changes. Place of the aged in Indian Society Practical - Survey on problems of old age.				
UNIT - V Exceptional Children		10		
Introduction to Children with Special Needs and identification & Educational Rehabilitation Gifted children Orthopedically challenged Mentally retarded Hearing impaired Visually handicapped Learning disability Practical - Visit to an institution for exceptional children.				
Total Lecture Hours				75

BOOKS FOR STUDY:

- World Bank Group (2011) From Early Child Development to Human Development
- World Bank Group (2007) Early Child Development
- F Neil J. Salkind (2002) Child Development
- Robert V. Kail & John C. Cavanaugh (2015) Human Development: A Life-Span View

BOOKS FOR REFERENCES:

- Hurlock E.B., (1972). Child Development, New York: McGraw Hill Book company.
- Hurlock, E.B., (1995): Developmental Psychology - A Life Span Approach, 5th (Ed.) New York: McGraw Hill Book Co.
- Nanda V.K., (1998): Principles of Child Development, New Delhi: Anmol Publications Pvt. Ltd.
- Rajammal P. Devadas and Jaya N. Muthu (2002). A Textbook of Child Development, New Delhi: Macmillan Publishers.
- Singh, A. (2015). Foundations of Human Development: A Life Span Approach. New Delhi: Orient Black Swan.
- Suriakanthi A., (1997). Child Development – An Introduction, Tamil Nadu: Kavitha Publishers.
- Swaminathan, M (1998). The First Five Years: A Critical Perspective on Early Childhood Care and Education in India. New Delhi: Sage Publications.
- Suriakanthi, A., (2009). Child Development. Kavitha publications, Tamil

WEB RESOURCES:

- ❖ http://www.wbnsou.ac.in/online_services/SLM/BED/SEM-01_A1.pdf
- ❖ <https://ncert.nic.in/textbook/pdf/kepy104.pdf>
- ❖ <https://egyankosh.ac.in/bitstream/123456789/17134/1/Unit-3.pdf>
- ❖ https://www.cukashmir.ac.in/departmentdocs_16/Growth%20&%20Development%20%20Dr.%20Ismail%20Thamarasseri.pdf

Nature of Course	EMPLOYABILITY		SKILL ORIENTED		✓	ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL	✓	GLOBAL	
Changes Made in the Course	Percentage of Change		No Changes Made			New Course		✓

*** Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.**

COURSE OUTCOMES:		K LEVEL
After studying this course, the students will be able to:		
CO1	Describe the meaning and principles of Growth & Development	K1 to K4
CO2	Explain developmental aspects during infancy, early and late childhood.	K1 to K4
CO3	Evaluate developmental aspects during adolescence.	K1 to K4
CO4	Identify the developmental tasks during adulthood and old age.	K1 to K4
CO5	Introduction to Children with Special Needs and identification & Educational Rehabilitation	K1 to K4

MAPPING WITH PROGRAM OUTCOMES:										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	2	3	2	3	3	2	3
CO2	3	3	3	2	3	2	3	3	2	3
CO3	3	3	3	2	3	2	3	3	2	3
CO4	3	3	3	2	3	2	3	3	3	3
CO5	3	3	3	2	3	2	3	3	3	3
S- STRONG			M – MEDIUM				L – LOW			

CO / PO MAPPING:					
COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3
CO 2	3	3	3	3	3
CO 3	3	3	3	3	3
CO 4	3	3	3	3	3
CO 5	3	3	3	3	3
WEITAGE	15	15	15	15	15
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	3	3	3	3	3

LESSON PLAN:			
UNIT	COURSE NAME	HRS	PEDAGOGY
I	Growth and development Meaning - growth and development, principles of governing growth and development, developmental task of different stages. Methods of study of human development. Practical - preparation of case study - observing various development- physical, motor, cognitive, creative, social, emotional, and intellectual of a	20	PPT, Chalk & Talk

	particular child.		
II	<p>Infancy and Childhood Characteristics, physical, social, and emotional development, cognitive and language development during infancy, early childhood, and late childhood.</p> <p>Children’s play – meaning, types, importance stages. Parental disciplinary Techniques – merits and demerits</p> <p>Practical - Socio-metric study of early adolescents. Analysis of various play techniques.</p>	20	PPT, Chalk & Talk
III	<p>Adolescence Adolescence –physical and psychological changes, emotional, moral and social development, Problems of adolescence. Delinquency – causes, prevention, and rehabilitation.</p> <p>Educational and vocational guidance, role of family and schools and colleges in guiding adolescence</p> <p>Practical - A survey on Juvenile Delinquency prevalence</p>	15	PPT, Chalk & Talk
IV	<p>Adulthood and Old Age Adulthood - Characteristics and developmental tasks, all aspects of development and vocational adjustments.</p> <p>Old age - Characteristics of old age, physical changes, psychological changes. Place of the aged in Indian Society</p> <p>Practical - Survey on problems of old age.</p>	10	PPT, Chalk & Talk
V	<p>Exceptional Children Introduction to Children with Special Needs and identification & Educational Rehabilitation</p> <p>Gifted children Orthopedically challenged Mentally retarded Hearing impaired Visually handicapped Learning disability</p> <p>Practical - Visit to an institution for exceptional children.</p>	10	PPT, Chalk & Talk

**Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)**

Internal	Cos	K Level	Section A		Section B Either or Choice	Section C Either or Choice
			MCQs			
			No. of Questions	K - Level		
CI	CO1	K1 – K4	2	K1	2 (K2,K3)	2(K3,K4)
AI	CO2	K1 – K4	2	K1	2 (K2,K3)	2 (K3,K4)
CI	CO3	K1 – K4	2	K1	2 (K2,K3)	2(K3,K4)
AII	CO4	K1 – K4	2	K1	2 (K2,K3)	2 (K3,K4)
Question Pattern CIA I & II		No. of Questions to be asked	4		4	4
		No. of Questions to be answered	4		2	2
		Marks for each question	1		5	8
		Total Marks for each section	4		10	16

Distribution of Marks with K Level CIA I & CIA II

	K Level	Section A (Multiple Choice Questions)	Section B (Either / Or Choice)	Section C (Either / Or Choice)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	2			2	6.66	46.66
	K2	2	10		12	40	
	K3			8	8	26.66	26.66
	K4			8	8	26.66	26.66
	Marks	4	10	16	30	100	100
CIA II	K1	2			2	6.66	46.66
	K2	2	10		12	40	
	K3			8	8	26.66	26.66
	K4			8	8	26.66	26.66
	Marks	4	10	16	30	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)						
S. No	COs	K - Level	Section A (MCQs)		Section B (Either / or Choice) With K - LEVEL	Section C (Either / or Choice) With K – LEVEL
			No. of Questions	K – Level		
1	CO1	K1-K4	2	K1-K2	2 K2	2 K3
2	CO2	K1-K4	2	K1-K2	2 K2	2 K3
3	CO3	K1-K4	2	K1-K2	2 K2	2 K3
4	CO4	K1-K4	2	K1-K2	2 K2	2 K4
5	CO5	K1-K4	2	K1-K2	2 K2	2 K4
No. of Questions to be Asked			10		10	10
No. of Questions to be answered			10		5	5
Marks for each question			1		5	8
Total Marks for each section			10		25	40
(Figures in parenthesis denotes, questions should be asked with the given K level)						

Distribution of Marks with K Level						
K Level	Section A (Multiple Choice Questions)	Section B (Either or Choice)	Section C (Either/ or Choice)	Total Marks	% of (Marks without choice)	Consolidated %
K1	5			5	3.57	43
K2	5	50		55	39.28	
K3			48	48	34.28	34
K4			32	32	22.85	23
Marks	10	50	80	140	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.						

Summative Examinations - Question Paper – Format

Q. No.	Unit	CO	K-level		
Answer ALL the questions				PART – A	
				(10 x 1 = 10 Marks)	
1.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
2.	Unit - I	CO1	K1		
				a)	b)
				c)	d)
3.	Unit - II	CO2	K1		
				a)	b)
				c)	d)
4.	Unit - II	CO2	K1		
				a)	b)
				c)	d)
5.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
6.	Unit - III	CO3	K1		
				a)	b)
				c)	d)
7.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
8.	Unit - IV	CO4	K1		
				a)	b)
				c)	d)
9.	Unit - V	CO5	K1		
				a)	b)
				c)	d)
10.	Unit - V	CO5	K1		
				a)	b)
				c)	d)

Answer ALL the questions				PART – B	(5 x 5 = 25 Marks)
11. a)	Unit - I	CO1	K2		
OR					
11. b)	Unit - I	CO1	K2		
12. a)	Unit - II	CO2	K2		
OR					
12. b)	Unit - II	CO2	K2		
13. a)	Unit - III	CO3	K2		
OR					
13. b)	Unit - III	CO3	K2		
14. a)	Unit - IV	CO4	K2		
OR					
14. b)	Unit - IV	CO4	K2		
15. a)	Unit - V	CO5	K2		
OR					
15. b)	Unit - V	CO5	K2		

Answer ALL the questions				PART – C	(5 x 8 = 40 Marks)
16. a)	Unit - I	CO1	K3		
OR					
16. b)	Unit - I	CO1	K3		
17. a)	Unit - II	CO2	K3		
OR					
17. b)	Unit - II	CO2	K3		
18. a)	Unit - III	CO3	K3		
OR					
18. b)	Unit - III	CO3	K3		
19. a)	Unit - IV	CO4	K4		
OR					
19. b)	Unit - IV	CO4	K4		
20. a)	Unit - V	CO5	K4		
OR					
20. b)	Unit - V	CO5	K4		



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	FOUNDATIONS OF ENTREPRENEURSHIP			
Course Code	23UFNSC41	L	P	C
Category	SKILL COURSE	2	-	2
COURSE OBJECTIVES:				
To enable the students to :				
<ul style="list-style-type: none">➤ Understand the meaning and importance of entrepreneurship.➤ Gain awareness about existing entrepreneurial development programmes.➤ Know the government financial schemes available for entrepreneurship				
UNIT - I	Entrepreneurship			12
Entrepreneurship - Introduction, Concept of Entrepreneur, Entrepreneurship and Enterprise, Definition of Entrepreneurship, Objectives of Entrepreneurship Development, Phases of Entrepreneurship Development, Role of Entrepreneurship, Characteristics of Entrepreneurship, Traits of Entrepreneurship				
Activity: Understanding the application process of financial services in Government sectors/MSME				
UNIT - II	Entrepreneur			12
Entrepreneur - Meaning, Functions of Entrepreneur, types of entrepreneurs, stages of entrepreneurial process role of entrepreneur in economic development.				
Activity: Categorize the stages of entrepreneurial process.				
UNIT - III	Women entrepreneurship			12
Women entrepreneurship - Concept, functions, growth, problems, functions, development. Rural entrepreneurship – meaning – need – problems – how to develop rural entrepreneurs – Role of NGOs and SHGs in rural entrepreneurship.				
Activity: List out the self-help group activities.				
UNIT - IV	Government Development Schemes			12
Government Development Schemes - Prime minister employment generation programme (PMEGP), stand up India, Pradhan Mantri Mudra Yojana (PMMY), Prime Minister Rural Development Fellows Scheme, Entrepreneurship and skill development programmes (ESDP) and state development schemes.				
Activity: Preparing/Submission of Project Proposal for Start Up/Business models				

UNIT - V	Institutions providing financial assistance	12
Institutions providing financial assistance - Loan schemes offered by SIDBI, SIDC's, SIIC's, NSIC and NABARD- Difficulties in procuring Institutional finance Agencies for Urban and Rural Development – Government, District Rural Developmental Agencies (DRDA). Activity: Visit to SSI Units. Availing Seed fund from SIDBI/ Angel Investors.		
Total Lecture Hours		60

BOOKS FOR STUDY:

- Dutta and Sundaram, Indian Economy, S Chand Publications, New Delhi, 2013.
- Rakesh Saxena (2020) Government Schemes, missions, campaigns and programmes in India, Prabhat Prakashan.
- S S Khanka (2011) Entrepreneurial development, S Chand, and company

BOOKS FOR REFERENCES:

- Dr.Jayshree Suresh (2012) Entrepreneurial Development, Margham Publications
- S.K.Singh, Rural Development Policies and Programmes, Northern book centre New Delhi, 2002.
- Sreedhar and Rajasekhar (2014) Rural Development in India Strategies and process, Concept Publishing Company

WEB RESOURCES:

- ❖ <http://www.simplynotes.in/e-notes/mbabba/entrepreneurship-development/>
- ❖ https://www.iare.ac.in/sites/default/files/lecture_notes/IARE_Entrepreneurial_Development_NOTES.pdf<https://www.yourarticlelibrary.com/women/women-entrepreneurship/womenentrepreneurship/99813>
- ❖ https://ccsuniversity.ac.in/bridge-library/pdf/DHA-MHA-403_Unit3.pdf
- ❖ <https://www.creditmantri.com/article-top-10-government-schemes-to-support-startups-promote-the-spirit-of-entrepreneurship>

Nature of Course	EMPLOYABILITY		SKILL ORIENTED		ENTREPRENEURSHIP		✓
Curriculum Relevance	LOCAL	REGIONAL	✓	NATIONAL	GLOBAL		
Changes Made in the Course	Percentage of Change		60	No Changes Made		New Course	
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.							

COURSE OUTCOMES:	K LEVEL
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After studying this course, the students will be able to:

CO1	Describing the concept of entrepreneurship	K1 & K2
CO2	Analyze the types of entrepreneurs and understand their roles	K1 & K2
CO3	Identify the financial institutions and apply for loan schemes for starting a business	K1 & K2
CO4	Assess the problems of women and rural entrepreneurs.	K1 & K2
CO5	Prepare a proposal for entrepreneurship utilizing government financial schemes	K1 & K2

MAPPING WITH PROGRAM OUTCOMES:										
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CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	3	1	3	2	3	3
CO2	3	1	3	3	2	1	3	3	3	3
CO3	3	3	3	2	1	1	3	1	2	2
CO4	3	3	3	3	2	2	3	3	3	3
CO5	3	3	3	3	2	1	3	2	2	3

S- STRONG

M - MEDIUM

L - LOW

CO / PO MAPPING:					
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COS	PSO1	PSO2	PSO3	PSO4	PSO5
CO 1	3	3	3	3	3
CO 2	3	3	3	2	3
CO 3	2	3	3	3	3
CO 4	3	3	2	3	3
CO 5	3	2	3	3	3
WEITAGE	14	14	14	14	15
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	3	3	3	3	3

LESSON PLAN:			
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UNIT	COURSE NAME	HRS	PEDAGOGY
I	Entrepreneurship	12	PPT, CHALK & LECTURES, VIDEOS
II	Entrepreneur	12	PPT, CHALK & LECTURES
III	Women entrepreneurship	12	PPT, CHALK & LECTURES
IV	Government Development Schemes	12	PPT, CHALK & LECTURES
V	Institutions providing financial assistance	12	PPT, CHALK & LECTURES

Learning Outcome Based Education & Assessment (LOBE) Formative Examination - Blue Print Articulation Mapping – K Levels with Course Outcomes (COs)				
Internal	Cos	K Level	Section A	
			MCQs	
			No. of. Questions	K - Level
CI AI	CO1	K1 – K2	25	K1,K2
	CO2	K1 – K2	25	K1,K2
CI AII	CO3	K1 – K2	25	K1,K2
	CO4	K1 – K2	25	K1,K2
Question Pattern CIA I & II		No. of Questions to be asked	50	
		No. of Questions to be answered	50	
		Marks for each question	1	
		Total Marks for each section	50	

* Two Formative examinations will be conducted as a part of Continuous Internal Assessment under which, 50 MCQ's will be asked [50X1=50 marks] from any 4 CO's. (Ist Test-2 CO's & IInd Test-2 CO's) in equal weightage

Distribution of Marks with K Level CIA I & CIA II					
	K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidate of %
CIA I	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	100	100
CIA II	K1	30	30	60	100
	K2	20	20	40	
	K3				
	K4				
	Marks	50	50	100	100

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented- Solving Problems

K4- Examining, analyzing, presentation and make inferences with evidences

CO5 will be allotted for individual Assignment which carries five marks as part of CIA component.

Summative Examination – Blue Print Articulation Mapping – K Level with Course Outcomes (COs)				
S. No	COs	K - Level	Section A (MCQs)	
			No. of Questions	K – Level
1	CO1	K1-K2	15	K1,K2
2	CO2	K1-K2	15	K1,K2
3	CO3	K1-K2	15	K1,K2
4	CO4	K1-K2	15	K1,K2
5	CO5	K1-K2	15	K1,K2
No. of Questions to be Asked			75	
No. of Questions to be answered			75	
Marks for each question			1	
Total Marks for each section			75	
(Figures in parenthesis denotes, questions should be asked with the given K level)				

In summative examinations, 75 MCQ's will be asked [75X1=75 marks] from all 5 CO's in equal weightage.

Distribution of Marks with K Level				
K Level	Section A (Multiple Choice Questions)	Total Marks	% of (Marks without choice)	Consolidated %
K1	40	40	53	100
K2	35	35	47	
K3				
K4				
Marks		75	100	100
NB: Higher level of performance of the students is to be assessed by attempting higher level of K levels.				



MANNAR THIRUMALAI NAICKER COLLEGE (AUTONOMOUS)

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

FOR THOSE WHO JOINED IN 2023-2024 AND AFTER

Course Name	COMPUTER APPLICATIONS IN HOME SCIENCE LAB			
Course Code	23UCSSP41	L	P	C
Category	SKILL	-	2	2

COURSE OBJECTIVES:

The main objectives of this course are to:

- To understand the Computer applications in Home Science.
- To be able to use Computers for Education and data presentation.
- Understand the MS-Word
- To use MS-Excel, MS Power point
- Create hyperlink between MS-Word and MS-Excel

LIST OF PROGRAMS

MS-Word

- Creating and formatting a document,
- Entering and Editing text Toolbars and their Icons.
- Table creation and operations.
- Auto correct, Auto Text, Spell Check, Thesaurus.
- Word Art, Inserting Objects.
- Mail-merge.
- Page set-up, Page Preview.

MS-Excel

- Creating a work sheet
- Selecting Cells Toolbars and Their Icons.
- Entering & Editing text, Entering Numbers
- Sorting Data, Auto Sum.
- Use of Functions, Formulas
- Naming Cells and Ranges.
- Generating Graphs and Charts.
- Creating Hyperlink to Word document.

MS-PowerPoint

- Starting PowerPoint
- Creating Power Point Presentation
- Editing Text on Slide
- Formatting Text
- Formatting Paragraphs
- Checking Text
- Using Clip Art Gallery
- ✓ Develop a Slide Show

Total Lecture Hours

30

BOOKS FOR STUDY:

- Anita Goel, (2001). Fundamentals of Computers: Forthcoming title in Pearson Education
- V Rajaraman, (2007). Fundamentals of Computers, Fourth Edition, PHI.

BOOKS FOR REFERENCES:

- Kihrwadkar A, Pushpanadan, (2006), Information and Communication Technology in Education, Sarup and Sons, Delhi
- Sampath K (1998), Introduction to Educational Technology, Sterling Publishers Pvt. Ltd
- Sagar Krshna (2007), ICTs and Teacher Training, Authors Press, Delhi
- Valerie Q (1998), Internet in a nutshell, Shroff Publishers and Distributors Pvt. Ltd, Delhi.

WEB RESOURCES:

- ❖ <https://www.thesourcecad.com/autocad-tutorials/>
- ❖ <https://www.vmaker.com/tutorial-video-hub/microsoft-tutorial-videos/microsoft-office-tutorial/>
- ❖ <https://www.thesourcecad.com/autocad-tutorials/>
- ❖ <https://nutrium.com/blog/why-should-you-choose-a-nutrition-software-over-an-excel-word/>

Nature of Course	EMPLOYABILITY		✓	SKILL ORIENTED		ENTREPRENEURSHIP		
Curriculum Relevance	LOCAL		REGIONAL		NATIONAL		GLOBAL	✓
Changes Made in the Course	Percentage of Change			No Changes Made			New Course	✓
* Treat 20% as each unit (20*5=100%) and calculate the percentage of change for the course.								

COURSE OUTCOMES:**K LEVEL**

After studying this course, the students will be able to:

CO1	Understand and apply the basic concepts of a word processing package.	K1 & K2
CO2	To perform documentation	K1 & K2
CO3	To perform documentation with images	K1 & K2
CO4	Understand and apply the basic concepts of electronic spreadsheet software.	K1 & K2
CO5	To perform presentation skills	K1 & K2

MAPPING WITH PROGRAM OUTCOMES:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	S	S
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S

CO5	S	S	M	S	S	S	M	M	S	S
S- STRONG			M – MEDIUM				L – LOW			

CO / PO MAPPING:						
COS	PSO1	PSO2	PSO3	PSO4	PSO5	PO6
CO 1	3	3	3	3	3	3
CO 2	3	3	2	3	3	3
CO 3	3	3	3	2	3	2
CO 4	3	2	3	3	3	3
CO 5	3	3	3	2	3	3
WEITAGE	15	14	13	12	15	13
WEIGHTED PERCENTAGE OF COURSE CONTRIBUTION TO POS	100%	93%	93%	87%	100%	93%

LESSON PLAN:

UNIT	COURSE NAME	HRS	PEDAGOGY
I	General command	5	PPT,CHALK& LECTURES, VIDEOS
II	Computer Application in Space planning	8	PPT,CHALK& LECTURES
III	Computer Application in Nutrition	5	PPT,CHALK& LECTURES
IV	Computer Application in Textiles	7	PPT,CHALK& LECTURES
V	Computer Application in Research	5	PPT,CHALK& LECTURES

**Learning Outcome Based Education & Assessment (LOBE)
Formative Examination - Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)**

INTERNAL	COs	K LEVEL	MAJOR	MINOR	SPOTTERS	RECORD	VIVA
CI AI	CO1	K1					5
	CO2	K2				5	
	CO3	K3			5		
	CO4	K4		5			
	CO5	K4	5				
Question Pattern		No. of Questions to be asked	2 (A-Written B-Practical Demo)	2 (A-Written B-Practical Demo)	2	1	5
		No. of Questions to be answered	2	2	2	1	5
		Marks for each question	A-3 B-2	A-3 B-2	5	10	1
		Total Marks for each section	5	5	5	5	5

Distribution of Marks with K Level

	K Level	Major	Minor	Spotters	Record	Viva	Total Marks	% of Marks without choice	Consolidated %
CIA	K1	-	-	-	-	5	5	6.66	6.66
	K2	-	-	-	5	-	5	6.66	6.66
	K3	-	-	5	-	-	5	6.66	6.66
	K4	-	5	-	-	-	5	6.66	6.66
	K4	5					5	6.66	6.66

**Summative Examination – Blue Print
Articulation Mapping – K Levels with Course Outcomes (COs)**

EXTERNAL	COs	K LEVEL	MAJOR	MINOR	SPOTTERS	RECORD	VIVA
CI AI	CO1	K1					5
	CO2	K2				5	
	CO3	K3			20		
	CO4	K4		20			
	CO5	K4	25				
Question Pattern		No. of Questions to be asked	2 (A-Written B-Practical Demo)	2 (A-Written B-Practical Demo)	2	1	5
		No. of Questions to be answered	2	2	2	1	5
		Marks for each question	A-20 B-5	A-15 B-5	5	10	1
		Total Marks for each section	25	20	20	5	5

Distribution of Marks with K Level CIA

	K Level	Major	Minor	Spotters	Record	Viva	Total Marks	% of Marks without choice	Consolidated %
CIA	K1					5	5	6.6	6.6
	K2				5		5	6.6	6.6
	K3			20			20	26.6	26.6
	K4		20				20	26.6	26.6
	K4	25					25	33.3	33.3
	Marks	25	20	20	20	5	5	75	100