DEPARTMENT OF MICROBIOLOGY				*CLASS: II B.Sc. Microbiology*				
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/week**	**CIA**	**Ext**	**Total**
III	NME - I	20U3RNM1	Nutrition and Health	2	2	25	75	100

Nature of Course				
Knowledge and skill	✓		Employability oriented	
Skill oriented			Entrepreneurship oriented	

Course Objectives:

1. To understand the fundamental concepts of food, nutrition and health
2. To understand the relationship among food, nutrition and health
3. To gain knowledge regarding nutritional contribution of various food groups
4. To know about the importance of food safety and food quality
5. To gain knowledge regarding nutritional disorders ranging from nutritional deficiencies to life style disorders

Course Learning Outcomes:

On successful completion of the programme, the students will be able to

1. Understand basic concepts in food, nutrition and health
2. Summarize nutritional contribution of various food groups
3. Elaborate the functions and dietary sources of Macronutrients and Micronutrients
4. Explain food laws, regulations and standards
5. Identify the causes, symptoms of Nutritional deficiency diseases

Unit	Description	Hours	K-level	CLO
I	**Unit - I: Basic concepts in food and nutrition** Basic terms used in study of food and nutrition. Understanding relationship among food, nutrition and health. Functions of food- Physiological, Psychological and Social.	6 hrs	Up to K2	1
II	**Unit- II: Major Food Groups** Nutritional contribution of the food groups: cereals, pulses, fruits and vegetables, milk and milk products, egg, meat, poultry and fish, fats and oils. Role of fibres in nutrition.	6 hrs	Up to K2	2
III	**Unit- III: Nutrients** Functions, dietary sources of the following nutrients: Macronutrients- carbohydrates, lipids and proteins. Micronutrients- Fat soluble vitamins-A, D, E and K, Water soluble vitamins – thiamine, riboflavin, niacin, pyridoxine, folate, vitamin B12 and vitamin C, Minerals – calcium, iron and iodine.	6 hrs	Up to K2	3

IV	**Unit- IV: Food Adulteration** Prevention of Food Adulteration (PFA) - Definition of food adulteration. Adulterants in commonly consumed food items. Accidental contamination: botulism, staphylococcal and aflatoxin intoxication. Importance of food labels in processed foods and nutritional labelling. Food laws, regulations and standards - Codex Alimentarius - Prevention of Food Adulteration (PFA) Act - Agmark - Fruit Products Order (FPO) - Meat Products Order (MPO) - Bureau of Indian Standards (BIS) - MMPO – FSSAI**.**	6 hrs	Up to K2	4
V	**Unit-V: Nutritional deficiency diseases** Introduction to Nutritional deficiency diseases - causes, symptoms, treatment, prevention of the following: Protein Energy Malnutrition (PEM),Vitamin A Deficiency (VAD), Iron Deficiency Anaemia (IDA), Iodine Deficiency Disorders (IDD), Zinc Deficiency, Fluorosis	6 hrs	Up to K2	5

Total 30 Hours

Books for Study

1. Mudambi, S.R. and Rajagopal, M.V. (2007). Fundamentals of Foods, Nutrition and Diet Therapy; Fifth Ed. New Age International Publishers, Chennai.
2. Wadhwa, A. and Sharma, S. (2003). Nutrition in the Community-A Textbook. Elite Publishing House Pvt. Ltd., New Delhi.
3. Srilakshmi. (2010). Food Science, 4th Edition. New Age International Ltd., Chennai.

Books for Reference

1. Virag Gupta. (2011). The Food Safety and Standards Act along with Rules and Regulations. Commercial Law Publishers (India) Pvt Ltd, New Delhi.
2. Mahan, L. K. and Escott Stump, S. (2013). Krause's Food & Nutrition Therapy, 13th ed. Saunders-Elsevier,Philadelphia.
3. Stacy Nix. (2009). William's Basic Nutrition and Diet Therapy, 13th Edition. Elsevier Mosby,Philadelphia.
4. Bamji, M.S., Krishnaswamy, K, Brahmam, G.N.V. (2009). Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
5. Park, K. (2011). Park's Textbook of Preventive and Social Medicine, 21st Edition. M/s BanarasidasBhanot Publishers, Jabalpur, India.

Web Resources

1. https://egyankosh.ac.in/bitstream/123456789/41571/1/CNCC-01-E-B1-U1.pdf
2. https://www.brainkart.com/article/Physiological,-Social,-Psychological-functions-of-food_2499/
3. https://www.healthychildren.org/English/healthy-living/nutrition/Pages/The-5-Food-Groups-Sample-Choices.aspx
4. https://www.open.edu/openlearncreate/mod/oucontent/view.php?id=315&printable=1
5. https://www.medlife.com/blog/nutritional-deficiency-anemia-causes-symptoms-treatment/

Rationale for Nature of the course

Proper nutrition practices enable the achievement and maintenance of optimal physical and mental health. The paper focuses on the raising standards in food science, food safety practices, and food

standards. The beneficiaries will be imbibed with knowledge and skills that would help them to secure good health and well being for themselves and their family, which leads to a healthy society.

Activities having direct impact on Skill development/Employability / Entrepreneurship

- Developing skills in preparing diet charts for nutritional deficiency diseases.
- Would apply knowledge gained through this paper in meal planning safety
- Safety quality of good would be assessed

Pedagogy

Chalk and talk, PPT, Group discussion, Seminar, Screening of educational videos and quiz

Course Learning Outcomes (CLO)

	Course Learning Outcome *On successful completion of the programme, the students will be able to*	**Knowledge Level**
CLO1	Understands basic concepts in food, nutrition and health.	Up to K2
CLO2	Summarizes nutritional contribution of various food groups.	Up to K2
CLO3	Elaborates the functions and dietary sources of Macronutrients and Micronutrients	Up to K2
CLO4	Explains food laws, regulations and standards	Up to K2
CLO5	Identifies the causes, symptoms of Nutritional deficiency diseases	Up to K2

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 interferences with evidences

Mapping of Course Learning Outcome with Programme Specific Outcome

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CLO1	2	1	2	1	1
CLO2	1	1	1	2	2
CLO3	1	2	1	1	2
CLO4	2	2	1	1	2
CLO5	1	1	2	3	2

Advance application–3 Intermediate level –2 Basic level –1

Mapping of Course Outcome with Programme Outcome

	PO1	PO2	PO3	PO4	PO5
CLO1	1	1	1	1	1
CLO2	2	1	1	1	1
CLO3	2	2	1	1	1
CLO4	2	2	1	2	2
CLO5	3	2	2	2	2

Advance application–3 Intermediate level –2 Basic level –1

Learning Outcome Based Education & Assessment (LOBE)
Formative Exam – Blue Print (CIA I & II)
Articulation Mapping - K Levels with Courses Learning Outcomes (CLOs)

CLOs	K- Level	Section A		Section B		Section C	
		Short Answers		(Either/or Choice)		(Open Choice)	
		No. of Questions	K- Level	No. of Questions	K- Level	No. of Questions	K- Level
CLO x	Up to K2	1	K1	1	K2/K2	1	K1
CLO y	Up to K2	2	K1	1	K2/K2	2	K1
No. of Questions to be asked		3		2		3	
No. of Questions to be answered		3		2		2	
Marks for each question		2		7		10	
Total Marks for each section		**6**		**14**		**20**	

- *CLO5 will be allotted for individual Assignment which carries five marks as part of CIA component.*

Distribution of Section-wise Marks with K Levels (CIA I & II)

K Levels	Section A (No Choice)	Section B (No Choice)	Section C (Either/or)	Section D (Open Choice)	**Total Marks**	% of Marks without choice	Consolidated %
K1	6	-	30	-	**36**	56.25	**100**
K2	-	28	-	-	**28**	43.75	
K3	-	-	-	-	**-**	-	**-**
K4	-	-	-	-	**-**	-	**-**
Total Marks	**6**	**14**	**30**	**-**	**64**	**100.00**	**100%**

Articulation Mapping – K Levels with Courses Learning Outcomes (CLOs)

Units	CLOs	K-Level	Section – A		Section – B		Section – C	
			Short Answers		(Either / or Choice)		(Open Choice)	
			No. of Questions	K-Level	No. of Questions	K-Level	No. of Questions	K-Level
1	CLO 1	Up to K2	1	K1	1	K2/K2	1	K1
2	CLO 2	Up to K2	1	K1	1	K2/K2	1	K1
3	CLO 3	Up to K2	1	K1	1	K2/K2	1	K1
4	CLO 4	Up to K2	1	K1	1	K2/K2	1	K1
5	CLO 5	Up to K2	1	K1	1	K2/K2	1	K1
No. of Questions to be asked			5		5		5	
No. of Questions to be answered			5		5		3	
Marks for each question			2		7		10	
Total Marks for each section			**10**		**35**		**30**	

Distribution of Section-Wise Marks with K Levels

K Levels	Section A (No Choice)	Section B (No Choice)	Section C (No Choice)	Section D (No Choice)	Total Marks	% of Marks (without choice)	Consolidated
K1	10	-	50	-	60	46.15	100
K2	-	70	-	-	70	53.85	
K3	-	-	-	-	-	-	-
K4	-	-	-	-	-	-	-
Total Marks	**10**	**35**	**50**	**-**	**130**	**100.00**	**100**

LESSON PLAN

Units	Description	Staff	Hours	Mode
I Basic concepts in food and nutrition	Basic terms used in study of food and nutrition		1	Chalk and Talk
	Understanding relationship among food, nutrition and health.		2	
	Functions of food- Physiological, Psychological		2	
	Functions of food- Social.		1	
II Major Food Groups:	Nutritional contribution of the food groups - cereals, pulses.		2	Chalk and Talk
	Nutritional contribution of fruits and vegetables,		1	
	Nutritional contribution of milk and milk products,		1	
	Nutritional contribution of egg, meat, poultry and fish, fats and oils. Role of fibres in nutrition		2	
III Morphology and fine Structure of Bacteria	Functions, dietary sources of the following nutrients: Macronutrients- Carbohydrates, lipids and proteins.		2	Chalk and Talk & PPT
	Micronutrients- Fat soluble vitamins-A, D, E and K		2	
	Water soluble vitamins – thiamine, riboflavin, niacin, pyridoxine, folate, vitamin B12 and vitamin C, Minerals – calcium, iron and iodine		2	
IV Food Adulteration	Prevention of Food Adulteration (PFA) - Definition of food adulteration. Adulterants in commonly consumed food items.		2	PPT & Chalk and Talk
	Accidental contamination: botulism, staphylococcal and aflatoxin intoxication. Importance of food labels in processed foods and nutritional labelling.		2	
	Food laws, regulations and standards - Codex Alimentarius - Prevention of Food Adulteration (PFA) Act - Agmark - Fruit Products Order (FPO) - Meat Products Order (MPO) - Bureau of Indian Standards (BIS) - MMPO - FSSAI		2	
V Nutritional deficiency diseases:	Introduction to Nutritional deficiency diseases - causes, symptoms, treatment, prevention of the following: Protein Energy Malnutrition (PEM)		2	PPT
	Causes, symptoms, treatment, prevention of Vitamin A Deficiency (VAD), Iron Deficiency Anaemia (IDA)		2	
	Causes, symptoms, treatment, prevention of Iodine Deficiency Disorders (IDD), Zinc Deficiency, Fluorosis		2	
	Total		**30 Hrs**	

Course designers

1. Mrs. K. Rajeswari