Programme Structure

Sharda School of Allied Health Sciences

Master of Science
(Nutrition and Dietetics)

Programme code: SAH0129

Batch: 2023-25

Sharda School of Allied Health Sciences
M.Sc. (Nutrition and Dietetics)
Batch: 2023-25
Semester: I

S. No.	Subject Code	Subjects	Teaching Load			Credits	Type of Course
			L	T	P		
Theory							
1	MFN 101	Applied Human Physiology	4	0	-	4	CC
2	MFN 102	Advanced Nutritional Biochemistry and Instrumentation-I	3	1	-	4	CC
3	MFN 103	Advanced Nutrition Science	4	0	-	4	CC
4	MFN 104	Advanced Food Chemistry	4	0	-	4	CC
5	RMS 002	Biostatistics and Research Methodology	3	1	-	4	AECC
6		Value added course (VAC)					
Practical							
1.	MFN 152	Advanced Food Chemistry (Lab)	-	-	2	1	SEC
2.	MFN 153	Advance Nutritional Biochemistry and Instrumentation -I(Lab)	-	-	2	1	SEC
3.	RBL 001	Research based Learning (RBL 1)	0	0	4	0	Project
		Total Credits				**22**	

Sharda School of Allied Health Sciences
M.Sc. (Nutrition and Dietetics)
Batch: 2023-25
Semester: II

S. No.	Paper ID	Subject Code	Subjects	L	T	P	Credits	Type of Course
THEORY SUBJECTS								
1.	35551	MFN 106	Food Microbiology and safety	3	1	-	4	CC
2	35552	MFN 107	Advance Nutritional Biochemistry and Instrumentation-II	2	1	-	3	CC
3	35553	MFN 108	Clinical Nutrition-I	3	1	-	4	CC
4	35554	MFN 109	Nutrition in Emergency and Disaster Management	3	1	-	4	DSE
5	35555	MFN 110	Public Health and Nutrition	3	1	-	4	DSE
			Open Elective (OPE)	2	-	-	2	OE
PRACTICAL SUBJECTS								
1	35556	MFN 158	Advance Nutritional Biochemistry and Instrumentation-II	-	-	2	1	CC
2	35557	MFN 159	Clinical Nutrition-I (Lab)	-	-	2	1	CC
3	35558	MFN 156	Food Microbiology and Safety (Lab)	-	-	2	1	CC
4	31456	RBL 002	Research based Learning (RBL 2)	0	0	4	0	Project
5		CCU 108	Community Connect	0	0	4	2	CC
						Total Credits	**26**	

Sharda School of Allied Health Sciences
M.Sc. (Nutrition and Dietetics)
Specialization Clinical Nutrition
Batch: 2023-25
Semester: III

S. No.	Subject Code	Subjects	Teaching Load			Credits	Type of Course
			L	T	P		
Theory							
1	MFN 201	Functional Food and Nutraceuticals	3	0	-	3	CC
3	MFN 202C	Nutrition for Maternal and Child Health	3	1	-	4	DSE
4	MFN 203C	Clinical Nutrition –II	3	1	-	4	DSE
5	MFN 204 C	Sports and Fitness Nutrition	3	1		4	DSE
		Value added course (VAD)					
Practical							
5	MFN 256C	Clinical Nutrition-II (Lab)	-	-	4	2	DSE
6	MFN 261	Internship/ Summer Training	-	-	6	3	SEC
7.	RBL 003	Research based Learning (RBL 3)	0	0	4	2	Project
8.	MFN 263	FSIC (Faculty Students Industry Connect)	0	0	4	2	SEC
		Total Credits				**24**	

Programme Structure
Sharda School of Allied Health Sciences
M.Sc. (Nutrition and Dietetics)
Specialization Public Health Nutrition
Batch: 2023-25
Semester: III

S. No.	Subject Code	Subjects	Teaching Load			Credits	Type of Course
			L	T	P		
Theory							
1	MFN 201	Functional Food and Nutraceuticals	3	0	-	3	CC
2	MFN 202P	Nutrition Epidemiology	3	1		4	DSE
3	MFN 203P	Programme Planning in Public Health Nutrition	3	1	-	4	DSE
4	MFN 204P	Perspective of community nutrition and assessment	3	1	-	4	DSE
		Value added course (VAD)					
Practical							
5	MFN 256P	Programme Planning in Public Health Nutrition (LAB)	-	-	4	2	DSE
6	MFN 261	Internship/ Summer Training	-	-	6	3	SEC
	RBL 003	Research based Learning (RBL 3)	0	0	4	2	Project
7.	INC 001	FSIC (Faculty Students Industry Connect)	0	0	4	2	SEC
		Total Credits				**24**	

Sharda School of Allied Health Sciences
M.Sc. (Nutrition and Dietetics)
Specialization Food Science and Nutrition
Batch: 2023-25
Semester: III

S. No.	Subject Code	Subjects	Teaching Load			Credits	Type of Course
			L	T	P		
Theory							
1	MFN 201	Functional Food and Nutraceuticals	3	0	-	3	CC
2	MFN 202F	Food Preservation and Processing	3	1		4	DSE
3	MFN 203F	Food Quality Assurance and Food Toxicity	3	1	-	4	DSE
4	MFN 204F	Food Product Development and Sensory Evaluation	3	1	-	4	DSE
		Value added course (VAD)					
Practical							
5	MFN 256F	Food Processing (Lab)	-	-	4	2	DSE
6	MFN 261	Internship/ Summer Training	-	-	6	3	SEC
7.	RBL 003	Research based Learning (RBL 3)	0	0	4	2	Project
8.	MFN 263	FSIC (Faculty Students Industry Connect)	0	0	4	2	SEC
		Total Credits				**24**	

Sharda School of Allied Health Sciences
M.Sc. (Nutrition and Dietetics)
Batch: 2023-25
Semester: IV

S. No.	Subject Code	Subjects	Teaching Load			Credits	Type of Course
			L	T	P		
1	MFN 204	Dissertation	-	-	40	20	CC
2	MFN264	RBL (4)	0	0	4	2	Project
3	OPE	Open Elective (OPE)	2	-	-	2	OE
					Topic	28	

Course Modules

Theory Subjects

School: SSAHS		**Batch:2023-25**	
Programme: MFN			
Branch:		**Semester:** 1st Semester	
1	Course Code	MFN-101	
2	Course Title	Applied Human Physiology	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	Course Type	Compulsory	
5	Course Objective	To understand the normal structure and functioning of various organ systems of the body and their interactions and to be able to comprehend the pathophysiology of commonly occurring diseases	
6	Course Outcomes	CO1: Remembering the current state of knowledge about the functional organization of the human body. CO2: Understand insight of normal functioning of all the organ systems of the body and their interactions. CO3: Apply the knowledge of physiology in pathophysiology of commonly occurring diseases. CO4: Analyse the physiology with various disorders and their pathogenesis. CO5: Evaluate the defence mechanism of human body CO6: Create the knowledge of physiological functions of different body organs	
7	Course Description	The course in Physiology and Anatomy cover the first year is designed to give the students a depth knowledge of fundamental functions of different systems of human body. The major topics to be covered include the following: the cell, muscle& nervous tissue; blood; lymphoid tissues; respiratory system; blood vessels; circulation; heart; gastro intestinal tract; endocrine & Reproductive system, excretory system, central nervous system and special senses.	
8	**Outline syllabus**		CO Mapping
	Unit 1	**DIGESTIVE AND EXCRETORY SYSTEM**	
	A	Structure and functions of gastrointestinal tract Structure and functions of liver Functions of gastrointestinal secretions Role of enzymes in digestion Gut flora, role of prebiotics and probiotics in the maintenance of health of digestive system	CO1,CO2
	B	Structure and functions of kidney	CO1,CO2

		Urine formation Organic constituents of urine Inorganic constituents of urine	
	C	Physiology of different diseases related to digestive and excretory system	CO1,CO6
	Unit 2	**RESPIRATORY AND NERVOUS SYSTEM**	
	A	Structure and functions of nose and nasal cavity, pharynx, larynx, trachea, bronchi and lungs Mechanism of respiration, Oxygen transport, Carbon dioxide transport Respiratory rate, Air volume in lung in different situations Respiratory abnormalities; Hypoxia, Hypercapnia, carbon monoxide poisoning, Asphyxia, Cyanosis, High altitude sickness	CO2,CO1,CO6
	B	Emphysema, Asthma, COPD Structure of nerve cell, nerve impulses Classification of nervous system, Structure and functions of brain, spinal cord Peripheral nervous system Cerebrospinal fluid, Blood Brain Barrier, Neurotransmitters Alzheimer's disease, Parkinson's disease	CO1, CO3
	C	Physiology of different diseases related to respiratory and nervous system	CO2, CO6
	Unit 3	**BLOOD AND CIRCULATORY SYSTEM**	
	A	Structure and functions of heart and blood vessels Pulmonary, Systemic and Portal circulation Blood pressure, Heart rate, Factors affecting BP and heart rate Regulation of Cardiac output Composition of blood	CO3, CO1

	B	Plasma proteins; Functions, role in fluid balance Organic and Inorganic compounds in plasma Blood Lipids – Chylomicrons, VLDL, LDL, HDL,Cholesterol, Triglycerides Enzymes in blood Blood coagulation	CO3
	C	Physiology of different diseases related to blood and circulatory system	CO3,CO6
	Unit 4	**ENDOCRINE SYSTEM**	
	A	Endocrine glands, Formation and secretion of hormones Control of hormone secretion, mechanism of hormone action Pituitary gland: Hormones secreted and their functions, abnormalities Thyroid gland: Structure of thyroid gland, formation of thyroid hormones, functions of thyroid hormones, hypothyroidism, hyperthyroidism Adrenal gland: Structure of adrenal gland, secretions of adrenal cortex and their functions, hypoadrenalism, hyperadrenalism Secretions of adrenal medulla and their functions	CO4
	B	Parathyroid gland: Structure of parathyroid gland, functions of parathormone, hypo and hyper secretion of parathormone Islets of Langarhans: Structure of islets of Langarhans, functions of Insulin, deficiency of insulin, functions of glucagon Testes: Structure of testes, functions of testosterone, deficiency of testosterone Ovaries: Structure of ovaries, functions of estrogens and progesterone	CO4,CO3
	C	Physiology of different diseases related to Endocrine system	CO4, CO3, CO6
	Unit 5	**Excretory Physiology and Exercise Physiology**	
	A	Acid Base balance Pathophysiology of Renal Stones, Urinary Tract Infection,	CO5

		Glomerulonephritis Water and electrolyte balance				
	B	Concept of Fitness, Adaptations to exercise Energy Metabolism in Sports				CO5,CO3
						CO5
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		25%	25%	50%		
	Text book/s*	Text book of physiology- A.K. Jain				
	Reference book	Essentials of medical physiology- K.Sembulingam				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	1	-	-	1	1
CO2	3	1	2	2	1	2	1
CO3	2	3	3	2	1	1	1
CO4	3	2	1	2	1	1	1
CO5	3	2	2	-	1	1	1
CO6	3	2	2	-	1	1	1

Theory Subjects

School: SSAHS		**Batch :** 2023-25	
Programme: MFN		**Current Academic Year: 2023-2025**	
Branch:		**Semester:** 1st Semester	
1	Course Code	MFN111	
2	Course Title	Advanced Nutritional Biochemistry and Instrumentation-I	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Type	The course is an detail discussion to nutritional biochemistry. The students will learn how nutrients effect biochemical processes and signal transduction pathways and how this can lead to development of nutrition related diseases.	
5	Course Objective	CO1:Definethe process of carbohydrate metabolism CO2: Understand the process of lipid metabolism CO3:Apply the knowledge of Protein metabolism in human body CO4: Analyse the mechanism of biological oxidation CO5: Evaluate the functioning of analytical instruments CO6: Create the knowledge of different metabolic functions	
6	Course Outcomes	Nutritional Biochemistry provides students with knowledge and understanding of the delivery and function of cellular nutrients and metabolism in the human body. It involves integrated learning between the areas of Biochemistry and Nutrition.	
7	Course Description	The students will learn how nutrients effect biochemical processes and signal transduction pathways and how this can lead to development of nutrition related diseases.	
8	**Outline syllabus**		CO Mapping
	UNIT 1	**Carbohydrate Metabolism**	CO1
	A	Carbohydrate chemistry (in brief) and metabolism-An overview, Glycolysis,TCA cycle, Gluconeogenesis,Metabolism of glycogen,HMP shunt pathway	CO1, CO6
	B	Regulation of carbohydrate metabolism at substrate level, enzyme level, hormonal level and organlevel.	CO1
	C	Intestinal transport of carbohydrates and Transport of glucose across various cells	CO1
	Unit 2	**Lipid Metabolism**	CO2
	A	Metabolism of lipids (beta-oxidation, denovo synthesis of fatty acids, synthesis and breakdown of unsaturated fatty acids, cholesterol and alcohol)	CO2, CO6
	B	Lipoprotein metabolism, VLDL, LDLandHDL	CO2, CO6
	C	Ketone bodies and ketosis	CO2
	Unit 3	**Protein Metabolism**	CO3

	A	Absorption and Biosynthesis of protein (translation)				CO3
	B	Catabolism of protein Urea cycle transamination, one-carbon metabolism				CO3
	C	Essential and non-essential amino acids and non-protein functions of amino acids				CO3
	Unit 4	**Biological Oxidation**				CO4
	A	Biological Oxidation, Enzymes and co-enzymes involved in oxidation and reduction, respiratory chain				CO4,CO6
	B	Role of electron transport chain or respiratory chain				CO4
	C	Mechanism of Oxidative phosphorylation; Uncouplers				
	Unit 5	**Basic Instrumentation**				CO5
	A	Centrifuge and weighing balance				CO5
	B	Water bath and pH meter				CO5
	C	Colorimeter and Spectrophotometer				
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		25%	25%	50%		
	Text book/s* Reference book	• BergJM, Tymoczko JL and Stryer L. (2002) Biochemistry 5th ed. W.H. Freeman. • Devlin TM. (2002) Text Book of biochemistry with • Clinical Correlations 5th ed. John Wiley and Sons. • Horton RH, Moran LA, Ochs RS, Rawn JD and Scrimgeour. (2002) Principles of Biochemistry 3rd ed. Prentice Hall. • Murray RK, Granner DK, Kayes PA and Rodwell VW.(2003) Harper's Illustrated Biochemistry. 26th ed. McGraw-Hill. Asia. • Voet D and Voet JG. (2004)Biochemistry. 3rd ed. John Wiley and Sons.				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	-	1	2	-
CO2	3	1	2	1	2	2	-
CO3	3	1	2	1	2	2	-
CO4	3	1	2	1	2	1	1
CO5	2	2	2	1	3	3	-
CO6	3	1	2	1	3	2	-

Theory Subjects

School: SSAHS		**Batch :** 2023-25	
Programme: MFN		**Current Academic Year: 2023-2025**	
Branch:		**Semester:** 1st Semester	
1	Course Code	MFN 103	
2	Course Title	Advanced Nutrition Science	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	Course Type	Compulsory	
5	Course Objective	This course will enable the students to gain in-depth knowledge of the physiological and metabolic role of macronutrients and micronutrients and their importance in human nutrition. It enables the understanding of basis of human nutritional requirements and recommendations through the life cycle and translate the knowledge into practical guidelines for dietary needs and also of various vitamins and their implications.	
6	Course Outcomes	CO1:To define various nutritional components of the food and their interaction in human health. CO2:To understand the human nutrition principles and guidelines CO3:To apply the requirements of the nutritional components for different age, sex and physiological groups. CO4:To analyse the gained knowledge in practical conditions CO5: To evaluate concepts of micronutrients and effect of its deficiency. C06: To create knowledge of different nutrient functioning and its deficiencies	
7	Course Description	This course is a description of Metabolic processes which involve essential dietary components and methods of evaluating nutrition status. It helps in appreciate the importance of nutrition immunity interactions and their implication and to learn various measures for enhancing nutritional quality of diets.	
8	**Outline syllabus**		CO Mapping
	Unit 1	**Human Nutritional Requirements – Development and Recent Concepts**	
	A	Methods of determining human nutrient needs Definition of basic terms and concepts in relation to human nutritional requirements	CO1,CO2
	B	Basic terminology in relation to Nutritional knowledge Methods of studying the nutrient requirements	CO1
	C	International and National Recommendations on Nutritional Requirements, Goals of National and International Requirement Estimates and RDAs	CO2
	Unit 2	**Body Composition , Energy**	

	A	**Body Composition:** Significance of body composition and changes through the life cycle, Methods for assessing body composition (both classical and recent) and their applications	CO1
	B	**Energy:** Components of energy requirements: BMR, RMR, thermic effect of feeding, physical activity. Factors affecting energy requirements, Methods of measuring energy expenditure	CO1,CO2
	C	Estimating energy requirements of individuals and groups, Regulation of energy metabolism and body weight: Control of food intake – role of leptin and other hormones.	CO2
	Unit 3	**Carbohydrates**	
	A	Nutritional significance of carbohydrates Changing trends in dietary intake of different types of carbohydrates and their implications	CO1,CO2
	B	Dietary fibre: Types, sources, role and mechanism of action,	CO1,CO2
	C	Resistant starch, fructo-oligosaccharides, other oligosaccharides: Chemical composition and physiological significance, Glycemic Index and glycemic load.	CO2
	Unit 4	**Proteins and Lipids**	
	A	**Protein:** Nutritional significance of proteins in the body. Protein quality and methods of determining protein and amino acid contents of food Nutritional requirements and R DA at different stages of life cycle., Therapeutic applications of specific amino acids.	CO3
	B	**Lipids** Lipids: Common types and properties,Function of fats and oils. Nutritional significance of fatty acids – SFA, MUFA, PUFA: functions and deficiency	CO3
	C	Role of n-3 and n-6 fatty acids, Prostaglandins, Trans Fatty Acids, Conjugated linoleic acid, Nutritional Requirements for different age group. Dietary guidelines (International and National) for visible and invisible fats in diets.	CO3,CO6
	Unit 5	**Vitamin and Minerals**	
	A	History, structure, sources, absorption, transport, utilization, storage, excretion, functions, bioavailability, requirements and	CO3,CO4,CO6

		RDA, deficiency, toxicity, assessment of status and alteration in requirements in various clinical and metabolic disorders. **Macro minerals:** Calcium, Phosphorus, Magnesium, Sodium, Potassium.				
	B	**Micro minerals:** Iron, Copper, Iodine, Fluoride, Zinc etc				CO3, CO4,CO6
	C	**Fat Soluble Vitamins:** Vitamin A and Carotenoids, Vitamin D, Vitamin E, Vitamin K, **Water Soluble Vitamins:** Ascorbic acid, Thiamin, Riboflavin, Niacin, Pyridoxine, Folic acid, Vitamin B12				CO3, CO4,CO6
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		25%	25%	50%		
	Text book/s*	• Shills, M.E.; Olson, J.; Shike, M. and Roos, C. (1998): Modern Nutrition in Health and Disease. 9th edition.				
		• Williams and Williams. A Beverly Co. London. • Indian Council of Medical Research. Recommended Dietary Intakes for Indians – Latest Recommendations. • Indian Council of Medical Research. Nutritive Value of Indian Foods –LatestPublication.				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	2	-	2	2	-
CO2	3	2	2	1	2	3	1
CO3	3	1	2	2	2	2	-
CO4	3	1	2	2	2	2	-
CO5	3	1	2	1	3	3	1
CO6	3	1	2	1	3	3	1

Theory Subjects

School: SSAHS		**Batch:**2023-25	
Programme: MFN		**Current Academic Year: 2023-2025**	
Branch:		**Semester:**1st Semester	
1	Course Code	MFN104	
2	Course Title	Advanced Food Chemistry	
3	Credits	4	
4	Contact Hours (L-T-P)	4-0-0	
	Course Type	Compulsory	
5	Course Objective	The course aims to provide systematic knowledge and understanding of chemistry of food components like water, proteins, carbohydrates and lipids, various aspects of food product development and get an insight in to the additives that are relevant to processed food industry for shelf life extension, processing aids and sensory appeal.	
6	Course Outcomes	CO1: To define the chemistry of various food components of food. CO2:To understand the properties and reactions of various food components CO3: To apply basic concepts of new food product development. CO4: To analyse the food additives and its application in food industry. CO 5:To evaluate the utilisation of functional property of food component C06: To create the knowledge of novel product development and value addition of foods.	
7	Course Description	This course focuses on providing an introduction to food science and nutrition in general and particularly stressing upon the chemistry aspects of different kinds of foods. Food chemistry is the discipline that mainly deals with chemical composition of foods, basic bio molecules, with chemical structure and properties of food constituents. The course basic scientific principles to food systems and practical applications. The course is divided into different unitswhich gives the learner the basic information about chemical composition of main types of foods, bio molecules such as carbohydrates, proteins and enzymes, lipids, vitamins, pigments, flavors, minerals and other micro components, additives and contaminants.	
8	**Outline syllabus**		CO Mapping
	Unit 1	**Water in Food**	
	A	Water in foods, water activity, phase diagram of water, phase transition of food containing water, interaction of water solute and food compounds	CO1
	B	Water activity and its influence on quality and stability of foods,	CO1
	C	Methods for stabilization of food systems by control of water activity, sorption isotherm.	CO2
	Unit 2	**Protein and Enzymes**	
	A	Physical, chemical, nutritional property of protein	CO1

	B	Functional properties of protein and interactions with other food constituents				CO1,CO2
	C	Classification, application of enzymes in food industry and immobilized enzymes				CO2
	Unit 3	**Carbohydrate and Lipids**				
	A	Composition and properties of different types of sugars, their application in food systems, crystallization, caramelization, Maillard reaction and its industrial application.				CO1,CO2
	B	Properties of fats, functional properties of fats and oils, fat stabilizers, fat deterioration and antioxidants,				CO1.CO2
	C	Emulsions such as mayonnaise, interesterification of fats, auto-oxidation of lipids and rancidity				CO2
	Unit 4	**Basic concepts of new product development**				
	A	Stages of product development and standardization				CO3, CO6
	B	Sensory evaluation of foods, packaging, labelling				CO3, CO6
	C	marketing of new food products.				CO3, CO6
	Unit 5	**Food Ingredients and additives**				
	A	Food additives- definitions, classification and functions, Preservatives, antioxidants, colours and flavours (synthetic and natural),				CO4, CO6
	B	emulsifiers, hydrocolloids, sweeteners, acidulants, buffering salts, anticaking agents, etc. - chemistry, food uses and functions in formulations				CO4, CO6
	C	Indirect food additives; toxicological evaluation of food additives.				CO4, CO6
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		25%	25%	50%		
	Text book/s*	Branen AL, Davidson PM &Salminen S. (2001) Food Additives. 2nd Ed. Marcel Dekker.				
		• Fellows P J (2002) Food Processing Technology- Principles and Practices, 2nd Edition. Woodhead Publishing Ltd. • Food and Agriculture Organization. (1980) Manual of Food Quality Control. Additive Contaminants Techniques. Rome. • Fuller, G.W. (1999) New Food Product Development. From concept to market place. CRC press, New York. •Mahindru, S N (2000) Food Additives- Characteristics Detection and Estimation. Tata Mc Graw Hill Publishing Co. Ltd. • Peter Murano , Understanding Food Science and Technology (with InfoTrac) 1st •BIS standards for food products and analysis manual.				

		• Manuals of methods of analysis of various food products, FSSAI, 2016	

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	1	3	3	1
CO2	3	1	1	1	3	3	-
CO3	3	1	1	1	3	3	1
CO4	3	2	1	1	3	3	-
CO5	3	1	2	1	3	3	1
CO6	3	1	1	1	3	3	-

Theory Subjects

School: SSAHS		**Batch: 2023-25**	
Programme: MFN		**Current Academic Year: 2023-2025**	
Branch:		**Semester: 1st Semester**	
1	Course Code	MFN 105	
2	Course Title	Research Methodology and Biostats	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
6	Course Objective	1. To interpret and analyze a research problem 2. To introduce methods of literature Survey; what and where to look 3.To provide understanding for extracting appropriate information from a research problem so as to perform a hypothesis test 4. To differentiate and provide insights into qualitative and quantitative aspects of research 5. To introduce methods and tools for doing quantitative analysis 6. To introduce computational methods and software for quantitative analysis	
7.	Course Outcomes	The students will be able to : CO1: To frame a research problem and infer an appropriate statistical technique that may be applied to it to meaningful insight CO2: Explain and setup the null and alternative hypotheses correctly CO3:Apply hypothesis testing techniques to research problems / issues CO4: Demonstrate basic knowledge and understanding of data analysis and interpretation in relation to the research process. CO5: Integrate SPSS to simplify computational efforts and draw and interpret outputs obtained from these tools CO6: Develop the analytical knowledge of research	
8	Course Description	The course is designed to introduce various qualitative and quantitate aspects of research. With this basic understanding, the student will be able to take up research in the focussed area of study.	
9	Syllabus		CO Mapping
	Unit 1	**Introduction to Research Methodology and Scaling 10 Hrs**	
	A	**Introduction to Research:** What is research, Types of research, Problem identification, Research Design- Exploratory and Descriptive, Formulation of research design, Writing of research proposals, Research report, Impact factor of research journals, Citation Index of research papers, Plagiarism, Copy right, patents and intellectual property right	CO1
	B	**Attitude Measurement and Scaling:** Types of Measurement,	CO1

		Classification of scales, Single Item Vs. Multiple Item Scale, Comparative Vs. Non-Comparative scale, Measurement error	
	C	**Questionnaire Designing:** Criterion, Types of questionnaire, types of questions, Testing reliability and validity , Pilot testing	CO1
	Unit 2	**DESCRIPTIVE ANALYTICS: 10 Hrs**	
	A	**Measures of central tendency:** Type of averages, choosing an appropriate average, Constructing Polygons and Ogives and using them to find median, quantiles and mode.	CO4
	B	**Measures of Dispersion:** Range, Inter-quartile range and deviation, Mean Deviation and Mean Absolute Deviation, Variance and Standard Deviation, Coefficient of variation. Measures of Skewness, Measures of Kurtosis, Constructing Stem and Leaf plot, Box-Whiskers Plot, Checking normality of data	
	C	**Probability & Probability Distributions:** Probability, basic concepts and approaches, Addition and Multiplication Theorem of Probability, Conditional Probability Probability Distributions: Random variable-Discrete and Continuous, Mean and Variance of Random Variable, Binomial, Poisson, Normal and Exponential distributions	
	Unit 3	**INFRENTIAL ANALYTICS: 15Hrs**	
	A	**Sampling and sampling distribution:** Census versus sample surveys. Simple random sampling, stratified sampling, systematic sampling, sampling with probability proportional to size. **Hypothesis Testing:** Formulation of null and alternative hypothesis, Level of Significance, Type I, Type II errors, Steps for hypothesis testing, One tail and Two tailed tests , p- value **Parametric Tests: Parametric Tests.** Errors, Checking normality of data, Hypothesis Testing, Confidence Interval, p-values, Z-test, t-test, F-test, Test of significance of correlation coefficient, **ANOVA.** **Non Parametric Tests:** Chi Square Test, Goodness of fit, Run Test , Sign Test-One sample and two sample,	CO2, CO3, CO4, CO6
	Unit 4	**PREDICTIVE ANALYTICS 10 Hrs**	CO2, CO3, CO4
	A	**Correlation Analysis**: Definition, types of correlation, Bivariate scatter plot, multiple scatter plot, Karl Pearson Coefficient of Correlation and its assumption, Partial correlation	
	B	Kendall Tau b and c correlation, Spearman's Rank Correlation	
	C	**Regression Analysis :**Introduction, Standard Multiple Regression Assumption, Multiple regression model ,Test of significance of Regression Parameters, Coefficient of Determination.	

	Unit 5	**Computational Methods**		**5 Hrs**	
	A	**SPSS:** **Entering and Editing**: Data Importing from Excel Characteristics of Variables Adding Value Labels Grouping Data Transforming Variables Selecting a Subset **Producing summary statistics:** Frequencies Percentages Averages Measures of spread **Charts**: Bar Charts Histograms Pie Charts Boxplots Cluster Bar Charts Scatter Diagrams			CO4, CO5, CO6
	B	Using SPSS for performing techniques covered in Unit 2			CO4, CO5, CO6
	C	Solutions of examples discussed in Unit 2,3 and 4 using SPSS			CO4
10	Mode of examination	Theory/Practice Sessions/Viva			
11	Weightage Distribution	CA	VIVA	ETE	
		25%	25%	50%	
12	Reading Materials for Unit 1	Kendra Cherry: Introduction to Research Methods: available for download at http://psychology.about.com/od/researchmethods/ss/expdesintro.htm Davis S. Walonick: Elements of a research proposal and report: available for download at http://www.statpac.com/research-papers/research-proposal.htm. 1.RESEARCH METHODOLOGY Professor Suresh Chandra			
	Readings for Unit 2:	•Basic Statistical Tools: available for download at http://www.fao.org/docrep/w7295e/w7295e08.htm#6 basic statistical tools. •DamodarGujrati and S. Sangeetha: Basic Econometrics, Mc Grow Hill, 2007. •Richard I. Levin and David S. Rubin: Statistics for Management, Pearson, 2010 •SP. Gupta & M.P. Gupta: Business Statistics, 16th Edition, Sultan Chand & Sons, New Delhi, 2012. •Roger D. Wimmer and Joseph Dominick: Mass Media Research, New Delhi, Wadsworth (Indian Edition), 2006.			
	Readings for Unit 3:	SPSS Beginners Tutorial: Available for download at https://www.spss-tutorials.com/basics/			

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	2	1	1	1	3	1
CO2	1	2	1	2	3	2	3
CO3	-	-	2	1	1	2	1
CO4	1	2	-	-	1	2	1
CO5	3	2	-	2	3	2	2
CO6	2	1	-	2	3	-	2

Practical Subject

School: SSAHS		**Batch:2023-25**	
Programme: MFN		**Year: 2023-25**	
Branch:		**Semester: I**	
1	Course Code	MFN 152	
2	Course Title	Advanced Food Chemistry Lab	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	1. To understand the raw and processed food commodities used in daily life. 2. To discuss the qualities of available commodities and their suitability for different purposes	
6	Course Outcomes	CO1: To create a knowledge regarding differentfood constituents. CO2: To understand proximate analysis of food sample CO3: To interpret the evaluation of protein rich food quality. CO 4:To appraise various testing on organoleptic evaluation of the products C0 5: To evaluatephysiochemical properties of macronutrients CO6: To integrate knowledge of food testing and analysis	
7	Course Description	**Food Sciences** is the study of the nature of **foods** and the changes that occur in them naturally and as a result of handling and processing	
8	Outline syllabus		CO Mapping
	Unit 1	**Water and Protein**	
	A	Determination of moisture content in food stuff	CO1,CO2
	B	Determination of protein – gluten content in food stuff.	CO1,CO2
	C	Method of blanching vegetables	CO1, CO2
	Unit 2		
	A	Determination of fat content in food stuff.	CO1, CO2
	B	Determination of mineral ash content in food stuff	CO1, CO2
	C	Demonstration of Bomb calorimeter	CO2
	Unit 3		
	A	Effect of heat and acid on protein of milk	CO3
	B	Effect of heat on sugar solution and their behaviourcorresponding to cold water and thread test	CO3
	C	Effect of heat and acid on protein of milk	CO3
	Unit 4		
	A	Determination of the taste Threshold for different sensation: sweet, salty, sour	CO1, CO2, CO6
	B	Determination of free fatty acid and acid value	CO1, CO2
	C	Determination of smoke point in fats and oils.	CO1, CO2
	Unit 5		
	A	Effect of salt, acid sugar and fat on the stability of egg white foam.	CO3
	B	Testing of food adulteration in various food	CO6
	C		
	Mode of		

	examination				
	Weightage Distribution	CA	VIVA	ETE	
		25%	25%	50%	

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	1	3	3	1
CO2	3	2	1	1	3	3	1
CO3	3	2	1	1	3	3	1
CO4	3	1	1	2	3	3	1
CO5	3	2	1	2	3	3	1
CO6	3	2	2	2	3	3	1

Practical Subject

1	**Course Code**	**MFN 153**	
2	**Course Title**	Advanced Nutritional Biochemistry and Instrumentation-I **(LAB)**	
3	**Credits**	**1**	
4	**Contact Hours (L-T-P)**	**0-0-2**	
5	Course Outcomes	CO1: To describe the importance of Preparation of protein free filtrate CO2: To explain the importance of Glucose estimation CO3: To apply the importance of Glucose tolerance test CO4: To appraise the importance of Total protein estimation CO5: To compare theclinicalimportanceof Albumin, Globulin and A: G ratio determination CO6: To create understanding of biochemical parameters used in nutrition analysis	
6	Course Description	• Preparation of protein free filtrate • Glucose estimation and Glucose tolerance test • Total protein estimation • Albumin estimation • A:G ratio determination	
	Practical's		CO mapping
	Unit 1	Preparation of protein free filtrate	CO1
		a. Briefing b. Demonstration c. Practical	
	Unit 2	Quantitative estimation of Glucose	CO2
		a. Glucose estimation in normal sample b. Glucose estimation in abnormal sample c. Glucose estimation in unknown sample	
	Unit 3	Glucose tolerance test	CO3
		a. Briefing b. Demonstration c. Practical and Clinical interpretation of curve	
	Unit 4	Quantitative estimation of Total Protein	CO4, CO6
		a. Total protein estimation in normal sample b. Total protein estimation in abnormal sample c. Total protein estimation in unknown sample	

	Unit 5	Albumin, Globulin and A: G ratio determination			CO5, CO6
		a. Estimation of Albumin b. Determination of Globulin concentration c. Calculation of A: G ratio			
	Mode of examination	Theory and Practical			
	Weightage Distribution for Practical's	CA	VIVA	ETE	
		25%	25%	50%	
	Text book/s*	1. A text book of Medical Biochemistry by Chatterjee & Shinde 2. Text book of biochemistry for Medical students by Vasudevan and Sreekumari 3. Biochemistry by Lehringer 4. Clinical chemistry by Varley 5. Harpers Illustrated Biochemistry by Robert K.M.			

Pos COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	1	2	3	3	2
CO2	3	3	1	2	3	3	2
CO3	3	3	1	2	3	3	2
CO4	3	3	1	2	3	3	2
CO5	3	3	1	2	3	3	2
CO6	3	3	1	2	3	3	2

Theory Subjects

School: SSAHS		**Batch :** 2023-25	
Programme: MFN		**Current Academic Year: 2023-25**	
Branch:		**Semester:2**st Semester	
1	Course Code	MFN 106	
2	Course Title	Food Microbiology and Food Safety	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	This course will enable the students to gain deeper knowledge of role of micro-organisms in humans and environment and the importance of micro-organisms in food spoilage and to learn advanced, techniques used in food preservation.	
6	Course Outcomes	CO1 To describe the importance of micro-organisms in food spoilage and to learn advanced, techniques used in food preservation CO2 To explain the importance of micro-organisms in food spoilage and to learn advanced, techniques used in food preservation CO3To interpret the nature of microorganisms involved in food spoilage, food infections and intoxications. CO4 To analyse the principles of various preservation and control techniques CO5 To evaluate microbial safety in various foods operations CO6 To create the knowledge of food microbiology for better understanding of food spoilage	
7	Course Description	The course aims to provide theoretical and practical knowledge about the micro-organisms involved in the food spoilage, infections and intoxications. The course also enables to understand the concept of preservation and microbiological safety in various food operations.	
8	**Outline syllabus**		**CO Mapping**
	Unit 1	**Basic Microbiology**	
	A	Introduction to microbiology	CO 1
	B	Characteristics of microorganisms	CO1
	C	Factors effecting microbial growth	CO1
	Unit 2	**Food Spoilage and Preservation**	
	A	Cultivation of micro-organisms	CO2
	B	Controlling agents for micro-organism	CO2
	C	Food spoilage Principles and methods of food preservation	CO2, CO3, CO6
	Unit 3	**Beneficial Role of Food Microbes in Health**	
	A	Importance of normal flora, prebiotics and probiotics	CO3
	B	Single cell proteins	CO3
	C	Fermentation and Fermented food products	CO3
	Unit 4	**Food Borne Microbial Diseases**	
	A	Public health hazards: Food borne infections and	CO4

		intoxications				
	B	Symptoms, mode of transmission and methods of prevention				CO4,CO6
	C	Emerging food pathogens				CO3
	Unit 5	**Food Safety and Quality Control**				
	A	Indicator micro-organisms				CO5
	B	Concept of Food Safety Management System, GHP and GMP				CO5
	C	HACCP, ISO 22000, Food Laws, Regulations and Standards				CO5,CO6
	Mode of examination	Theory				
	Weightage Distribution	CA	MTE	ETE		
		25%	25%	50%		

	Text Book	Frazier, W.C. &Westoff, D.C. (2013*). Food Microbiology. 5thEdition.* Tata McGraw- Hill Publishing Co. Ltd.
	Reference Book	Garbutt, J. (1997). *Essentials of Food Microbiology*. Arnold London. Jay, J.M., Loessner, D.A. & Martin, J. (2006). *Modern Food Microbiology. 7thEdition.* Springer Banwart, G.J. (2004). *Basic Food Microbiology. 2ndEdition*. CBS Publishers and Distributors, India. Pelczar, M.J., Chan, E.C.S., Krieg, N. (1993). *Microbiology. 5thEdition*. Tata McGraw- Hill Publishing Co. Ltd. *Manual of Methods of Analysis of Foods- Microbiological Testing*. (2012). Lab Manual 14. FSSAI, GoI, New Delhi.

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	3	2	2	2	2	2
CO2	1	2	2	2	1	2	2
CO3	2	2	2	1	3	2	2
CO4	2	1	1	2	3	2	2
CO5	2	2	2	3	3	2	2
CO6	2	3	3	2	2	2	1

Theory Subjects

School: SSAHS		**Batch :** 2023-25	
Programme: MFN		**Current Academic Year: 2023-2025**	
Branch:		**Semester: 2nd** Semester	
1	Course Code	MFN112	
2	Course Title	Advanced Nutritional Biochemistry and Instrumentation-II	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Type	The course is an detail discussion to nutritional biochemistry. The students will learn how nutrients effect biochemical processes and signal transduction pathways and how this can lead to development of nutrition related diseases.	
5	Course Objective	CO1: To examine the concept of enzymes and clinical enzymology CO2:To understand the concept of organ function test CO3:To apply the importance of Antioxidants in body CO4: To appraise mechanism of inborn error of metabolism CO5: To access the functioning of analytical instruments CO6: To integrate all the knowledge of biochemistry principle for better understanding of nutrition	
6	Course Outcomes	Nutritional Biochemistry provides students with knowledge and understanding of the delivery and function of cellular nutrients and metabolism in the human body. It involves integrated learning between the areas of Biochemistry and Nutrition.	
7	Course Description	The students will learn how nutrients effect biochemical processes and signal transduction pathways and how this can lead to development of nutrition related diseases.	
8	**Outline syllabus**		CO Mapping
	UNIT 1	**Enzymes and Clinical enzymology**	
	A	Definition of Enzymes, Active site, Cofactor (Coenzyme, Activator), Proenzyme ,Classification with examples, Factors effecting enzyme activity	CO1
	B	Isoenzymes, Diagnostic enzymology (clinical significance of enzymes with respect to different organs such as liver heart etc	CO1
	C	Enzyme inhibition and its significance	
	Unit 2	**Organ function test**	CO2
	A	Liver function tests and their clinical significance	CO2
	B	Kidney function tests and their clinical significance	CO2
		Thyroid function test and Cardiac Markers	CO2, CO6
	Unit 3	**Antioxidants**	CO3
	A	Antioxidants and Free radicles, Role and production of oxygen free radicals,	CO3
	B	Physiological mechanism to limit free radical damage.	CO3
	C	Free radical in human pathology and disease	CO3
	Unit 4	**Inborn error of metabolism**	CO4

	A	General Concept, Disorders of protein metabolism				CO4
	B	orders of carbohydrate metabolism				CO4
		Disorders of lipid metabolism				
	Unit 5	**Advance Analytical Instrumentation: Separation Techniques**				CO5.CO6
	A	Chromatography and Electrophoresis				CO5
	B	Blotting techniques and PCR				CO5,CO6
	C	ELISA and RIA				
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		25%	25%	50%		
	Text book/s*	• BergJM, Tymoczko JL and Stryer L. (2002) Biochemistry 5th ed. W.H. Freeman.				
	Reference Books	• Devlin TM. (2002) Text Book of biochemistry with Clinical Correlations 5th ed. John Wiley and Sons. • Horton RH, Moran LA, Ochs RS, Rawn JD and Scrimgeour. (2002) Principles of Biochemistry 3rd ed. Prentice Hall. • Murray RK, Granner DK, Kayes PA and Rodwell VW.(2003) Harper's Illustrated Biochemistry. 26th ed. McGraw-Hill. Asia. • Voet D and Voet JG. (2004)Biochemistry. 3rd ed. John Wiley and Sons. • Nelson, D.L. and Cox, M.M. (2000): 3rd Ed. Lehninger's Principles of Biochemistry,Macmillan Worth Publishers				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	1	2	1	1
CO2	3	2	1	2	2	1	-
CO3	3	1	1	1	2	2	1
CO4	3	2	2	1	1	2	1
CO5	2	2	1	1	2	1	-
Co6	3	2	2	1	1	2	2

Theory Subjects

School: SSAHS		**Batch :** 2023-25	
Programme: MFN		**Current Academic Year: 2023-2025**	
Branch:		**Semester: 2nd**Semester	
1	Course Code	MFN108	
2	Course Title	Clinical Nutrition-I	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	To understand the nutrition assessment, planning, implementation, monitoring and follow up in nutrition care process, the causative factors and metabolic changes in various diseases/disorders and acquire knowledge on the principles of diet therapy and comprehend principles of dietary counselling and the rationale of prevention of various diseases/disorders.	
6	Course Outcomes	CO1: To examine the importance of nutritional assessment in the care of patients. CO2: To understand about causative factors and metabolic changes in various diseases/disorders and the associated principles of diet therapy. CO3: To interpret the principles of dietary counselling. CO4: To comprehend the rationale of prevention of variousdiseases/disorders. CO5: To access various concept of paediatric nutrition CO6: To integrate the concept of nutrition as it relates to the prevention and treatment of diseases	
7	Course Description	The course deals with the nutritional aspects of diseases and clinical disorders by integrating students' existing knowledge of physiology, biochemistry and food science.	
8	**Outline syllabus**		CO Mapping
	Unit 1	**Nutritional Assessment and Care of Patients**	
	A	Nutrition care process Nutritional screening and assessment of patients – out patient & hospitalized o Tools for screening o Nutritional interpretation of routine medical and laboratory data o Nutrition care plan and implementation o Monitoring and follow up o Ethical issues	CO1
	B	Dietary Counselling	CO1
	C	Nutrition Support: Enteral Nutrition	CO1, CO3
	Unit 2	**Medical Nutrition Therapy in metabolic diseases**	

	A	Diabetes Mellitus – Type 1, Type 2 and Gestational diabetes				CO2
	B	Endocrine disorders – Polycystic ovary disease, thyroid				CO1, CO3
	Unit 3	**Coronary Heart Diseases**				
	A	Etiopathophysiology, metabolic & clinical aberrations, diagnosis, complications, treatment, MNT, dietary counselling and recent advances in				CO3, CO6
	B	Hypertension, dyslipidemia, Congestive heart failure				CO3
	C	Chronic Obstructive Pulmonary Disease Systemic Lupus Erythematosis				CO3,CO6
	Unit 4	**Overview of some degenerative disorders**				
	A	Cancer – General and specific cancers, effect of cancer therapy on MNT,				CO4
	B	Role of diet in aetiology and management				CO4
	C	Nutrition for bone health				CO4
	Unit 5	**Paediatric Nutrition**				
	A	Inborn errors of metabolism – Phenylketonuria, Galactosemia, Maple Syrup Urine Disease, Glycogen Storage Disease				CO5, CO6
	B	Severe Acute Malnutrition				CO5
	C	Cystic fibrosis				CO5
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		25%	25%	50%		
	Text book/s*	• Text book of physiology- A.K. Jain				
	Reference Book	• Essentials of medical physiology- K.Sembulingam				

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	2	1	2	1
CO2	3	2	1	1	1	2	1
CO3	3	2	1	2	2	2	2
CO4	3	3	1	1	1	1	1
CO5	3	2	1	2	1	2	1
CO6	3	2	1	2	1	1	1

Theory Subjects

School: SSAHS		**Batch :** 2023-25	
Programme: MFN		**Current Academic Year: 2023-25**	
Branch:		**Semester: 2**st Semester	
1	Course Code	MFN109	
2	Course Title	Nutrition in Emergency and Disaster	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Type	Compulsory	
5	Course Objective	To introduce learners to the key concepts and practices of natural disaster management and develop understanding of the management of major emergencies with a nutritional component,	
6	Course Outcomes	CO1 To identify the nutritional management concepts during emergencies. CO2 To explain the knowledge of nutrition during emergency and disaster. CO3 To applythefood needs for nutrition relief and rehabilitation during emergency CO4 To analyse the nutritional status for emergency preparedness and response Programmemes CO5 To access the role of coordinated and effective action during emergencies. CO6 To create the awareness about the malnutrition in emergency	
7	Course Description	Hunger and malnutrition are rampant among refugees and displaced populations, representing currently around 40 million people worldwide, many of whom – infants, children, adolescents, adults and older people – suffer from one or more of the multiple forms of malnutrition. The levels of risk of malnutrition in emergencies depends on factors such as the degree of civil security, food availability and accessibility, access to health services, and adequacy of assistance delivery.	
8	**Outline syllabus**		**CO Mapping**
	Unit 1	**Disasters and emergency situations**	
	A	Famine, drought, flood, earthquake, cyclone, war, civil and political emergencies. Factors giving rise to emergency situation in these disasters.	CO 1
	B	Meeting nutritional requirements in emergency situations – principles, Meeting energy and protein requirements, Meeting micronutrient and other specific nutrient requirements	CO1
	C	Monitoring the adequacy of food access and intake.	CO1
	Unit 2	**Nutritional Problems in Emergencies**	

	A	Nutritional problems in emergencies in vulnerable groups, causes of malnutrition in emergency situations.	CO2
	B	Major nutritional deficiency diseases in emergencies- Protein-energy malnutrition- Causes and consequences, Symptoms and signs, Treatment.	CO2
	C	Specific deficiencies (micronutrient deficiencies) and nutritional relief	CO2
	Unit 3	**Communicable diseases in Emergencies**	
	A	Communicable diseases: surveillance, treatment and control of communicable diseases in emergencies	CO3, CO6
	B	Role of immunization and sanitation.	CO3,CO6
	C	Effective health Programmeme	CO3
	Unit 4	**Nutritional status Assessment and surveillance**	
	A	Assessment and surveillance of nutritional status in emergencies affecting population - Reasons for measuring malnutrition in emergencies: Indicators of malnutrition, Rapid nutritional surveys Individual screening, data collection, identification of population at nutrition risk	CO4, CO6
	B	Nutrition Relief and Rehabilitation -Assessment of food needs in emergency situation. Food distribution strategy – identifying	CO4
	C	General feeding Programmeme-Introduction, General principles, organizing general dry ration distribution, large scale cooked ration distribution Selective feeding Programmeme: supplementary feeding, Therapeutic feeding for children, treatment of severe wasting and famine	CO3
	Unit 5	**Emergency preparedness and response Programmeme**	
	A	Infant and young children feeding in emergencies Reaching the vulnerable group – Targeting Food Aid response, food pipeline ,logistic and distribution	CO5
	B	Preparedness and response strategies	CO5
	C	Public nutrition approach to tackle nutritional problems in emergencies	CO5
	Mode of Examination	Theory	

	Weightage distribution	CA	MTE	ETE		
		25%	25%	50%		
	Textbooks	1. Goyet, Fish V, Seaman, J. and Geijaer (1978). The management of nutritional emergencies in large				
	Reference Books	populations, WHO, Geneva. 2. Refuge Nutrition Information system (RNIS). Newsletters UNACC / SCN Sub-Committee on Nutrition. 3. Bradley, A. Woodruff and Arabella Duffield (July, 2000), Assessment of Nutritional status in emergency affected populations – Adolescents, special supplement, UNACC/SCN sub-committee on nutrition. 4. Young, H, Mears, C (1998): Acceptability and use of cereal – based foods in refugee Camps. Oxfam working paper, Oxfam publishing Oxford, U.K. 5. UNHCR (1999) UNHCR Hand Books of emergencies 2nd edition Geneva, UNHCR.				

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	3	2	2	2	1	2
CO2	1	2	2	2	1	2	2
CO3	2	3	2	3	1	2	2
CO4	1	3	2	1	2	2	1
CO5	1	3	1	2	1	1	2
CO6	2	2	-	2	1	-	2

Theory Subjects

School: SSAHS		**Batch : 2023-25**	
Programme: MFN		**Current Academic Year: 2023-2025**	
Branch:		**Semester: 2nd**	
1	Course Code	MFN 110	
2	Course Title	Public Health and Nutrition	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Type	Compulsory	
5	Course Objective	The course will familiarize the students with understanding of the concept of public health nutrition and the national health care delivery system , the current concerns in public health nutrition and the strategies for improving the nutritional status of the communities. The course will also orient students towards concept of food and nutrition security and critical appraisal of the current scenario.	
6	Course Outcomes	CO1: To describe the concept and current concerns of Public Health Nutrition. CO2: To explain the National Health Care Delivery System. CO3. To interpret population dynamics and economics of malnutrition and how it impacts national development CO4: To analyse the causes and consequences of nutritional problems in the community. CO5: To evaluate the concept of food and nutrition security. CO6: To integrate the working in a community for providing nutrition education	
7	Course Description	This course will provide an introduction to the practice of public health nutrition, discussion of significant public health nutrition problems. and an overview of food and nutrition Programmes available to the community. Students will engage in skill-building and participatory activities, as well be introduced to case examples of creative and innovative approaches to community nutrition	
8	Outline syllabus		CO Mapping
	Unit 1	**Public Health Nutrition and Health Care System**	
	A	Aim, scope and content of public health nutrition	CO1,
	B	Current concerns in public health nutrition: An overview Role of public health nutritionists in national development Health - definition, dimensions, determinants, indicators Community health care	CO1
	C	National Health Care Delivery System	CO1
	Unit 2	**Population Dynamics**	
	A	Demographic transition	CO2
	B	Population structure: Implications on quality of life	CO2
	C	Population Policy	CO2

	Unit 3	**Economics of Malnutrition**			
	A	Health Economics and Economics of Malnutrition			CO3
	B	Impact of malnutrition on productivity and national development			CO3
	Unit 4	**Approaches for improving nutrition and health status of the community**			
	A	Health based interventions including immunization, provision of safe drinking water/ sanitation, prevention and management of diarrhoeal diseases			CO4
	B	Food based interventions including food fortification, dietary diversification, supplementary feeding and biotechnological approaches.			CO4
	C	Education based interventions including growth monitoring and promotion (GMP), health / nutrition related social and behaviour change communication.			CO4, CO6
	Unit 5	**Food and Nutrition Security**			
	A	Concepts and definitions of food and nutrition security at national, regional, household and individual levels			CO5,CO6
	B	Impact of food production losses, distribution, access, availability, consumption on food and nutrition security- critical appraisal of the current scenario			CO5,CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	
	Reference book/s*	• ICMR (1990). Nutrient Requirements and Recommended Dietary Allowances for Indians. • FAO/WHO/UNU (2004). Human Energy Requirements. Report of a Joint Expert Consultation. • WHO (2007). Protein and Amino-acid Requirements in Human Nutrition. Report of a joint WHO/FAO/UNU expert consultation. WHO Technical Report Series 935.			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	3	1	3	2	1	2
CO2	1	2	1	2	1	1	2
CO3	2	3	2	3	1	1	3
CO4	1	3	1	2	2	1	3
CO5	1	3	1	2	1	1	3
CO6	2	3	2	3	2	-	3

Practical Subject

1	**Course Code**	**MFN 154**	
2	**Course Title**	Advanced Nutritional Biochemistry and Instrumentation-II**(LAB)**	
3	**Credits**	**1**	
4	**Contact Hours (L-T-P)**	**0-0-2**	
5	Course Outcomes	CO1: To describe the importance of Urea, uric acid and creatinine estimation CO2: To understand the importance of Clearance test CO3: To interpret the use of enzymatic kit in enzyme activity estimation CO4: To analyse the importance of urine analysis in disease diagnosis CO5: To compare the importance of Lipid profile and CSF analysis. CO6: To create knowledge for different biochemical parameters for nutrition assessment	
6	Course Description	• Urea estimation and Creatinine estimation • Clearance test • Estimation of enzymes and Uric acid by kit method • Urine analysis • Lipid profile and CSF analysis	
	Practical's		CO mapping
	Unit 1	**Urea estimation and Creatinine estimation**	CO1, CO6
		a. Estimation of Urea and Creatinine in normal sample b. Estimation of Urea and Creatinine in abnormal sample c. Estimation of Urea and Creatinine in unknown sample	
	Unit 2	**Clearance test**	CO2
		a. Briefing of clearance test b. Perform and calculate Urea clearance test c. Perform and calculate Creatinine clearance test	
	Unit 3	**Estimation of enzymes and Uric acid by kit method**	CO3

		a) Estimation of SGPT and SGOT by kit method b) Estimation of LDH and Amylase by kit method c) Estimation of Uric acid by kit method	
	Unit 4	**Urine analysis**	CO4
		a. Physical properties of urine b. Normal constituent of urine c. Abnormal constituent of urine	
	Unit 5	**Lipid profile and CSF analysis**	CO5, CO6
		a. Total cholesterol, TG and HDL estimation b. Calculation of LDL and VLDL c. Collection of CSF and CSF protein analysis	
	Mode of examination	Theory and Practical	
	Weightage Distribution for Practical's	CA: 25% / Viva: 25% / ETE: 50%	
	Text book/s*	1. A text book of Medical Biochemistry by Chatterjee & Shinde	
	Reference books	2. Text book of biochemistry for Medical students by Vasudevan and Sreekumari 3. Biochemistry by Lehringer 4. Clinical chemistry by Varley 5. Harpers Illustrated Biochemistry by Robert K.M.	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	1	1	3	1	1
CO2	3	2	1	1	3	1	1
CO3	3	2	2	3	3	2	1
CO4	3	1	1	1	1	2	1
CO 5	3	2	1	1	1	1	1
CO6	3	3	1	1	1	1	1

Practical Subject

School: SSAHS		**Batch: 2023-25**	
Programme: MFN		**Current Academic Year: 2023-2025**	
3Branch:		**Semester:2nd semester**	
1	Course Code	MFN155	
2	Course Title	Clinical Nutrition-I	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	To enable students to plan and prepare suitable therapeutic diets based on patient needs, provide dietary counselling for prevention/ treatment of various diseases/ disorders and familiarize with special therapeutic/ health foods	
6	Course Outcomes	CO1: To remember the methods of assessment of patient needs CO2: To Understand the methods of food preparation for diabetes CO3: To interpret the methods of food preparation for different diseases CO4:To analyse the methods of food preparation for different diseases CO5: To evaluatethe methods of food preparation for different diseases CO6:To Design nutrition care plan for the different disease condition	
7	Course Description	To understand the nutrition assessment, planning, implementation, monitoring and follow up in nutrition care process, the causative factors and metabolic changes in various diseases/disorders and acquire knowledge on the principles of diet therapy and comprehend principles of dietary counselling and the rationale of prevention of various diseases/disorders.	
8	Outline syllabus		CO Mapping
	Unit 1	Assessment of patient needs – nutritional assessment and screening	
	A	Panning	CO1
	B	Calculations	CO1
	Unit 2	Planning and preparation of diets for following diseases	
	A	Type 1 diabetes	CO2, CO6
	B	Type 2 diabetes	CO2
	C	Gestational Diabetes	CO2
	Unit 3	Planning and preparation of diets for following diseases	
	A	PCOD	CO3, CO6
	B	Peptic ulcer	CO3
	C	Hypertension and dyslipidaemia	CO3
	Unit 4	Planning and preparation of diets for following diseases	
	A	Congestive heart failure	CO4, CO6
	B	Ulcerative colitis	**CO4**
	C	Diverticular disease	CO4
	Unit 5	Planning and preparation of diets for following diseases	
	A	Cancer	CO5, CO6
	B	IEM	CO5, CO6
	C	SAM	CO5, CO6
	Mode of	Practical/Viva	

	examination				
	Weightage	CA	VIVA	ETE	
	Distribution	25%	25%	50%	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	1	3	1	1
CO2	3	1	1	1	3	1	1
CO3	3	2	1	1	3	2	1
CO4	3	2	1	1	3	2	1
CO5	3	1	1	1	3	2	1
CO6	3	2	1	1	3	3	1

Practical Subject

School: SSAHS		**Batch: 2023-25**	
Programme: MFN		**Current Academic Year: 2023-2025**	
Branch:		**Semester:2nd semester**	
1	Course Code	MFN156	
2	Course Title	Food Microbiology lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	To enable students to plan and prepare suitable therapeutic diets based on patient needs, provide dietary counselling for prevention/ treatment of various diseases/ disorders and familiarize with special therapeutic/ health foods	
6	Course Outcomes	CO1:To define the methods of assessment of patient needs CO2:To understand the methods of food preparation for diabetes CO3:To apply the methods of food preparation for different diseases CO4:To analyse the methods of food preparation for different diseases CO5: To access the methods of food preparation for different diseases CO6: To integrate various methods for the estimation of microbial contents of various food stuffs	
7	Course Description	To understand the nutrition assessment, planning, implementation, monitoring and follow up in nutrition care process, the causative factors and metabolic changes in various diseases/disorders and acquire knowledge on the principles of diet therapy and comprehend principles of dietary counselling and the rationale of prevention of various diseases/disorders.	
8	Outline syllabus		CO Mapping
	Unit 1	**Morphology and Structural Features of Various Micro-organisms**	
	A	Demo	CO1
	B	• Simple staining • Differential staining	CO1
	Unit 2	**Various Techniques and Instruments Used in Microbiology**	
	A	Sterilization and Disinfection	CO2
	B	Filtration, biosafety cabinets	CO2
	Unit 3	**Isolation of Microorganisms**	
	A	• Pure Culture Technique	CO3
	B	• Standard Plate Count Method	CO3
	C	• Pure Culture Technique	CO3
	Unit 4	**Microbiological Analysis For**	
	A	Water (Most Probable Number)	CO4, CO6
	B	Milk (Methylene Blue Reduction Test)	**CO4, CO6**
	C	Curd and probiotic count	CO4, CO6
	Unit 5	**Biochemical Test**	

	A	• Rapid detection test			CO5
	B	• Phenol co-efficient method			CO5
	C	• Zone of Inhibition technique			CO5
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	VIVA	ETE	
		25%	25%	50%	

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	1	1	2	1	-
CO2	3	1	1	1	3	3	1
CO3	3	1	2	1	2	2	1
CO4	3	1	2	1	2	2	-
CO5	3	1	2	1	2	2	1
CO6	3	2	1	-	-	2	1

Theory Subject

School: SSAHS		**Batch :** 2023-25	
Programme: MFN		**Current Academic Year: 2023-2025**	
Branch:		**Semester: 3th**Semester	
1	Course Code	MFN 207	
2	Course Title	F**unctional Foods and Nutraceuticals**	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	1. Gain knowledge about functional foods and nutraceuticals 2. Have thorough understanding about the health effects 3. Be familiar with applications in industry.	
6	Course Outcomes	CO1: Description of the concept of functional food and nutraceuticals CO2: Understanding the role of functional food in different diseases CO3: To interpret the importance and functional properties of functional food CO4: Analyse the role of Non- nutrient effect of specific nutrients CO5: To assess the knowledge about Recent Advancements in Functional Foods CO6: To create the knowledge about functional food and health effects	
7	Course Description	Examines nutrition as it relates to the prevention and treatment of disease. The course deals with the nutritional aspects of diseases and clinical disorders by integrating students' existing knowledge of physiology, biochemistry and food science.	
8	**Outline syllabus**		CO Mapping
	Unit 1	**Introduction**	
	A	Functional foods, Nutraceuticals, classification functional foods	CO1
	B	Introduction to nutraceuticals and functional food basis of claims for a compound as a nutraceuticals regulatory aspects for nutraceuticals / functional foods including CODEX	CO1
	C	Important definitions associated with the nutraceutical and functional food industry.	CO1
	Unit 2	**Role of functional foods in Health**	
	A	Role of nutraceuticals/functional foods in management of health and disease	CO2
	B	Nutraceuticals for ¬ cardiovascular diseases, hypertension ¬ cancer, diabetes, ¬ cholesterol management,	

		¬ obesity, ¬ joint pain, ¬ immune enhancement, ¬ age-related macular degeneration ¬ mood disorders.				
	Unit 3	**Functional properties of Nutraceuticals**				
	A	Properties and functions of various nutraceuticals such as ¬ lycopene, ¬isoflavonoids, ¬ prebiotics and probiotics, ¬ glucosamine,				CO3,CO6
	B	¬free radicals, ¬concept of antioxidants.				CO3
	C	Resistant starch Gums				CO3
	Unit 4	Non- nutrient effect of specific nutrients:				
	A	Proteins, Peptides and nucleotide				CO4,CO6
	B	Conjugated linoleic acid and n-3 fatty acids				CO4
	C	Vitamins and Minerals.				CO4
	Unit 5	**Recent Advancements in Functional Foods**				
	A	Adverse effects and toxicity of nutraceuticals;				CO5
	B	nutrigenomics,				CO5
	C	recent advancements and techniques in the formulation and processing of functional foods..				CO5,CO6
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		25%	25%	50%		
	Text book/s*	Cho S. S. and Dreher, M.L. (2001): Handbook Dietary Fibre, Marcel Dekker Inc., New York.				
	Reference books	2. Yurawecz, M.P., M.M. Mossoba, J.K.G. Kramer, M.W. Pariza and G.J. Nelson eds (1999) Advances in Conjugated Linoleic Acid Research, Vol. 1. AOCS Press, Champaign. 3. Wildman, R.E.C. ed. (2000) Handbook of Nutraceuticals and Functional Foods, CRC Press, Boca Raton. 4. Fuller, R. ed. (1992) Probiotics the scientific basis, London: Chapman and Hall, New York. 5. Fuller, R. ed. (1997) Probiotics Applications and Practical Aspects, London: Chapman and Hall, New York. 6. Salminen, S. A. Von Wright (eds) (1998): Lactic acid bacteria: microbiology and functional aspects, 2nd edition, Marcell Dekker Inc. New York.				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	1	3	2	1	1
CO2	3	2	2	3	2	1	2
CO3	2	1	2	3	1	2	1
CO4	3	1	1	3	2	2	1
CO5	3	2	1	3	1	1	1
CO6	3	2	1	3	1	2	1

Practical Subject

School: SSAHS		**Batch:** 2023-25
Programme: MFN		**Current Academic Year: 2023-25**
Branch:		**Semester:3rd semester**
1	Course Code	INC001
2	Course Title	Faculty Student Industry Connect (FSIC)
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course Objective	To create a platform to enhance the industry-academia interaction To give exposure to the industry to our faculty members and students To bridge the gap between industry and academia
6	Course Outcomes	CO1: Enhanced role of the university across industries in the form of knowledge creation, learning, training, consultancy CO2:To give real-time exposure to our faculties about industry environment CO3:Developing an understanding of various real-time problems, latest updates, technological advancements, and best practices of the industry CO4:Establishing corporate connections and strong networking CO5: To make our students industry-ready. CO6: Develop industrial skills among students.
7	Course Description	The university offers a Faculty-Student Industry Connect (FSIC) course for the holisticdevelopment and empowerment of students and faculties to gain more practical insights andexposure to the industry. FSIC will support the curriculum by amplifying, supplementing, andfilling in the gaps related to industry exposure, if any.In addition, FSIC will help students andfaculty to enrich their knowledge and skills about the various practices of the industry by makingindustry visits, working on live projects with the industry, and solving the real-time problems ofthe industry.
8	Outline syllabus	

Guidelines:

For Students:

1. It is mandatory for every student to get registered for the two-credit FSIC course offered by the school/department.
2. Students pursuing UG Programmes are required to enroll in this course in the 2nd or 3rd year.
3. Students pursuing PG Programmes are required to enroll in this course in the 2nd or 3rdsemester.
4. Attendance for a minimum of two visits to the same industry/organization will be marked as a requisite for the completion of the FSIC course. Students will be required to submit geotagged pics for both visits.

5. As FSIC is a two-credit course, it is essential for students to clear/complete the FSIC course.

6. A student shall be graded for the FSIC course.
7. If a student fails in the FSIC course, the student will get the grade "F" and need to repeat the course with the succeeding batch. Only final-year students will be allowed to appear in the summer batch.
8. The student shall be issued a course completion certificate by the school/department after Passing the course.

II. For School/Department:

1. Individual schools/departments must appoint an FSIC coordinator for the smooth Functioning of the FSIC course at the school/departmental level.
2. The FSIC is mandatory for all the non-council courses but even then for council based courses this course may be given as Value Added Course (VAC)
3. The school/department FSIC coordinator should ensure students' enrolment in the FSIC course.
4. Industry/organization visit slots must be mapped on the timetable. The slot can be given on iCloud if the specific visit by any team should be intimated to the FSIC coordinator, one week in advance.
5. The FSIC coordinator will allot a minimum of 2-3 students to every faculty member of the school/department.
6. The FSIC coordinator will ensure that every faculty member with their allotted students must visit a minimum twice the same industry/organization to get better insights into the industry/organization.
7. The school/department should get it mapped FSIC on PeopleSoft.
8. FSIC course details along with an evaluation scheme must be designed for this course.
9. For the FSIC course, course outcomes (COs) must be created and mapped with POs & PSOs of the Programme. Approval is required from the Office of the Dean of Academic Affairs.
10. FSIC brochure must be prepared by the school/department.
11. Attendance records and assessment records should be maintained properly and on a regular basis.
12. The school/department FSIC coordinator must inform students about the requisites (regular attendance and passing the exam) for the completion of the course.
13. On completion of the course, students will be issued a course completion certificate.
14. The FSIC Course Execution Process.

Evaluation Scheme:

The evaluation scheme of the FSIC course will be as follows:

Continuous Evaluation (CE)	Industry Visit Report	Viva – Voce	Total
80 %	10 %	10 %	100 %

Theory Subject

School: SSAHS		**Batch :** 2023-25	
Programme: MFN		**Current Academic Year 2023-25**	
Branch:		**Semester: 3rd**Semester	
1	Course Code	MFN 202 C	
2	Course Title	Nutrition for Maternal and Child Health	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	To understand to concept of nutritional knowledge of nutrition and health system	
6	Course Outcomes	CO1:To examine the basic concept and definitions of Child Health and Nutrition CO2:To explain Common child hood illness CO3:To interpret and apply knowledge of child hood care with special need CO4:To appraise various theories and nutritional requirement of Pregnancy CO5: To assess the theories and nutritional requirement of Lactation CO6: To integrate the effect of maternal and child eating pattern on nutritional status	
7	Course Description	Maternal health is not a "women's issue". It is about the integrity of communities, societies and nations, and the well-being of all the men, women, boys and girls whose own prospects in life depend upon healthy women and mothers.	
8	**Outline syllabus**		CO Mapping
	Unit 1	**Child Health and Nutrition**	
	A	Nutrition during Infancy Nutrition during Early Childhood Health Care of the Child	CO 1
	B	Nutrition Related Disorders in Early Childhood	CO1
	C	Nutrition and Health Programmemes	CO1
	Unit 2	**Common Childhood Illnesses, Their Prevention & Management-**	
	A	Some Disorders of the Respiratory System	CO2
	B	Some Infections of the Mouth and Throat	CO2
	C	Some Disorders of the Alimentary System	CO2
	Unit 3	**Child hood care**	
	A	Early Childhood Care and Education in Perspective	CO3
	B	Organizations for Children	CO3
	C	Introduction to Special Needs, Services for Special	CO3

		Children	
	Unit 4	**Nutrition During Pregnancy**	
	A	Concept of different food groups recommended dietary allowances for Indians, basis for requirement, computation of allowance. Concept of balance diet.• nutrition requirements during pre-pregnancy and pregnancy	CO4
		Storage of nutrients, physiological cost of pregnancy • Micronutrients- Iron and folic acid requirements and foetal undernutrition • Complication	CO6
	C	Nutrition in pregnancy - Stages of gestation, maternal physiological adjustments, weight gain during pregnancy and 20% nature of weight gain Maternal Mortality	CO3, CO6
	Unit 5	**Nutrition in Lactation**	
	A	Physiological adjustments during lactation, hormonal controls and reflex action, lactation in relation to growth and health of infants, physiology of milk production, problems of breast feeding, nutritional components of colostrum and mature milk, special foods during lactation, nutritional requirements during lactation.	CO5
	B	problems of breast feeding, nutritional components of colostrum and mature milk, special foods during lactation, nutritional requirements during lactation.	CO5
	C	Maternal Health Services	CO5, CO6
	Mode of Examination	Theory	
	Weightage distribution	CA: 25% / MTE: 25% / ETE: 50%	
		Text book of Nutrition and Dietetics- Kumud Khanna	

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	1	1	2	2	2	1
CO2	1	2	1	2	1	2	1
CO3	2	1	1	1	1	1	1
CO4	2	1	1	2	1	2	1
CO5	1	2	1	1	1	2	1
CO6	2	1	1	2	2	2	1

TheorySubject

School: SSAHS		**Batch :** 2023-25	
Programme: MFN		**Current Academic Year 2023-25**	
Branch:		**Semester: 3rd**Semester	
1	Course Code	MFN 203 C	
2	Course Title	Clinical Nutrition-II	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	To understand the nutrition assessment, planning, implementation, monitoring and follow up in nutrition care process, the causative factors and metabolic changes in various diseases/disorders and acquire knowledge on the principles of diet therapy and comprehend principles of dietary counselling and the rationale of prevention of various diseases/disorders.	
6	Course Outcomes	CO1: Define a detailed understanding of the etiology, physiological and metabolic anomalies of various acute and chronic disorders / diseases CO2: Explain competency in nutrition assessment and diet history interview skills CO3: Apply the understanding and expertise on the effect of various disorders on nutritional status, nutritional and dietary requirements CO4: Analyse clinical reasoning to develop nutritional care plan for prevention and treatment of various disorders / diseases CO5: Evaluate the nutrition care process to the medical nutritional therapy of nutritionally vulnerable individuals using best evidence. CO6: Create clinical nutrition knowledge for disease management.	
7	Course Description	Examines nutrition as it relates to the prevention and treatment of disease. The course deals with the nutritional aspects of diseases and clinical disorders by integrating students' existing knowledge of physiology, biochemistry and food science.	
8	**Outline syllabus**		CO Mapping
	Unit 1	**Nutrition Care**	
	A	Nutrition Support – Parenteral Nutrition	CO1
	B	Dietary Counselling	CO1
	C	Nutrition Support: Enteral Nutrition	CO1
	Unit 2	**Hepatobiliary and Pancreatic Disorders**	
	A	Etiopathophysiology, metabolic & clinical aberrations, diagnosis, complications and recent advances in prevention, treatment, MNT and dietary counselling in Non-alcoholic fatty liver disease (NAFLD), Cirrhosis, End stage liver disease (ESLD), Encephalopathy,	CO2
	B	Liver resection and transplant; Cholecystitis, Cholelithiasis, cholecystectomy, Pancreatitis.	CO1, CO3
	Unit 3	**Diseases of Heart and Blood Vessels**	
	A	Etiopathophysiology, metabolic & clinical aberrations, diagnosis, complications and recent advances in prevention, treatment.	CO3

	B	MNT and dietary counselling in Myocardial Infarction				CO3
	C	Coronary artery bypass graft (CABG), angioplasty, cerebrovascular and peripheral vascular disease, heart transplant				CO3
	Unit 4	**Surgery and Critical Care**				
	A	Metabolic & clinical aberrations, diagnosis, complications, treatment, MNT and dietary counselling in Metabolic Stress - Surgery, Burns, Sepsis and Trauma, Critical care				CO4
	B	Etiopathophysiology, metabolic & clinical aberrations, diagnosis, complications and recent advances in prevention, treatment, MNT and dietary counselling in Nephrotic Syndrome.				CO4,CO6
	C	Glomerulonephritis, Acute Renal Failure, Chronic Kidney Disease, End Stage Renal Disease (ESRD), Dialysis, Transplant, Renal Stones.				CO4
	Unit 5	**Neurological disorders**				
	A	Etiopathophysiology, metabolic & clinical aberrations, diagnosis, complications and recent advances in prevention, treatment, MNT and dietary counselling in Alzheimer's disease, Parkinson disease, Epilepsy				CO5,CO6
	B	MNT and dietary counselling in Alzheimer's disease, Parkinson disease, Epilepsy				CO5,CO6
	C	MNT and dietary counselling in Epilepsy				CO5
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		25%	25%	50%		
	Text book/s*	• Text book of physiology- A.K. Jain				
	Reference book	• Essentials of medical physiology- K.Sembulingam				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	1	2	2	2	2	1
CO2	1	2	1	2	1	1	2
CO3	2	2	1	1	1	1	1
CO4	2	3	1	1	2	2	1
CO5	3	2	1	2	1	2	1
CO6	3	2	1	3	2	2	1

Theory Subject

School: SSAHS		**Batch :** 2023-25	
Programme: MFN		**Current Academic Year 2023-25**	
Branch:		**Semester: 3rd**Semester	
1	Course Code	MFN 204 C	
2	Course Title	Sports and Fitness Nutrition	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	To learn the concepts of fitness, methods of assessing fitness, exercises for physical fitness and bioenergetics of exercise and role of macro- and micro-nutrients in sports performance and to gain knowledge & application skills with respect to nutrition for high performance sports, through the life-cycle and diet & nutritional care of special groups of athletes.	
6	Course Outcomes	1. Define concepts of fitness, its assessment and exercises for physical fitness training. 2. Understand the role of nutrition to support recreational and competitive athletes 3. Exhibit knowledge of the metabolism and bioenergetics of exercise and continuum in various sports 4. Analyse plan, implement and monitor sport-specific diets for athletes through all age groups 5. Evaluate the diet and nutritional care in terms of nutrition education, diet plans and counselling to special groups of athletes 6. Integrate the knowledge of nutrition for fitness and sport	
7	Course Description	This course Enable the students to understand the role of adequate nutrition for physical activities and exercise and also to attaining wellness and goodhealth.	
8	**Outline syllabus**		CO Mapping
	Unit 1	**Introduction to physical fitness**	
	A	Definition of physical fitness	CO1
	B	Components of physical fitness	CO1
	C	Aim of nutrition for sports and exercise, Significance of Physical fitness. Body systems involved in physical activity (Cardio-respiratory and muscular-skeletal system), benefits of an active lifestyle.	CO1
	Unit 2	**Energy and Carbohydrate need for Energy**	
	A	Integrated approach to care for athletes	CO2
	B	Energy requirements of sportsperson, Dietary recommendations for health and fitness, Carbohydrate as a fuel for exercise	CO2
	C	Carbohydrate metabolism during exercise, Carbohydrate reserves and dietary intake, Carbohydrate feeding before, during and postexercise,	CO2
	Unit 3	**Fat and Fluids for exercise**	

	A	Fat as a fuel for exercise, Function, classification and dietary sources of fat Body fat reserves and Dietary fat intake				CO3
	B	Fat mobilization during exercise Dietary fat recommendations for optimal performance				CO3
	C	Fluid and Electrolytes Balance and need for Exercise, Sports drink and fluid replacements for sport person				CO3
	Unit 4	Proteins and Micronutrients for exercise				
	A	Function and classification of protein, Dietary sources of protein, Metabolism of protein during and after exercise, Protein recommendations for active individuals				CO4
	B	Micronutrient Requirements for Sports person Recommendations of vitamin and minerals for sportsperson				CO4,CO6
	C	Athletes with eating disorders, athletes with diabetes and other medical conditions ,				CO4,CO6
	Unit 5	**Nutrition during other life span**				
	A	Introduction of cardio-respiratory system and assessment of cardio-respiratory fitness using maximum aerobic capacity (VO2 max)				CO5
	B	Code of Ethics, Professional Responsibilities of a fitness trainer towards clients				CO5
	C	Ergogenic substances: Ergogenic substances in sports and exercise, choosing quality ergogenic substances.				CO5,CO6
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		25%	25%	50%		
	Text book/s*	• Text book of Nutrition and Dietetics-KumudKhanna				
	Reference book	• Text of Human Nutrition-Anjana Agarwal, Shobha Agarwal				

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	1	2	1	1
CO2	3	2	1	2	2	1	1
CO3	2	1	2	1	2	2	2
CO4	3	1	1	2	2	2	2
CO5	3	2	1	1	1	2	1
CO6	2	2	1	1	2	2	1

Practical Subject

School: SSAHS		**Batch: 2023-25**	
Programme: MFN		**Current Academic Year 2023-25**	
Branch:		**Semester:3rd semester**	
1	Course Code	MFN 254C	
2	Course Title	Clinical Nutrition-II	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	To enable students to plan and prepare suitable therapeutic diets based on patient needs, provide dietary counselling for prevention/ treatment of various diseases/ disorders and familiarize with special therapeutic/ health foods	
6	Course Outcomes	CO1: Describe the methods of assessment of patient needs CO2:Understand the methods of food preparation for diabetes CO3:Application of the methods of food preparation for different diseases CO4:Analyse the methods of food preparation for different diseases CO5: Compare the methods of food preparation for different diseases CO6: Create knowledge of nutrition for dietary management of various diseases	
7	Course Description	To understand the nutrition assessment, planning, implementation, monitoring and follow up in nutrition care process, the causative factors and metabolic changes in various diseases/disorders and acquire knowledge on the principles of diet therapy and comprehend principles of dietary counselling and the rationale of prevention of various diseases/disorders.	
8	Outline syllabus		CO Mapping
	Unit 1	Market Survey for commercial nutritional therapeutic products	
	A	Panning	CO1
	B	Calculations	CO1
	Unit 2	Planning and preparation of diets for following diseases	
	A	Post burn	CO2
	B	Liver Cirrhosis	CO2
	C	Hepatic Encephalopathy	CO2
	Unit 3	Planning and preparation of diets for following diseases	
	A	Pancreatitis	CO3
	B	Myocardial infarction	CO3
	C	Congestive heart failure	CO3
	Unit 4	Planning and preparation of diets for following diseases	
	A	Nephritis	CO4,CO6
	B	Acute Renal Failure	**CO4**
	C	Chronic renal failure	CO4
	Unit 5	Planning and preparation of diets for following diseases	CO6
	A	Patients on Dialysis	CO5
	B	PARQ assessment and interpretation for fitness	CO5

	C	Planning an education module for special groups of athletes : Diabetes, special needs			CO5
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	VIVA	ETE	
		25%	25%	50%	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	1	2	1	1
CO2	3	2	1	2	2	1	1
CO3	2	1	2	1	1	1	2
CO4	3	1	1	2	2	2	2
CO5	3	2	1	1	1	2	1
CO6	3	2	2	2	2	2	2

Theory Subject

School: SSAHS		**Batch :** 2023-25	
Programme: MFN		**Current Academic Year: 2023-2025**	
Branch:		**Semester:3rd**Semester	
1	Course Code	MFN 202 P	
2	Course Title	Nutrition Epidemiology	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	The purpose of this course is to enable the students to understand the principles of disease causation with emphasis on modifiable environmental factors including dietary factors. This will also help students appreciate the effect of quality measures of nutritional exposure and nutrition related health outcomes on determination of diet-disease relationship. This will encourage the application of epidemiology to prevention of disease and promotion of health through nutrition.	
6	Course Outcomes	1.Describe major study designs in nutritional epidemiology and select an appropriate design for addressing a study question. 2. Explain implication of study design and methods of diet and nutritional status assessment in interpreting studies in nutritional epidemiology 3. Interpret the role of epidemiological research in improving health and nutritional status 4. Demonstrate knowledge of epidemiological approach to defining and measuring occurrence of nutrition and health related states in population 5. Assess the knowledge of epidemiological approach to causation 6. Integrate the knowledge of epidemiological approach to measure nutrition and health status of populations.	
7	Course Description	Nutritional epidemiology is a relatively new field of medical research that studies the relationship between nutrition and health. Diet and physical activity are difficult to measure accurately, which may partly explain why nutrition has received less attention than other risk factors for disease in epidemiology.	
8	**Outline syllabus**		CO Mapping
	Unit 1	Concepts and Designs in Epidemiology	
	A	An Introduction to Epidemiology . History of Epidemiological Methods and Concepts	CO 1
	B	Epidemiology and public health	CO1
	C	Descriptive Studies Cohort Studies	CO1

		Case-Control Studies Community-Based Health Promotion	
	Unit 2	**Methodological Approaches in Epidemiology**	
	A	Design and Planning of Epidemiological Studies Data Management in Epidemiology	CO2
	B	Sample Size Determination in Epidemiological Studies, Meta-Analysis in Epidemiology .	CO2
	C	Ethical aspects of research in nutritional epidemiology Regression Methods for Epidemiological Analysis .	CO2, CO3
	Unit 3	**Nutritional Epidemiology**	
	A	Dietary data on a national level. Per capita consumption Dietary data on the household level. Household based surveys Food consumption of individuals. Dietary assessment methods	CO3
	B	Calculation of nutrient intake from data on food intake Number of days required to classify individuals' dietary intake	CO3
	C	The validation of dietary assessment Misreporting Biological markers for food intake	CO3, CO4
	Unit 4	**Outcome-Oriented Epidemiology**	
	A	Infectious Disease Epidemiology Cardiovascular Health and Disease	CO4
	B	•Cancer Epidemiology Epidemiology of Obesity Epidemiology of Diabetes	CO4, CO5
	Unit 5	Epidemiology, health policy and planning	
	A	Health policy The influence of epidemiology Framing health policy Health policy in practice	CO5, CO6
	B	Health policy The influence of epidemiology Framing health policy Health policy in practice	CO5, CO6
	C	Implementing interventions Monitoring activities and measuring progress	CO5, CO6
	Mode of Examination	Theory	

	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	
	Text Book	• Agarwal, K.C.2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.			
	Reference books	• BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd. , Ahmedabad — 380 013, India, Email: mapin@icenet.net • Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill lnc.480p 4. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	1	1	2	2
CO2	3	2	1	2	1	2	2
CO3	3	1	2	1	1	1	1
CO4	2	1	1	1	2	2	1
CO5	3	2	1	1	1	1	1
CO6	3	3	2	2	3	3	3

Theory Subject

School: SSAHS		**Batch :** 2023-25	
Programme: MFN		**Current Academic Year: 2023-2025**	
Branch:		**Semester:** 1st Semester	
1	Course Code	MFN 204 P	
2	Course Title	Perspective of community Nutrition and Assessment	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	The objective of this course is to enable the students to learn the concepts, significance and scope of nutrition assessment of individual and group and to understand the importance of communication in assessment of nutritional status	
6	Course Outcomes	CO1:To define the causes, consequences and preventive strategies for nutritional problems in the community. CO2:To understand, and measure nutritional status of individual and population. CO3: To interpret knowledge about the concept of food and nutrition security and the various Programmemes for improving food and nutrition security. CO4: To analyse the purpose and importance of communication in nutrition. CO5:To evaluate the NEC concept for community education CO6: To integrate the knowledge of assessment deficiency diseases for improving nutrition security	
.7	Course Description	The nutritional assessment is done to obtain information about the prevalence and geographic distribution of nutritional disorders within a community or a specified population group. Assessment of the nutritional status aids assessing the prevalence of nutritional disorders, planning corrective measures, and evaluating the effectiveness of the implemented strategies simultaneously. This course will help the student to gain and apply knowledge of public health.	
8	**Outline syllabus**		CO Mapping
	Unit 1	**Public Health Aspects of Malnutrition**	
	A	Etiology, public health implications, preventive strategies for CED /PEM, Severe Acute malnutrition (SAM)	CO1
		Malnutrition and micronutrient deficiencies of public health significance	CO1
		Public health implications and preventive strategies for Obesity, Hypertension, Coronary Heart Disease, Diabetes, Osteoporosis, Dental Caries.	CO1
	Unit 2	**Nutritional Problems**	
	A	Protein Energy Malnutrition (PEM) 1 Different Forms of PEM 1.1 Kwashiorkor 1.2 Marasmus 1.3 Marasmic - Kwashiorkor 1.4 Sub-clinical PEM What is the Prevalance of PEM What Causes PEM?	CO2

		What are the Consequences of PEM? How do we Treat PEM? How to Prevent and Control PEM?				
	B	Vitamin A Deficiency, Iron Deficiency Anaemia (IDA)				CO2
	C	IDD and Zinc Deficiency, Vitamin B complex deficiencies				CO2
	Unit 3	**Methods of Nutritional status assessment**				
	A	Definitions of dietary assessment methods, Interview techniques, record techniques, computerised assessment				CO2
	B	Requirement of Biochemical Assessment, Type of tests, Methods of analysis of various biochemical parameters				CO2, CO6
	C	Clinical assessment of nutritional status and its assessment and computation				CO2, CO3, CO6
	Unit 4	**Planning of Nutrition Education**				
	A	Understanding the need, scope and importance of nutrition education Potential challenges and constraints of Nutrition Education				**CO4**
	B	Theories of Nutrition education, Process of Nutrition education and communication				**CO4**
	C	Conceptual phase of NEC: formative research, behaviour analysis				CO4
	Unit 5	**NEC formulation, implementation and Evaluation**				
	A	Designing messages, Choosing media and multimedia combination and development of communication material				CO5
	B	Implementation process and execution of NEC, Social marketing and community participation				CO5, CO6
	C	Developing an Evaluation system of NEC, Types and major features of evaluation				CO5, CO6
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		25%	25%	50%		
	Text book/s*	1. Field guide to designing communication strategy, WHO publication-2007.				

	Reference books	2. Behavior change consortium summary (1999-2003) www1.od.nih.gov.behaviour change 3. Communication strategy to conserve/improve Public Health., John Hopkins University-Centre for Communication Programmes. 3. Gibney M J, Margetts B M, Kearney J M Arab (IstEds) (2004) Public Health Nutrition, NS Blackwell Publishing 4.Kaufman M (2007) Nutrition in promoting the public health strategies, principles and practices. Jones and Barlett Publishers5. Hubley J (1993) Communicating Health. London: Teaching Aids at Low Cost, London, UK.	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	2	1	2	2
CO2	3	2	1	2	1	2	2
CO3	3	1	1	1	1	1	1
CO4	2	1	1	2	2	2	1
CO5	3	2	1	2	1	1	1
CO6	3	2	3	2	3	3	3

Theory Subject

School: SSAHS		**Batch:** 2023-25	
Programme: MFN		**Current Academic Year: 2023-2025**	
Branch:		**Semester: 3rd**Semester	
1	Course Code	MFN 203P	
2	Course Title	Programme Planning in Public Health Nutrition	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	This course will make the students familiar with the process of planning and management of public health nutrition Programmemes. It will help them understand the concept of monitoring of Programmemes and nutritional surveillance.	
6	Course Outcomes	CO1: Become familiar with the process of planning and management of public health nutrition Programmemes. CO2: Develop an understanding of the concept of nutrition monitoring. CO3: To acquire knowledge and implementation of nutrition surveillance CO4: Analyse the public health implications of various nutritional problems and the strategies to overcome the same. CO5: To compare acquainted with national/ public sector policies and Programmemes for promotion of health and nutritional status. CO6: To interpret the knowledge of Programme planning in public health nutrition for promotion of health and nutritional status.	
7	Course Description	This course will help the students to become familiar with the process of planning and management of public health nutrition Programmemes and to develop an understanding of the concept of nutrition monitoring and nutrition surveillance.	
8	**Outline syllabus**		CO Mapping
	Unit 1	**Programmeme planning and management in public health nutrition**	
	A	Introduction to Management Principles	CO1
	B	Basic principles and models of Programmeme planning	CO1
	C	Planning process in public health nutrition	CO1
	Unit 2	**Programmeme monitoring and evaluation**	
	A	Definition, significance and purpose of monitoring food/nutrition Programmemes Identification and selection of indicators for monitoring, data collection and analysis system (e.g. MIS)	CO2, CO6
	B	Definition, significance and purpose of evaluation of food/nutrition Programmemes Principles of evaluation, types, models and steps of evaluation	CO2
	C	Identification and selection of indicators for evaluation Strategies for data collection - qualitative and quantitative	CO2

	Unit 3	**Nutrition Surveillance**				
	A	Nutrition Monitoring: objectives and current Programmemes				CO3, CO6
	B	Nutrition Surveillance system (NSS)				CO3
	C	Key indicators and Conceptualization for NSS				CO3
	Unit 4	**National / Public Sector Policies for Promotion of Nutrition and Health Status of the Population**				
	A	National Nutrition Policy, National Nutrition Mission,				CO4
	B	National Food Security Act, National Water Policy, National Urban Sanitation Policy				CO4, CO6
	C	National Health Policy				CO4
	Unit 5	**Nutrition Policy and Programmeme**				
	A	Nutrition sensitive and nutrition specific Programmemes				CO5, CO6
	B	Critical appraisal of ongoing public sector Programmemes				CO5
	C	Success stories of some Programmemes				CO5, CO6
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		25%	25%	50%		
	Text book/s*	1. Edelstein S. (2010) *Nutrition in Public Health: A handbook for developing Programmemes and services*. Third Edition. Jones and Bartlett Learning.				
	Reference books	2. Behavior change consortium summary (1999-2003) www1.od.nih.gov.behaviour change 3. Communication strategy to conserve/improve Public Health., John Hopkins University- Centre for Communication Programmes. 3. FAO. (1983) *Selecting Interventions for Nutrition Improvement. A Manual*. Nutrition in Agriculture. No. 3. 4. Vir, S.C. (Ed.). (2011). *Public Health Nutrition in Developing Countries*. Part 2. Woodhead Publishing India. 5 Facts for Life (1990). A Communication Challenge. UNICEF / WHO / UNESCO / UNFPA, UK.				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	2	1	1	2	2
CO2	3	2	1	2	2	2	2
CO3	3	2	2	1	1	1	1
CO4	2	2	1	1	2	2	1
CO5	3	2	1	2	1	1	1
CO6	3	2	2	2	2	2	2

Theory Subject

School: SSAHS		**Batch :** 2023-25	
Programme:MFN		**Current Academic Year 2023-25**	
Branch:		**Semester:3rd**Semester	
1	Course Code	MFN 202F	
2	Course Title	Food Preservation and Processing	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	This course will provide each student with an exposure about different food preservation and food processing techniques with their commercial applications	
6	Course Outcomes	CO1:Define use of various processing operation for preserving different kind of foods and food products CO2: To explain the mechanism behind different food preservation techniques CO3: To interpret the need of novel preservation techniques in view of retention of bioactive compound in food CO4: To analyse the processing of Animal origin Foods CO5: To compare the processing of drying and other preservation techniques CO6: To create knowledge of processing in food industry	
7	Course Description	In all the food industries knowledge of Food preservation technology is very essential, therefore the current course deals mainly with various techniques related to preservation and processing of various food commodities.	
8	**Outline syllabus**		CO Mapping
	Unit 1	Preservation techniques	
	A	Basic principles and applications of various food preservation techniques	CO1, CO2
	B	thermal processing ,refrigeration, freezing, drying and dehydration,	CO1
	C	Pickling, curing, irradiation, smoking, chemical preservation and irradiation	CO2
	Unit 2	Novel techniques of Food Preservation	
	A	Basic principle and commercial applications of Dielectric heating	CO1
	B	Ohmic heating, Infrared heating, Pulsed electric field processing,	CO1, CO2
	C	High pressure processing, hurdle technology, cryogenic freezing, dehydro freezing, Freeze drying, Radiation Processing	CO2, CO6
	Unit 3	Processing of Cereal, Pulses and Oil seeds	
	A	Rice and wheat milling	CO2, CO3
	B	parboiling; processing of pulses	CO2,CO3
	C	Oilseeds processingRefining	CO3, CO6
	Unit 4	Processing of Animal origin Foods	
	A	Milk and Milk Products, Processing of fluid milk; manufacturing	CO4

		of various milk products-cheese, ice-cream, concentrated milk, milk powder				
	B	Meat, Poultry and Egg, Slaughtering of animals and birds, Meat Products sausages, meat nuggets, meat patties;				CO4, CO6
	C	processing of egg-freezing, drying and pickling.				CO4
	Unit 5	processing of egg-freezing, dryingand pickling.				
	A	Basic concept of processing of Chutneys, Sauces and				CO4
	B	Pickles, jam, jelly and marmalade				CO5
	C	importance of pectin, Fruits beverages, squash, nectar, cordial.				CO5, CO6
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		25%	25%	50%		
	Text book/s*	• ShakuntalaManay, N., ShadakCheraswamy, M., Food Facts and Principles, Wiley EasternLtd., 1987.				
	Reference books	• Saiauel, A. Matz., The Chemistry and Technology of cereals of Foods and Feed", CBSPublishers and Distributors,1996. • Fruit and vegetable processing', FAO Agricultural Services Bulletin 119, International Book Distributing Co				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	2	1	1	2	2	1
CO2	2	2	1	2	2	2	1
CO3	3	2	1	1	2	2	1
CO4	3	3	1	1	1	1	2
CO5	3	2	1	1	2	1	1
CO6	3	3	3	3	2	3	3

Theory Subjects

School: SSAHS		**Batch :** 2023-25	
Programme: MFN		**Current Academic Year: 2023-25**	
Branch:		**Semester: 3rd** Semester	
1	Course Code	MFN 203F	
2	Course Title	Food Quality Assurance	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	The students will get acquainted with food quality assurance; various food laws; standards and specifications for quality assurance; and role of competent authority in imparting quality control.	
6	Course Outcomes	CO1 To describe the concept of food safety CO2 To explain different quality parameters CO3 to apply different test methods for quality control CO4 To analyse the quality control tests CO5 To evaluate food safety and toxicity and apply knowledge in food safety system CO6: To integrate the application of food quality in various food products	
7	Course Description	Food safety is the integral part of any food chain. It has to be ensured from raw material reception to the finished product dispatch. The food safety is a round the clock discipline and it is needed to keep it a priority at every step of production. his course is designed to provide thorough knowledge of the subject to help you analyze food safety management system risks, prepare meet food safety regulations in food industries	
8	**Outline syllabus**		CO Mapping
	Unit 1	Quality control and assurance	
	A	Quality control – Objectives, Importance, functions of quality control, Stages of quality control in food processing industry.	CO1, CO2
	B	Food quality assurance – Design of food processing industry quality assurance Programme,	CO1
	C	Microbiological concerns. Managing quality in supply chain and marketing of food products	CO1
	Unit 2	Food Standards for Quality Assurance	
	A	Food Safety and Standards Act; Domestic regulations; Global Food safety Initiative; Various organizations dealing with inspection, Traceability and authentication, certification and quality assurance Labeling issues; International scenario, International food standards	CO1, CO2
	B	Total Quality Management; GMP/GHP; GLP, GAP; Sanitary and hygienic practices;	CO1, CO2, CO3

		HACCP;				
	C	Indian & International quality systems and standards like ISO and Codex Alimentarius; Food adulteration and food safety; Consumer Protection Act (CPA)				CO2
	Unit 3	Role of Central and State Government in imparting quality control				
	A	WHO assisted activities – Role of control food laboratory and state food laboratories				CO1, CO2
	B	Qualification and duties of public analyst and food inspector.				CO1,CO2
	Unit 4	Food Standards				
	A	Cereals & products – bread, biscuits, cakes, pasta products etc. Fruit products – jam, juices, squashes, ketchup, sauce etc.				CO3,CO4
	B	Oils & fats – coconut oil, groundnut oil, palm oil, sunflower oil, vanaspati etc Milk & products – Skimmed milk powder, partly skimmed milk powder, condensed sweetened milk. Other products-coffee, tea, sugar, honey, toffees etc.				CO3, CO4
	C	Patent – definition, requirements, patent laws in India, administrator, need for patent system, advantages, precautions to be taken by applicants, patent procedures, non-patenable.				CO3, CO4, CO5
	Unit 5	**Food Safety**				
	A	Food Safety – meaning of food safety. Importance of food quality and safety for developing countries.				CO3, CO5, CO6
	B	Food hazards – Physical, Chemical, Biological hazards associated with foods – types. Effect of processing and storage on microbial safety				CO3, CO6
	C	Types of food toxicants – Endogenous, natural, synthetic toxicants.				CO3, CO6
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		25%	25%	50%		
	Text book/s*	• A first course in food analysis – A. Y. Sathe, New Age Publications, 1999.				
	Reference books	• Food Science – Norman. N. Potter & Joseph. H. Hotchkiss, CBS Publishers, 1996. • Food Science, Chemistry & Experimental foods – M. Swaminathan, Bappco Publishers. BIS standards. • Technology of food preservation – Desrosier And Desrosier, CBS Publishers, Fourth edition,1999.				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	1	2	2	1
CO2	3	2	1	1	2	2	1
CO3	3	2	1	1	1	2	1
CO4	3	3	1	1	1	2	2
CO5	3	2	1	2	2	1	2
CO6	3	2	1	2	1	2	1

Theory Subjects

School: SSAHS		**Batch :** 2023-25	
Programme: MFN		**Current Academic Year: 2023-25**	
Branch:		**Semester: 3rd** Semester	
1	Course Code	MFN 204 F	
2	Course Title	Food Product Development and Sensory Evaluation	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	This course will provide each student with an exposure about sensory quality parameters and methods of sensory evaluation of foods	
6	Course Outcomes	CO1To examine and apply the strategies for development of new food products in food industry. CO2 To understand the main factors of a food product development process CO3 To interpret the role of consumers, advertisement and marketing in food product development CO4 To analyse the Use various sensory evaluation techniques for determining quality changes of food samples as effect of storage or treatment. CO5 To evaluate the result of using different kind of sensory panels for evaluation CO6 To create the understanding of application of food development and sensory evaluation in food science	
7	Course Description	*Food product development* has become the key strategic focus for successful *food* industry companies and this *course* examines the principles and practices of new product development and its analysis. Organoleptic evaluation is very important form of evaluation hence this course provide details of both aspects.	
8	**Outline syllabus**		CO Mapping
	Unit 1	Food product development	
	A	Objectives, needs and importance of product development Product life cycle and its role in product development	CO1, CO2
	B	Role of creativity and strategy in product development	CO1
	C	Forecasting of raw materials, ingredients, and product needs Use of input – output analysis in forecasting	CO1, CO2
	Unit 2		
	A	Forecasting of raw materials, ingredients, and product needs Use of input – output analysis in forecasting	CO1,CO2
	B	Product development process indulging opportunity analysis Generation and evaluation of ideas Testing of concept v/s product	CO1, CO2
	C	Prototype product Positioning of product and market research Planning product development project using job progress bar chart and PERT technique	CO2
	Unit 3		
	A	Market survey, consumer trends, trials and survey	CO3, CO6

		Various quality control techniques (viz. total quality assurance, SQC, GMP, HACCP & ISO – 9000 series)				
	B	Applicable to product development and regulatory frame work for new produce.				CO3, CO2
	C	Product launching Advertisement and marketing IPR and patents				CO3, CO6
	Unit 4	Sensory Evaluation				
	A	Selection of sensory panelists; Factors influencing sensory measurements				CO4,CO5, CO6
	B	Sensory quality parameters-Size and shape, texture, aroma, taste, color and gloss				CO4,CO5, CO6
	C	General analysis conditions for sensory evaluation Requirements of sensory laboratory				CO4,CO5, CO6
	Unit 5	Methods of Sensory Evaluation				
	A	Different tests for sensory evaluation–Paired comparison test, Duo-trio test, Triangle test, Ranking test, Two sample difference test, multiple sample difference test,				CO4,CO5, CO6
	B	Hedonic rating test, composite scoring test, sensitivity threshold test, dilution test, descriptive flavor profile test				CO4,CO5, CO6
	C	Statistical analysis of sensorydata				CO4,CO5
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		25%	25%	50%		
	Text book/s*	• Arlington. Food Product Development •Desrosier NW and Desrosier JN. Economics of New Product Development				
	Reference books	• Graf, E and Israel SS. Food Product Development from Concept to Market Place •Amerine MA, Pangborn RM &Rossles E B. 1965.Principles of Sensory Evaluation of Food. Academic Press. •Jellinek G. 1985. Sensory Evaluation of Food - Theory and Practice. Ellis Horwoood. •Lawless HT & Klein BP.1991.Sensory Science Theory and Applicatons in Foods. Marcel Dekker				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	2	1	1	2	2	2
CO2	3	2	1	2	2	2	1
CO3	3	2	1	1	2	2	1
CO4	3	3	1	1	1	1	2
CO5	3	2	1	1	2	1	1
CO6	2	2	1	1	2	2	1

Theory Subject

School: SSAHS		**Batch :** 2023-25
Programme: BND		**Current Academic Year: 2023-2025**
Branch:		**Semester: 4th semester**
1	Course Code	MFN 204
2	Course Title	Dissertation
3	Credits	20
4	Contact Hours (L-T-P)	0-0-40
	Course Type	Compulsory
5	Course Objective	1 To encourage students to work in conjunction with relevant industries, institutes, hospitals, schools, etc. 2. To assist students in developing general research skills as well as research skills specific to their specialization. 3. To encourage students to adopt best practices in research. 4. To facilitate students in completing laboratory work/product development/data collection/data entry/data analysis, and writing the remaining three chapters of the dissertation (Results, Discussion, Summary). 5. To support students to complete and submit the dissertation for the viva voce examination, integrate feedback, submit the final copy of the dissertation, and write a research paper using the findings of their research..
6	Course Outcomes	CO1:The dissertation project willenable the students to acquire knowledge CO2: These types of activities will give practical exposure to our students. CO3: The students will learn different laboratory techniques for nutrient estimation. CO4: Students will able to learn about collaborating own findings using relevant literature. CO5: Students will able to enhance their research writing ability. CO6: Summarizing Findings and Completing the Writing of the Dissertation
7	**Guidelines**	(Writing of Synopsis, collection of literature, Preparation of research tool & plan for Field Work/ experimental work& Presentation through a seminar) Each student has to submit a research proposal to carry out independent research on a topic decided in consultation with the supervisor, (nominated by the teacher's council of the department) to the head of the department in the beginning of the Third

		semester. The candidate has to write the synopsis of the work to be carried out, prepare appropriate tool for collection/ generation of data, and plan for the field work/ experimental work and make a presentation of this in the department before the faculty and research students for evaluation by the supervisor (50%) and teachers' council of the department (50%). The feedback and comments received during the seminar presentation shall be suitably incorporated in the work under the advice of the supervisor.			
	Role of Coordinator	The Coordinator will supervise the whole process and assign students tothe dietitian of the hospital.			
	Layout of the Report	As per University Norms			
	Format	**The report should be in a hard cover /file** The Design of the Cover page to report will be given by the Coordinator			
	ETE	**The students will be evaluated by panel of faculty members on the basis of their presentation.**			
	Mode of examination	Practical			
	Weightage Distribution	CA(Rubric Based)	ETE		
		100 Marks	100 Marks		

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2	2	1	3	3
CO2	3	3	1	3	3	2	3
CO3	2	2	2	3	1	2	1
CO4	3	1	2	3	2	2	1
CO5	3	2	1	3	1	1	1
CO6	3	2	2	3	1	2	1