Program and Course Structure

School of Allied Health Sciences

M.Sc.

(Food and Nutrition)

Program code: SAH0129

Batch 2020-22

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Vision of the University

To serve the society by being a global University of higher learning in pursuit of academic excellence, innovation and nurturing entrepreneurship.

Mission of the University

1. Transformative educational experience
2. Enrichment by educational initiatives that encourage global outlook
3. Develop research, support disruptive innovations and accelerate entrepreneurship
4. Seeking beyond boundaries

Core Values

- Integrity
- Leadership
- Diversity
- Community

Vision of the SAHS

To steer the School of Allied Health Sciences towards excellence in academics, innovation and entrepreneurship by constant endeavors.

Mission of the SAHS

1. To create the state of the art facility for quality teaching learning, research & innovation
2. To incorporate the contemporary standards in teaching & learning
3. To inculcate in the students values of integrity and compassion towards the care of patients and society.

Core Values

- Skilled professional
- Multidimensional
- Compassion
- Management

1.3 Programme Educational Objectives (PEO)

PEO1: To make students aware about recent advancements in the field of Foods and Nutrition

PEO2: To develop technical expertise in the students to acquire skills to work on R & D projects and in the area of Foods and Nutrition

PEO3: To develop student's with advanced skills in research, entrepreneurial and strategic knowledge for leading and managing various private / government organizations dealing in Foods and Nutrition

PEO4: To make students competent for undertaking extension programmes in Foods and Nutrition

1.3.2 Map PEOs with Mission Statements:

PEO Statements	School Mission 1	School Mission 2	School Mission 3
PEO1:	**3**	**3**	**3**
PEO2:	**2**	**3**	**3**
PEO3:	**3**	**3**	**3**
PEO4:	**2**	**3**	**3**

Enter correlation levels 1, 2, or 3 as defined below:

1. Slight (Low)
2. 2. Moderate (Medium)
3. 3. Substantial (High)

1.3.3 Program Outcomes (PO's)

PO1: **Nutrition and Human Body Knowledge:** Possess knowledge and comprehension of the core information associated with the profession of Dietetics and community nutrition and food science regarding physiology and human anatomy, nutritional biochemistry, nutrition science, behavioural, social and planning diets for therapeutic conditions.

PO2: **Thinking Abilities:** Utilize the principles of scientific inquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyse, evaluate and apply information systematically and shall make defensible decisions.

PO3: **Environment and sustainability ability:** To understand the basic knowledge of environment and chemistry, its implications, and energy resource conservation.

PO4: **Communication:** Communicate effectively on complex nutritional activities with the community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentation and give receive clear instruction.

PO5: **Professional Identity and Planning abilities:** understand, analyse and communicate the value of their professional roles in society as community worker, nutritional product developer, Nutrition Advisor, Policy analysts, Fitness Consultants, Regulatory Affairs Specialists, Quality Assurance Specialists, Food Scientists.

PO6: **Nutritional Product Development:** develop nutritional rich products after analysing their nutritional and sensory qualities to increase nutritional status of population

PO7: **Ethics:** Apply ethical principles and commit to professional ethics and responsibility and norms of community practice and food industry.

1.3.4 Mapping of Program Outcome Vs Program Educational Objectives

	PEO1	PEO2	PEO3	PEO4
PO1	3	3	2	3
PO2	3	2	3	3
PO3	3	3	3	3
PO4	3	3	3	2
PO5	3	2	2	3
PO6	2	3	3	3
PO7	3	3	3	3

1. Slight (Low)

2. Moderate (Medium)

3. Substantial (High)

1.3.5 Program Outcome Vs Courses Mapping Table[1]:

Program Outcome Courses	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
Sem-1								
MFN 101	Applied Human Physiology	2	2	1	1	2	2	2
MFN 102	Advanced Nutritional Biochemistry and Instrumentation-I	3	3	3	3	3	3	3
MFN 103	Advanced Nutrition Science	2	3	3	3	3	2	2
MFN 104	Advanced Food Chemistry	3	3	2	3	3	2	3
MFN 105	Research Methodology and Biostats	2	2	3	2	2	3	2
MFN 152	Advanced of Food Chemistry (Lab)	3	2	2	2	2	2	2
MFN 153	Advance Nutritional Biochemistry and Instrumentation -I(Lab)	3	3	2	2	3	3	2
Sem-2								
MFN 106	Food Microbiology and Food Safety	3	3	2	2	3	2	3
MFN107	Advance Nutritional Biochemistry and Instrumentation-II	3	3	3	3	3	3	3
MFN 108	Clinical Nutrition-I	3	3	3	3	3	3	3
MFN 109	Nutrition in Emergency and Disaster Management	2	3	3	3	3	3	2
MFN 110	Public Health and Nutrition	3	2	2	3	3	3	3
MFN 154	Advance Nutritional Biochemistry and Instrumentation-II (Lab)	3	2	3	3	2	3	3
MFN 155	Clinical Nutrition-I (Lab)							
MFN 156	Food Microbiology and Safety (Lab)							

[1] Cel value will contain the correlation value of respective course with PO.

Sem-3								
MFN 201C	Functional Food and Nutraceuticals	3	3	3	3	3	3	3
MFN 255	Internship	3	3	3	3	2	3	3
MFN 202C	Nutrition for Maternal and Child Health	3	3	3	3	3	3	3
MFN 203C	Clinical Nutrition -II	3	3	2	3	3	3	2
MFN 254C	Clinical Nutrition -II (LAB)	3	3	3	3	3	3	3
MFN 202P	Nutrition Epidemiology	3	3	2	3	3	3	3
MFN 203P	Program Planning in Public Health Nutrition	3	3	2	3	3	3	3
MFN 204P	Perspective of community nutrition and assessment	3	3	2	3	3	3	3
MFN 254P	Program Planning in Public Health Nutrition (Lab)	3	3	2	3	3	3	3
MFN 201F	Food Processing	3	3	2	3	3	3	3
MFN 202F	Food Quality Assurance	3	3	2	3	3	3	3
MFN 203F	Food Product Development and Sensory Evaluation	3	3	2	3	3	3	3
MFN 254F	Food Processing (Lab)	3	3	2	3	3	3	3

Sem-4								
MFN 204	Dissertation	3	3	3	3	3	3	3

1. Slight (Low)
2. Moderate (Medium)
3. Substantial (High)

Program Structure Template
School of Allied Health Sciences
M.Sc. (Food and Nutrition)
Batch: 2020-22
TERM: I

S. No.	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[2]: 1. CC 2. AECC 3. SEC 4. DSE
			L	T	P			
THEORY SUBJECTS								
1	MFN 101	Applied Human Physiology	3	1	-	4	Core	CC, AECC
2	MFN 102	Advanced Nutritional Biochemistry and Instrumentation-I	3	1	-	4	Core	CC, AECC, SEC
3	MFN 103	Advanced Nutrition Science	3	1	-	4	Core	CC, AECC
4	MFN 104	Advanced Food Chemistry	3	1	-	4	Core	CC, AECC, SEC
5	MFN 105	Research Methodology and Biostats	3	1	-	4	Core	CC, AECC
6		Value added course (VAD)						
Practical/Viva-Voce/Jury								
1.	MFN 152	Advanced Food Chemistry (Lab)	-	-	4	2	Core	CC, AECC, SEC
2.	MFN 153	Advance Nutritional Biochemistry and Instrumentation -I(Lab)	-	-	2	1	Core	CC, AECC, SEC
TOTAL CREDITS						**23**		

[2] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

Program Structure Template
School of Allied Health Sciences
M.Sc. (Food and Nutrition)
Batch: 2020-22
TERM: II

S. No.	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[3]: 1. CC 2. AECC 3. SEC 4. DSE
			L	T	P			
THEORY SUBJECTS								
1	MFN 106	Food Microbiology and safety	3	1	-	4	Core	CC, AECC, SEC
2	MFN 107	Advance Nutritional Biochemistry and Instrumentation-II	2	1	-	3	Core	CC, AECC, SEC
3	MFN 108	Clinical Nutrition-I	3	1	-	4	Core	CC, AECC, SEC
4	MFN 109	Nutrition in Emergency and Disaster Management	3	1	-	4	Core	CC, AECC
5	MFN 110	Public Health and Nutrition	3	1	-	4	Core	CC, AECC
		Open Elective (OPE)	2	-	-	2	Elective	
Practical/Viva-Voce/Jury								
1	MFN 154	Advance Nutritional Biochemistry and Instrumentation-II (Lab)	-	-	4	2	Core	CC, AECC, SEC
2	MFN 155	Clinical Nutrition-I (Lab)	-	-	2	1	Core	CC, AECC, SEC

[3] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

3		Minor project				1	Core	
3	MFN 156	Food Microbiology and Safety (Lab)	-	-	2	1	Core	CC, AECC, SEC
	Total Credits					26		

Program Structure Template
School of Allied Health Sciences
M.Sc. (Food and Nutrition)
Specialization Clinical Nutrition
Batch: 2020-22
TERM: III

S. No.	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[4]: 1. CC 2. AECC 3. SEC 4. DSE
			L	T	P			
THEORY SUBJECTS								
1	MFN 201	Functional Food and Nutraceuticals	3	1	-	4	Core	CC, AECC
3	MFN 202C	Nutrition for Maternal and Child Health	3	1	-	4	Core	CC, AECC
4	MFN 203C	Clinical Nutrition -II	3	1	-	4	Core	CC, AECC
5	MFN 204 C	Sports and Fitness Nutrition	3	1		4	Core	CC, AECC
		Value added course (VAD)						
5	MFN 254C	Clinical Nutrition-II (Lab)	-	-	2	1	Core	CC, AECC
6	MFN 255	Internship	-	-	12	6	Core	CC, AECC

[4] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

TOTAL CREDITS	23		

Program Structure Template
School of Allied Health Sciences
M.Sc. (Food and Nutrition)
Specialization Public Health Nutrition
Batch: 2020-22
TERM: III

S. No.	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[5]: 5. CC 6. AECC 7. SEC 8. DSE
			L	T	P			
THEORY SUBJECTS								
1	MFN 201	Functional Food and Nutraceuticals	3	1	-	4	Core	CC, AECC
2	MFN 202P	Nutrition Epidemiology	3	1		3	**Elective**	AECC
3	MFN 203P	Program Planning in Public Health Nutrition	3	1	-	4	**Elective**	CC, AECC
4	MFN 204P	Perspective of community nutrition and assessment	3	1	-	4	**Elective**	CC,AECC
		Value added course (VAD)						

[5] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

5	MFN 254P	Program Planning in Public Health Nutrition (LAB)	-	-	2	1	**Elective**	CC,AECC
6	MFN 255	Internship	-	-	12	6	Core	CC,AECC
TOTAL CREDITS						23		

Program Structure Template
School of Allied Health Sciences
M.Sc. (Food and Nutrition)
Specialization Food Science and Nutrition
Batch: 2020-22
TERM: III

S. No.	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[6]: 9. CC 10. AECC 11. SEC 12. DSE
			L	T	P			
THEORY SUBJECTS								
1	MFN 201	Functional Food and Nutraceuticals	3	1	-	4	Core	CC,AECC
2	MFN 202F	Food Preservation and Processing	2	1		3	**Elective**	
3	MFN 203F	Food Quality Assurance	3	1	-	4	**Elective**	CC,AECC
4	MFN 204F	Food Product Development and Sensory Evaluation	3	1	-	4	**Elective**	CC,AECC
		Value added course (VAD)						

[6] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

5	MFN 254F	Food Processing (Lab)	-	-	2	1	**Elective**	CC,AECC
6	MFN 255	Internship	-	-	12	6	Core	SEC
TOTAL CREDITS						22		

Program Structure Template
School of Allied Health Sciences
M.Sc. (Food and Nutrition)
Batch: 2020-22
TERM: IV

S. No.	Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite	Type of Course[7]: 1. CC 2. AECC 3. SEC 4. DSE
			L	T	P			
THEORY SUBJECTS								
1	MFN 204	Dissertation	-	-	40	20	Core	CC,AECC,SEC
		Open Elective (OPE)	2	-	-	2		

[7] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

Course Templates

Theory Subjects

School: SAHS		**Batch :** 2020-22	
Program: MFN		**Current Academic Year: 2020-21**	
Branch:		**Semester:** 1st Semester	
1	Course Code	MFN-101	
2	Course Title	Applied Human Physiology	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	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: Understand the current state of knowledge about the functional organization of the human body. CO2: Describe insight of normal functioning of all the organ systems of the body and their interactions. CO3: State the pathophysiology of commonly occurring diseases. CO4: Identify physiology with various disorders and their pathogenesis. CO5: To understand the defence mechanism of human body	
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

	B	Structure and functions of kidney Urine formation Organic constituents of urine Inorganic constituents of urine	CO1
	C	Physiology of different diseases related to digestive and excretory system	CO1
	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
	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
	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
	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
	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
	C	Physiology of different diseases related to Endocrine system				CO4
	Unit 5	**Excretory Physiology and Exercise Physiology**				
	A	Acid Base balance Pathophysiology of Renal Stones, Urinary Tract Infection, Glomerulonephritis Water and electrolyte balance				CO5
	B	Concept of Fitness, Adaptations to exercise Energy Metabolism in Sports				CO5
						CO5
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		30%	20%	50%		
	Text book/s*	Text book of physiology- A.K. Jain Essentials of medical physiology- K.Sembulingam				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO	3	2	1	1	2	2	1
CO	3	2	1	2	2	2	1
CO	3	2	1	1	2	2	1
CO	3	3	1	1	1	1	2

CO	3	2	1	1	2	1	1

Theory Subjects

School: SAHS		**Batch :** 2020-22	
Program: MFN		**Current Academic Year: 2020-2021**	
Branch:		**Semester:** 1st Semester	
1	Course Code	MFN102	
2	Course Title	Advanced Nutritional Biochemistry and Instrumentation-I	
3	Credits	5	
4	Contact Hours (L-T-P)	3-1-1	
	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 understand the usage of glasswares and Laboratory equipments. CO2: To understand the methods of preparation of various solutions and their significance. CO3: To discuss the importance of Acid, base, indicators and importance of in nutrition CO4: To understand mechanism of carbohydrate utilization in body. CO5: To develop understanding of lipid chemistry	
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	Introduction of glasswares and Laboratory equipments	CO1
	A	**Introduction of Glasswares**: Pipettes, Burettes, Beakers, Petri dishes, depression plates. Flasks - different types; Volumetric, round bottomed, Erlemeyer conical etc. Bottles – Reagent bottles – graduated	CO1

		and common, Wash bottles – different type Specimen bottles etc. Measuring cylinders, different sizes Porcelain dish. Tubes – Test tubes, centrifuge tubes, test tube draining rack.	
	B	Racks – Bottle, Test tube, Pipette Dessicator, Stop watch, scissors Dispensers – reagent and sample. Tripod stand, Wire gauze, Bunsen burner. Care and cleaning of glass ware, different cleaning solutions of glassware, Detergents and Chromic acid	CO1
	C	**Introduction of Laboratory Equipments:** Water bath: Use, care and maintenance. Oven & Incubators : Use, care and maintenance. Water Distillation plant and water deionizers. Use, care and maintenance. Refrigerators, cold box, deep freezers – Use, care and maintenance. Laboratory balances : Manual balances: Single pan, double pan balance, Direct read out electrical balances. Use care and maintenance. Guideline to be followed and precautions to be taken while weighing. Weighing different types of chemicals, liquids. Hygroscopic compounds etc. Colorimeter: Principle, Parts Diagram. Use, care and maintenance. pH meter: Principle, parts, Types of electrodes, salt bridge solution. Use, care and maintenance of pH meter and electrodes Guidelines to be followed and precautions to be taken while using pH meter	CO1
	Unit 2	**Safety measurement and Preparation of solutions**	CO2
	A	**Safety of measurements in Laboratory, Sampling technique and its preservation** **(**includes different types of samples such as urine, blood, tool, tissue etc and various techniques to preserve the samples)	CO2
	B	**Preparation of Solutions:** Molecular weight, equivalent weight of elements and compounds, normality, molarity. Preparation of molar solutions (mole/litre solution) eg: 1 M NaCl, 1 M NaOH, 0.1 M HCl. Preparation of normal solutions. eg., 1N Na2 CO3 , 0.1N Oxalic acid. Percent solutions. Preparation of different solutions – v/v w/v (solids, liquids and acids). Conversion of a percent solution into a molar solution.	CO2
	C	**Diluting solutions**: eg. Preparation of 0.1 N NaCl from 1 N NaCl etc. Preparing working standard from stock standard, Body fluid dilutions, Reagent dilution techniques,	CO2

		calculating the dilution of a solution, body fluid reagent etc.. Saturated and supersaturated solutions. Standard solutions. Technique for preparation of standard solutions eg: Glucose, urea, etc. Significance of volumetric flask in preparing standard solutions.	
	Unit 3	**Acid, base, indicators and importance of nutrition**	CO3
	A	**Acid, Base and Indicators:** Acids and Bases, buffer, pH value of a solution, suitable pH indicators used in different titrations, universal indicators, Maintenance of acid base balance	CO3
	B	**Nutrition**: Introduction, Importance of nutrition Calorific values, Basal metabolic rate, Special dynamic action of food Physical activities - Energy expenditure for various activities. Calculation of energy requirement of a person, Balanced diet, Recommended dietary allowances,	CO3
	C	Role of carbohydrates in diet: Digestible carbohydrates and dietary fibers, Role of lipids in diet, Role of proteins in diet: Quality of proteins - Biological value, net protein utilization, Nutritional aspects of proteins-essential and non essential amino acids. Nitrogen balance, Nutritional disorders	CO3
	Unit 4	**Carbohydrate Chemistry**	CO4
	A	Definition, general classification of Carbohydrates with examples, Glycosidic bond, Structures, composition and sources of Monosaccharides, Disaccharides, Oligosaccharides and Polysaccharides. Glycosaminoglycans (mucopolysaccharides).	CO4
	B	Properties and functions of Monosaccharides, Disaccharides, Oligosaccharides and Polysaccharides. Glycosaminoglycans (mucopolysaccharides).	CO4
	Unit 5	**Lipid Chemistry**	CO5
	A	Definition, general classification of lipids with examples, Definition, classification, properties and functions of Fatty acids.	CO5
	B	Triacylglycerol, Phospholipids, Cholesterol, Essential fatty acids and their importance , Lipoproteins: Definition, classification, properties, Sources and function.	CO5

	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		30%	20%	50%		
	Text book/s*	• 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
CO	3	2	1	1	2	2	1
CO	3	2	1	2	2	2	1
CO	3	2	1	1	2	2	1
CO	3	3	1	1	1	1	2
CO	3	2	1	1	2	1	1

Theory Subjects

School: SAHS		**Batch :** 2020-22	
Program: MFN		**Current Academic Year: 2020-2021**	
Branch:		**Semester:** 1st Semester	
1	Course Code	MFN 103	
2	Course Title	Advanced Nutrition Science	
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 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 explain various nutritional components of the food and their interaction in human health. CO2: To explain the human nutrition principles and guidelines CO3: To analyze the requirements of the nutritional components for different age, sex and physiological groups. CO4: To apply the gained knowledge in practical conditions	
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
	Unit 5	**Vitamin and Minerals**				
	A	History, structure, sources, absorption, transport, utilization, storage, excretion, functions, bioavailability, requirements and RDA, deficiency, toxicity, assessment of status and alteration in requirements in various clinical and metabolic disorders. **Macro minerals:** Calcium, Phosphorus, Magnesium, Sodium, Potassium.				CO3,CO4
	B	**Micro minerals:** Iron, Copper, Iodine, Fluoride, Zinc etc				CO3, CO4
	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
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		30%	20%	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 – Latest Publication.				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO	3	2	1	1	2	2	1
CO	3	2	1	2	2	2	1
CO	3	2	1	1	2	2	1
CO	3	3	1	1	1	1	2
CO	3	2	1	1	2	1	1

Theory Subjects

School: SAHS		**Batch:** 2020-22	
Program: MFN		**Current Academic Year: 2020-2021**	
Branch:		**Semester:** 1st Semester	
1	Course Code	MFN104	
2	Course Title	Advanced Food Chemistry	
3	Credits	5	
4	Contact Hours (L-T-P)	3-1-2	
	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: Understand the chemistry of various food components of food. CO2: To analyse the properties and reactions of various food components CO3: Understand basic concepts of new food product development. CO4: Enable to learn about the food additives and its application in food industry. CO 5:	
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 units which 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, flavours, minerals and other micro components, additives and contaminants. In addition, the course also covers aspects of novel product development and value addition of foods.	
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
	B	Sensory evaluation of foods, packaging, labelling				CO3
	C	marketing of new food products.				CO3
	Unit 5	**Food Ingredients and additives**				
	A	Food additives- definitions, classification and functions, Preservatives, antioxidants, colours and flavours (synthetic and natural),				CO4
	B	emulsifiers, hydrocolloids, sweeteners, acidulants, buffering salts, anticaking agents, etc. - chemistry, food uses and functions in formulations				CO4
	C	Indirect food additives; toxicological evaluation of food additives.				CO4
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		30%	20%	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
CO	3	2	1	1	2	2	1
CO	3	2	1	2	2	2	1
CO	3	2	1	1	2	2	1
CO	3	3	1	1	1	1	2
CO	3	2	1	1	2	1	1

Theory Subjects

School: SAHS		**Batch:** 2020-22	
Program: MFN		**Current Academic Year: 2020-2021**	
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	
5	Course Objective	To provide students understandings about the basic concepts, approaches and methods in conducting research thereby enabling them to appreciate and critique the nuances of designing a research study as well the ethical dimensions of conducting researches.	
6	Course Outcomes	CO1: Demonstrate knowledge of the scientific method, purpose and approaches to research CO2: Compare and contrast quantitative and qualitative research CO3: Explain research design and the research cycle CO4: Prepare key elements of a research proposal CO5: Differentiate between the qualitative and quantitative methods of analysis of data	
7	Course Description	The course "Fundamentals of Food and Nutrition" aims at developing basic understanding about nutrition, its effect on human health and newer advances in food technology. This course encompasses physiological, biochemical and social aspects of food and discusses relationship between metabolites and human health. Moreover, the course is focused on the advances in the most emerging area of applied science of Nutraceuticals (where food is the medicine). The knowledge of nutrition under extreme climate conditions, space nutrition, and sports nutrition empowers students' knowledge and skills to utilize food as a powerful tool for physical, mental, and social wellbeing.	
8	**Outline syllabus**		CO Mapping
	Unit 1	**Purpose of research 5hrs**	

	A	• Definition, objectives and significance of research • Types of research	CO 1
	B	Scientific method: induction and deduction	CO1
	C	Research approaches: quantitative, qualitative and mixed Issues of relevance and cultural appropriateness	CO1
	Unit 2	**Principles of Research in quantitative and qualitative approaches 20hrs**	
	A	*Research design* Meaning and need of research design Components and types of research design Issues in design construction	CO2
	B	*Sampling, methods* Concept of sampling, key differences in the two approaches Sampling methods, sample size and sampling error Selecting participants and contexts to examine social phenomenon	CO2
	C	*Data collection and analyses* • Methods and measurement: Measurement in research, scales and errors in measurement, reliability and validity of measurement tools • Methods of data collection and types of data • Immersion, deep engagement, triangulation and reflexivity in qualitative data collection • Data management and quality control • Transcription in qualitative data analyses • Errors in inference – Bias and confounding, reliability and validity issues • Ensuring reliability and validity in qualitative research	CO2
	Unit 3	**The Research Cycle 10 hrs**	
	A	• Systematic literature review and referencing • Formulating a research problem – Developing research questions and objectives, exploring research context/phenomenon	CO3
	B	• Identifying variables, constructing hypotheses	CO3

		• Deciding research approach and design	
	C	• Selection of sample/participants, choice of methods and analysis. • Writing a research report-Styles and format.	CO3
	Unit 4	**Organisation and presentation of data 10hrs**	
	A	• Qualitative and quantitative data- Coding & data reduction strategies • Organisation of Data: Frequency distributions vs. thematic analysis • Percentage, percentile ranking and frequencies	CO4
	B	• Applications of descriptive statistics • Measures of Central tendency and Variability	CO4
	C	• Orientation to qualitative and quantitative research procedures • Measurement and computation- Scales of measurement, Reliability and validity	CO3
	Unit 5	**Probability and normal distribution 10hrs**	
	A	• Basic principles and applications of probability • Normal curve • Characteristics of distributions: Skewness, kurtosis • Testing hypotheses: Levels of significance and p values	CO5
	B	• Errors in hypothesis testing: Type I, Type • Sampling distribution • Standard scores, calculation and application	CO5
	C	• Concept of parametric and non-parametric tests, statistical tests and level of measurement • Parametric tests of difference: T test, ANOVA and post hoc analysis of significance • Chi-square test	CO5

		• Regression and its applications • Tests for ascertaining reliability of instruments				
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		30%	20%	50%		
	Text Book	• Aschengrau A, Seage III GR. (2014) *Essentials of Epidemiology in Public Health*. (Third Edition). Sudbury, MA: Jones & Bartlett • C.R Kothari: Research Methodology, methods and technique				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO	3	2	1	1	2	2	2
CO	3	2	1	2	3	2	3
CO	2	3	2	1	3	2	3
CO	3	3	1	1	1	1	3
CO	3	2	1	1	3	1	2

1-Slight (Low)
2-Moderate (Medium)
3-Substantial (High)

Changed

School: SAHS		**Batch: 2020-22**
Program: MFN		**Current Academic Year: 2020-2021**
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: 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	
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, Classification of scales, Single Item Vs. Multiple Item Scale, Comparative Vs. Non-Comparative scale, Measurement error	CO1
	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,	CO2,3,4
	Unit 4	**PREDICTIVE ANALYTICS 10 Hrs**	CO 2,3,4
	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	CO4,5
	B	Using SPSS for performing techniques covered in Unit 2	CO4,5
	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	ETE	
		25%	75%	
	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		
12	Readings for Unit 2:	•Basic Statistical Tools: available for download at http://www.fao.org/docrep/w7295e/w7295e08.htm#6 basic statistical tools. •Damodar Gujrati 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/		

Practical Subject

School: SAHS		**Batch: 2020-22**	
Program: MFN		**Year: 2021-2022**	
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 analyse food constituents. CO2: To understand proximate analysis of food sample CO3: To understand the evaluation of egg quality.	
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 behaviour corresponding 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

	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			
	C				
	Mode of examination				
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	

Pos COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO	3	3	1	2	3	3	2
CO	3	3	1	2	3	3	2
CO	3	3	1	2	3	3	2
CO	3	3	1	2	3	3	2
CO	3	3	1	2	3	3	2

Practical Subject

School: SAHS		**Batch: 2020-22**	
Program: MFN		**Year: 2020-2021**	
Branch:		**Semester: I**	
1	Course Code	MFN 153	
2	Course Title	Advanced Food Biochemistry Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course objective	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.	
6	Course outcome	CO1: To understand the usage of glasswares and Laboratory equipments. CO2: To understand the methods of preparation of various solutions and their significance. CO3: To discuss the importance of Acid, base, indicators and importance of in nutrition	
7	Course description	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.	
8	Outline syllabus		CO Mapping
	Unit 1	**1. Introduction to Laboratory apparatus**	
	A	Pipettes, Burettes, Beakers, Petri dishes, depression plates. Flasks - different types (Volumetric, round bottmed, Erlemeyer conical, etc.,) Funnels – different types (Conical, Buchner etc.) Bottles – Reagent bottles – graduated and common Wash bottles – different type Specimen bottles, etc. Measuring cylinders, Porcelain dish	CO1, CO2

		Tubes – Test tubes, centrifuge tubes, test tube draining rack, etc. Tripod stand, Wire gauze, Bunsen burner, sprit lamp, etc. Cuvettes, significance of cuvettes in colorimeter, cuvettes for visible and UV range, cuvette holders Racks – Bottle, Test tube, Pipette Dessicator, Stop watch, rimers, scissors Dispensers – reagent and sample	
	B	**Maintenance of lab glassware and apparatus:** Glass and plastic wares in Laboratory Use of glass: significance of boro-silicate glass ; care and cleaning of glassware, different cleaning solutions for glasswares Care and cleaning of plasticwares, different cleaning solutions Weighing of different types of chemicals, liquids, hygroscopic compounds, etc.	CO1, CO2
	Unit 2	**Safety measurements in Biochemistry lab**	
	A	Demo	CO1, CO2
	B	Practical	CO1, CO2
	C	Result Analysis	CO2
	Unit 3	Preparation of acid, bases and solutions of different concentration: percentage (W/V) and (V/V), Normal, Molar and Molal solutions.	
	A	Preparation of standard succinic acid solution	CO3
	B	Determination of the strength of NaOH solution	CO3

					CO3
	Unit 4	Determination of the strength of HCl solution			
	A	Demo			CO3
	B	Practical			CO3
	C	Result Analysis			CO3
	Unit 5	Determination of the strength of NH_4OH solution			
	A	Demo			CO4
	B	Practical			CO4
	C				CO4
	Mode of examination				
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	

Pos COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO	3	3	1	2	3	3	2
CO	3	3	1	2	3	3	2
CO	3	3	1	2	3	3	2

Theory Subjects

School: SAHS		**Batch :** 2020-22	
Program: MFN		**Current Academic Year: 2020-21**	
Branch:		**Semester: 2**st Semester	
1	Course Code	MFN 106	
2	Course Title	Food Microbiology and Food Safety	
3	Credits	5	
4	Contact Hours (L-T-P)	3-1-1	
	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 Understand the importance of micro-organisms in food spoilage and to learn advanced, techniques used in food preservation CO2 To Understand the importance of micro-organisms in food spoilage and to learn advanced, techniques used in food preservation CO3 Understand the nature of microorganisms involved in food spoilage, food infections and intoxications. CO4 Comprehend principles of various preservation and control techniques CO5 To understand microbial safety in various foods operations	
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
	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 intoxications	CO4
	B	Symptoms, mode of transmission and methods of prevention	CO4
	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
	Mode of examination	Theory	

	Weightage Distribution	CA	MTE	ETE	
		20%	30%	50%	

	Text Book	Frazier, W.C. & Westoff, D.C. (2013*). Food Microbiology. 5th Edition*. Tata McGraw- Hill Publishing Co. Ltd. Garbutt, J. (1997). *Essentials of Food Microbiology*. Arnold London. Jay, J.M., Loessner, D.A. & Martin, J. (2006). *Modern Food Microbiology. 7th Edition.* Springer Banwart, G.J. (2004). *Basic Food Microbiology*. *2nd Edition*. CBS Publishers and Distributors, India.

		Pelczar, M.J., Chan, E.C.S., Krieg, N. (1993). *Microbiology. 5th Edition*. 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
CO	2	1	1	2	2	2	2
CO	3	2	1	2	1	2	2
CO	2	2	2	1	3	2	2
CO	3	1	1	2	3	2	2
CO	3	2	2	3	3	2	2

Theory Subjects

School: SAHS		**Batch :** 2020-22	
Program: MFN		**Current Academic Year: 2020-2021**	
Branch:		**Semester: 2nd** Semester	
1	Course Code	MFN107	
2	Course Title	Advanced Nutritional Biochemistry and Instrumentation-II	
3	Credits	6	
4	Contact Hours (L-T-P)	3-1-4	
	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 understand the usage of glass wares and Laboratory equipments. CO2: To understand the methods of preparation of various solutions and their significance. CO3: To discuss the importance of Acid, base, indicators and importance of in nutrition CO4: To understand mechanism of carbohydrate utilization in body. CO5: To develop understanding of lipid chemistry	
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	**Amino-acid and Protein Chemistry**	
	A	Definition, Classification, Peptide bonds Peptides: Definition, Biologically important peptides.	CO1
	B	Definition, Classification, Functions of proteins, Primary,	CO1

		Secondary, tertiary and quartenary structure of proteins	
	C		
	Unit 2	**Enzymes and Clinical enzymology**	CO2
	A	Definition of Enzymes, Active site, Cofactor (Coenzyme, Activator), Proenzyme Classification with examples, Factors effecting enzyme activity, Enzyme inhibition significance	CO2
	B	Isoenzymes, Diagnostic enzymology (clinical significance of enzymes with respect to different organs such as liver heart etc	CO2
			CO2
	Unit 3	**Mineral Metabolism**:	CO3
	A	Classification of minerals, Sources, RDA, absorption, transport, excretion, biochemical, functions and disorder of Macroelements – Sodium, Potassium, Calcium and Phosphorus etc.	CO3
	B	Sources, RDA, absorption, transport, excretion, biochemical functions and disorder of Micro and Trace elements –Sulphur, Iron, Magnesium, Fluoride, Selenium, Zinc and Copper	CO3
	C		CO3
	Unit 4	**Vitamin**	CO4
	A	Fat soluble vitamins: Definition, types fat soluble vitamins, Individual vitamins: Sources. Fat soluble vitamins: Definition, types fat soluble vitamins, Individual vitamins: Sources	CO4
	B	Water soluble vitamins: Definition, classification, Individual vitamins Sources, Coenzyme forms, functions, RDA, digestion, absorption and transport, deficiency and toxicity	CO4
	Unit 5	**Cell biology and Molecular Biology**	CO5
	A	**Cell Biology**: Introduction, Cell structure, Cell membrane structure and function, various types of absorption. Intracellular organelles and their functions, briefly on cytoskeleton	CO5
	B	**Molecular Biology**: Nucleotide chemistry: Nucleic acid (DNA and RNA) chemistry: Genetic code, DNA replication, Transcription, Translation, Recombinant DNA technology.	CO5

	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		30%	20%	50%		
	Text book/s*	• 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
CO	3	2	1	1	2	2	1
CO	3	2	1	2	2	2	1
CO	3	2	1	1	2	2	1
CO	3	3	1	1	1	1	2
CO	3	2	1	1	2	1	1

Theory Subjects

School: SAHS		**Batch :** 2020-22	
Program: MFN		**Current Academic Year: 2020-2021**	
Branch:		**Semester: 2nd** Semester	
1	Course Code	MFN108	
2	Course Title	Clinical Nutrition-I	
3	Credits	6	
4	Contact Hours (L-T-P)	3-1-4	
	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: Understand the importance of nutritional assessment in the care of patients. CO2: Gain knowledge about causative factors and metabolic changes in various diseases/disorders and the associated principles of diet therapy. CO3: Learn the principles of dietary counselling. CO4: Comprehend the rationale of prevention of various diseases/disorders. CO5: Understand the concept of paediatric nutrition	
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	**Nutritional Assessment and Care of Patients**	

	A	Nutrition care process Nutritional screening and assessment of patients – out patient & hospitalized ○ Tools for screening ○ Nutritional interpretation of routine medical and laboratory data ○ Nutrition care plan and implementation ○ Monitoring and follow up ○ Ethical issues				CO1
	B	Dietary Counselling				CO1
	C	Nutrition Support: Enteral Nutrition				CO1
	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
	B	Hypertension, dyslipidemia, Congestive heart failure				CO3
	C	Chronic Obstructive Pulmonary Disease Systemic Lupus Erythematosis				CO3
	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
	B	Severe Acute Malnutrition				CO5
	C	Cystic fibrosis				CO5
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		30%	20%	50%		
	Text book/s*	• Text book of physiology- A.K. Jain • Essentials of medical physiology- K.Sembulingam				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO	3	2	1	1	2	2	1
CO	3	2	1	2	2	2	1
CO	3	2	1	1	2	2	1
CO	3	3	1	1	1	1	2
CO	3	2	1	1	2	1	1

Theory Subjects

School: SAHS		**Batch :** 2020-22	
Program: MFN		**Current Academic Year: 2020-21**	
Branch:		**Semester: 2**st Semester	
1	Course Code	MFN109	
2	Course Title	Nutrition in Emergency and Disaster	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	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 explain the nutritional management concepts during emergencies. CO2 To apply the knowledge of nutrition during emergency and disaster. CO3 To assess food needs for nutrition relief and rehabilitation during emergency CO4 To assess nutritional status for emergency preparedness and response programmes CO5 To improve understanding to promote coordinated and effective action during emergencies.	
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
	B	Role of immunization and sanitation.	CO3
	C	Effective health programme	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

	B	Nutrition Relief and Rehabilitation -Assessment of food needs in emergency situation. Food distribution strategy – identifying	CO4
	C	General feeding programme-Introduction, General principles, organizing general dry ration distribution, large scale cooked ration distribution Selective feeding Programme: supplementary feeding, Therapeutic feeding for children, treatment of severe wasting and famine	CO3
	Unit 5	**Emergency preparedness and response programme**	
	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: 20% / MTE: 30% / ETE: 50%	
	Textbooks	1. Goyet, Fish V, Seaman, J. and Geijaer (1978). The management of nutritional emergencies in large 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
CO	1	3	1	3	2	1	2
CO	1	2	1	2	1	1	2

CO	2	3	2	3	1	1	3
CO	1	3	1	2	2	1	3
CO	1	3	1	2	1	1	3

Theory Subjects

School: SAHS		**Batch : 2020-22**
Program: MFN		**Current Academic Year: 2021-2022**
Branch:		**Semester: 2nd**
1	Course Code	MFN 110
2	Course Title	Public Health and Nutrition
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	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: Understand the concept and current concerns of Public Health Nutrition. CO2: Comprehend the National Health Care Delivery System. CO3. Get exposed to population dynamics and economics of malnutrition and how it impacts national development CO4: Understand the causes and consequences of nutritional problems in the community. CO5: Be familiar with the concept of food and nutrition security.

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 programs 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
	Unit 5	**Food and Nutrition Security**	
	A	Concepts and definitions of food and nutrition security at national, regional, household and individual levels	CO5
	B	Impact of food production losses, distribution, access, availability, consumption on food and nutrition security- critical appraisal of the current scenario	CO5

	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Refrence 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
CO	1	3	1	3	2	1	2
CO	1	2	1	2	1	1	2
CO	2	3	2	3	1	1	3
CO	1	3	1	2	2	1	3
CO	1	3	1	2	1	1	3

Practical Subject

School: SAHS		**Batch: 2020-23**
Program: MFN		**Current Academic Year: 2020-21**
Branch:		**Semester:2 semester**
1	Course Code	MFN 154
2	Course Title	Advance Nutritional Biochemistry and Instrumentation-II
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course objective	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.
6	Course outcome	CO1: To understand the usage of glasswares and Laboratory equipments. CO2: To understand the methods of preparation of various solutions and their significance. CO3: To discuss the importance of Acid, base, indicators and importance of in nutrition
7	Course description	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.
8	Outline syllabus	CO Mapping

	Unit 1	Preparation of acid, bases and solutions of different concentration			**CO1**
	A	Briefing			
	B	Demonstration			
	C	Practical			
	Unit 2	Qualitative analysis of Monosaccharides, Disaccharides, Polysaccharides			**CO2**
	A	Briefing			
	B	Demonstration			
	C	Practical			
	Unit 3	Qualitative analysis of Proteins			**CO3**
	A	Briefing			
	B	Demonstration			
	C	Practical			
	Unit 4	Brief introduction of Spectropohometer, PCR			**CO3**
	A	Briefing			
	B	Demonstration			
	C	Practical			
	Unit 5	Brief introduction of Blotting technique and ELISA			CO3
	A	Briefing			
	B	Demonstration			
	C	Practical			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO	3	2	1	1	2	1	2
CO	3	2	2	2	1	1	2
CO	2	1	2	3	3	2	1

Practical Subject

School: SAHS		**Batch: 2020-22**
Program: MFN		**Current Academic Year: 2020-2021**
Branch:		**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: Understand the methods of assessment of patient needs CO2: Understand the methods of food preparation for diabetes CO3: Understand the methods of food preparation for different diseases CO4: Understand the methods of food preparation for different diseases CO5: Understand the methods of food preparation for different 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	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
	B	Type 2 diabetes			CO2
	C	Gestational Diabetes			CO2
	Unit 3	Planning and preparation of diets for following diseases			
	A	PCOD			CO3
	B	Peptic ulcer			CO3
	C	Hypertension and dyslipidaemia			CO3
	Unit 4	Planning and preparation of diets for following diseases			
	A	Congestive heart failure			CO4
	B	Ulcerative colitis			**CO4**
	C	Diverticular disease			CO4
	Unit 5	Planning and preparation of diets for following diseases			
	A	Cancer			CO5
	B	IEM			CO5
	C	SAM			CO5
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO	3	2	1	1	2	2	1
CO	3	2	1	2	2	2	1
CO	3	2	1	1	2	2	1
CO	3	3	1	1	1	1	2
CO	3	2	1	1	2	1	1

Practical Subject

School: SAHS		**Batch: 2020-22**
Program: MFN		**Current Academic Year: 2020-2021**
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: Understand the methods of assessment of patient needs CO2: Understand the methods of food preparation for diabetes CO3: Understand the methods of food preparation for different diseases CO4: Understand the methods of food preparation for different diseases CO5: Understand the methods of food preparation for different 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	**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
	B	Milk (Methylene Blue Reduction Test)			**CO4**
	C	Curd and probiotic count			CO4
	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	MTE	ETE	
		60%	0%	40%	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO	3	2	1	1	2	2	1
CO	3	2	1	2	2	2	1

CO	3	2	1	1	2	2	1
CO	3	3	1	1	1	1	2
CO	3	2	1	1	2	1	1

Theory Subject

School: SAHS		**Batch :** 2021-23
Program: MFN		**Current Academic Year: 2021-2022**
Branch:		**Semester: 3rd** Semester
1	Course Code	MFN 201
2	Course Title	**Functional 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: Understand the concept of functional food and nutraceuticals CO2: Gain knowledge about the role of functional food in different diseases CO3: Learn the importance and functional properties of functional food CO4: understand the role of Non- nutrient effect of specific nutrients CO5: Gain knowledge about Recent Advancements in Functional Foods	
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
	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
	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
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		30%	20%	50%		
	Text book/s*	Cho S. S. and Dreher, M.L. (2001): Handbook Dietary Fibre, Marcel Dekker Inc., New York. 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
CO	3	1	1	3	2	1	1
CO	3	2	2	3	2	1	2
CO	2	1	2	3	1	2	1
CO	3	1	1	3	2	2	1
CO	3	2	1	3	1	1	1

Theory Subject

School: SAHS		**Batch :** 2020-22
Program: MFN		**Current Academic Year: 2020-2021**
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: Understand basic concept and definitions of Child Health and Nutrition CO2: Gain Knowledge of Common child hood illness CO3: Knowledge of child hood care with special need CO4: Understand theories and nutritional requirement of Pregnancy CO5: Understand theories and nutritional requirement of Lactation	
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 Programmes	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 Children	CO3
	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	

	C	Nutrition in pregnancy - Stages of gestation, maternal physiological adjustments, weight gain during pregnancy and 20% nature of weight gain Maternal Mortality				CO3
	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
	Mode of Examination	Theory				
	Weightage distribution	CA	MTE	ETE		
		20%	30%	50%		

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO	2	1	2	2	2	2	2
CO	1	2	1	2	1	1	2
CO	2	1	2	1	1	1	1
CO	1	1	1	1	2	2	1
CO	1	2	1	1	1	2	1

Theory Subject

School: SAHS		**Batch :** 2020-22
Program: MFN		**Current Academic Year: 2020-2021**
Branch:		**Semester: 3rd** Semester
1	Course Code	MFN 203 C
2	Course Title	Clinical Nutrition-II
3	Credits	5
4	Contact Hours (L-T-P)	3-1-2
	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: Develop a detailed understanding of the etiology, physiological and metabolic anomalies of various acute and chronic disorders / diseases CO2: Demonstrate competency in nutrition assessment and diet history interview skills CO3: Develop understanding and expertise on the effect of various disorders on nutritional status, nutritional and dietary requirements CO4: Use critical thinking and clinical reasoning to develop nutritional care plan for prevention and treatment of various disorders / diseases CO5: Apply the nutrition care process to the medical nutritional therapy of nutritionally vulnerable individuals using best evidence.	
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
	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
	B	MNT and dietary counselling in Alzheimer's disease, Parkinson disease, Epilepsy				CO5
	C	MNT and dietary counselling in Epilepsy				CO5
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		30%	20%	50%		
	Text book/s*	• Text book of physiology- A.K. Jain • Essentials of medical physiology- K.Sembulingam				

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO	2	1	2	2	2	2	2
CO	1	2	1	2	1	1	2
CO	2	1	2	1	1	1	1
CO	1	1	1	1	2	2	1

CO	1	2	1	1	1	2	1

Theory Subject

School: SAHS		**Batch :** 2020-23	
Program: MFN		**Current Academic Year: 2020-2021**	
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. Understand concepts of fitness, its assessment and exercises for physical fitness training. 2. Function effectively as a sports dietitian, with knowledge and skills, to support recreational and competitive athletes 3. Exhibit knowledge of the metabolism and bioenergetics of exercise and continuum in various sports 4. Successfully plan, implement and monitor sport-specific diets for athletes through all age groups 5. Provide diet and nutritional care in terms of nutrition education, diet plans and counselling to special groups of athletes	
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 Sport sperson Recommendations of vitamin and minerals for sportsperson	CO4
	C	Athletes with eating disorders, athletes with diabetes and other medical conditions ,	CO4
	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
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		30%	20%	50%		
	Text book/s*	• Text book of Nutrition and Dietetics- Kumud Khanna • Text of Human Nutrition-Anjana Agarwal, Shobha Agarwal				

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO	3	2	1	1	2	1	1
CO	3	2	1	2	2	1	1
CO	2	1	2	1	1	1	2
CO	3	1	1	2	2	2	2
CO	3	2	1	1	1	2	1

Practical Subject

School: SAHS		**Batch: 2020-22**	
Program: MFN		**Current Academic Year: 2020-2021**	
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: Understand the methods of assessment of patient needs CO2: Understand the methods of food preparation for diabetes CO3: Understand the methods of food preparation for different diseases CO4: Understand the methods of food preparation for different diseases CO5: Understand the methods of food preparation for different 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
	B	Acute Renal Failure			**CO4**
	C	Chronic renal failure			CO4
	Unit 5	Planning and preparation of diets for following diseases			
	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	MTE	ETE	
		60%	0%	40%	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO	3	2	1	1	2	1	1
CO	3	2	1	2	2	1	1
CO	2	1	2	1	1	1	2
CO	3	1	1	2	2	2	2
CO	3	2	1	1	1	2	1

Theory Subject

School: SAHS		**Batch :** 2020-22
Program: MFN		**Current Academic Year: 2020-2021**
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. Explain 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. Demonstrate the knowledge of epidemiological approach to causation	
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	**Basic epidemiology concepts and methods**	
	A	Definition, scope and purpose of epidemiology • Basic measurements in epidemiology • Measurement of mortality, morbidity and disability – rates, ratios and proportions • Comparison of disease occurrence- absolute and relative comparisons • Epidemiologic study methods- observational and experimental studies	CO 1
	B	Observational epidemiology- descriptive and analytical studies – ecological, cross sectional, care-control and cohort • Experimental epidemiology- experimental and quasi experimental trials • Randomized control trials, Field trials and community trials	CO1
	C	Potential errors in epidemiologic studies o Measurement error and bias o Internal and external validity	CO1

	Unit 2	**Epidemiologic approaches to diet-disease relationships**	
	A	Measuring diet –disease associations- Type of measurement , time trends, correlation and regression, risk assessment • Design of nutritional epidemiological studies • Strengths and weaknesses of various designs in estimation of diet disease relationships, interpretation of epidemiologic research, multi variate relationship of diet and disease	CO2
	B	Genetics in nutritional epidemiology- genetic variation and epigenetics in nutritional epidemiology- Gene diet interactions.	CO2
	C	Ethical aspects of research in nutritional epidemiology	CO2
	Unit 3	**Measurements of exposure and outcomes in Nutritional epidemiology**	
	A	Nutritional exposures- Relevant direct and indirect measures of nutrition and health assessment	CO3
	B	• Critical review of diet assessment methods- assessment of food consumption at different levels, measurement errors, strengths and limitations, reproducibility and validity of methods measuring food consumption of individuals- 24 dietary recall, diet record and food frequency methods/Analysis of dietary patterns. Analysis and interpretation of dietary data.	CO3
	C	Biomarkers in nutritional epidemiology: Uses and limitations of biomarkers as measures of nutritional status and in dietary validation studies. • Physical activity assessment and interpretation: Strength and weaknesses of subjective and objective methods. • Ecological assessment of nutritional status, socio-economic, demographic, cultural and political factors.	CO3
	Unit 4	**Role of Epidemiological research in development of nutrition related policies and their evaluation**	

	A	• Generating evidence for policy making, strengthens implementation of nutrition and health interventions and programmes, evaluation of the effectiveness of such interventions. Examples of use of epidemiological research data for improvement of nutrition and health interventions or national programmes.	CO4
	B	• Examples of use of epidemiological research data for improvement of nutrition and health interventions or national programmes.	CO4
	Unit 5		
	A	• Design, steps in conducting the studies, data analysis and interpretation • Association and causation in epidemiology • Potential errors in epidemiologic studies o Measurement error and bias o Internal and external validity	CO5
	B	Association and causation in epidemiology and condensation polymers with examples - Thermoplastic and thermosetting polymers	CO5
	C	• Potential errors in epidemiologic studies o Measurement error and bias o Internal and external validity	CO5
	Mode of Examination	Theory	

	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text Book	• Agarwal, K.C.2001 Environmental Biology, Nidi Publ. Ltd. Bikaner. • Bharucha Erach, 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
CO	3	2	2	1	1	2	2
CO	3	2	1	2	1	2	2
CO	3	1	2	1	1	1	1
CO	2	1	1	1	2	2	1
CO	3	2	1	1	1	1	1

Theory Subject

School: SAHS		**Batch :** 2020-22
Program: MFN		**Current Academic Year: 2020-2021**
Branch:		**Semester:** 1st Semester
1	Course Code	MFN 204P
2	Course Title	Perspective of Community Nutrition and Assessment
3	Credits	
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 assess nutritional status of individual and population. CO2: To measure and analyze anthropometric parameters of subjects CO3: To Understand the meaning and importance of communication in nutrition. CO4: To study the purpose of communication and existing patterns of communication	
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	**Assessment of Nutritional status and anthropometry**	
	A	Nutritional assessment: definition, significance and scope in nutrition	CO1, CO2
	B	Anthropometric measurements: Measurement of anthropometric parameters, Height, weight, MUAC, head and Chest circumference,	CO1
	C	Calculation of Wt. for age, Ht. for age, Wt. for Ht., Calculation of BMI	CO2
	Unit 2	**Methods of Nutritional status assessment**	
	A	Definitions of dietary assessment methods, Interview techniques, record techniques, computerised assessment	CO1
	B	Requirement of Biochemical Assessment, Type of tests, Methods of analysis of various biochemical parameters	CO1, CO2
	C	Clinical assessment of nutritional status and its assessment and computation	CO2
	Unit 3	**Planning of Nutrition Education**	
	A	Factors affecting community health and nutrition: Major and Specific determinants Working in community: with individuals and group Planning nutrition education, Selection of target group. Messages in Nutrition education	CO1, CO2
	B	Role of nutrition educators: public health nutrition and Health promotion, Competencies and skills of nutrition education and nutrition education specialists.	CO1,CO2
	C	Health communication and Communication skills Strategies in Nutrition and Health Education	CO2

	Unit 4	**The Components and Processes of NHC**				
	A	Concept of Behavior Change Communication (BCC) from imparting information to focusing on changing practices.				CO3
	B	Components of BCC: Sender, Message, Channel, Receiver Various types of communication – interpersonal, mass media, visual, verbal/ non-verbal.				CO3
	C	Features of successful BCC • Market Research and Social Marketing				CO3
	Unit 5	**Programs and Experiences of NHC global and Indian perspective**				
	A	NHC in developed and developing nations: some examples Evolution of NHC in India: traditional folk media to modern methods of communication. Traditional folk media and its influence on NHC. Communication for urban and rural environment; for target specific audience				CO3,CO4
	B	Evolution of NHC/ IEC in Government nutrition health programs - shift in focus from knowledge gain to change in practices.				CO3, CO4
	C	Overview of NHC/IEC in government programs (Activities, strengths and limitations) Strengths and limitations of NHC imparted in NGO programs				CO3, CO4
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		30%	20%	50%		
	Text book/s*	1. Field guide to designing communication strategy, WHO publication-2007. 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 programs. 3. Michael Favin and Marcia Griffiths 1999, Nutrition tool kit-09-Communication for Behaviour change in Nutrition projects. Human Development Network-The World Bank-1999 4. Harvard Institute of International Development (1981) Nutrition Education in Developing Countries, New York: Oelgesch lager Gunn and Hain Publishers Inc. 5. Hubley J (1993) Communicating Health. London: Teaching Aids at Low Cost, London, UK.				

		6. Academy for Educational Development (1988). Communication for Child Survival, AED, USA. 7. Facts for Life (1990). A Communication Challenge. UNICEF / WHO / UNESCO / UNFPA, UK.	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO	3	2	2	1	1	2	2
CO	3	2	1	2	1	2	2
CO	3	1	2	1	1	1	1
CO	2	1	1	1	2	2	1
CO	3	2	1	1	1	1	1

Theory Subject

School: SAHS		**Batch:** 2020-22
Program: MFN		**Current Academic Year: 2020-2021**
Branch:		**Semester: 3rd** Semester
1	Course Code	MFN 204P
2	Course Title	Program Planning in Public Health Nutrition
3	Credits	
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 assess nutritional status of individual and population. CO2: To measure and analyze anthropometric parameters of subjects CO3: To Understand the meaning and importance of communication in nutrition. CO4: To study the purpose of communication and existing patterns of communication	
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	**Assessment of Nutritional status and anthropometry**	
	A	Nutritional assessment: definition, significance and scope in nutrition	CO1, CO2
	B	Anthropometric measurements: Measurement of anthropometric parameters, Height, weight, MUAC, head and Chest circumference,	CO1
	C	Calculation of Wt. for age, Ht. for age, Wt. for Ht., Calculation of BMI	CO2
	Unit 2	**Methods of Nutritional status assessment**	
	A	Definitions of dietary assessment methods, Interview techniques, record techniques, computerised assessment	CO1
	B	Requirement of Biochemical Assessment, Type of tests, Methods of analysis of various biochemical parameters	CO1, CO2
	C	Clinical assessment of nutritional status and its assessment and computation	CO2
	Unit 3	**Planning of Nutrition Education**	
	A	Factors affecting community health and nutrition: Major and Specific determinants Working in community: with individuals and group Planning nutrition education, Selection of target group. Messages in Nutrition education	CO1, CO2
	B	Role of nutrition educators: public health nutrition and Health promotion, Competencies and skills of nutrition education and nutrition education specialists.	CO1,CO2
	C	Health communication and Communication skills Strategies in Nutrition and Health Education	CO2

	Unit 4	**The Components and Processes of NHC**				
	A	Concept of Behaviour Change Communication (BCC) from imparting information to focusing on changing practices.				CO3
	B	Components of BCC: Sender, Message, Channel, Receiver Various types of communication – interpersonal, mass media, visual, verbal/ non-verbal.				CO3
	C	Features of successful BCC • Market Research and Social Marketing				CO3
	Unit 5	**Programs and Experiences of NHC global and Indian perspective**				
	A	NHC in developed and developing nations: some examples Evolution of NHC in India: traditional folk media to modern methods of communication. Traditional folk media and its influence on NHC. Communication for urban and rural environment; for target specific audience				CO3, CO4
	B	Evolution of NHC/ IEC in Government nutrition health programs - shift in focus from knowledge gain to change in practices.				CO3, CO4
	C	Overview of NHC/IEC in government programs (Activities, strengths and limitations) Strengths and limitations of NHC imparted in NGO programs				CO3, CO4
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		30%	20%	50%		
	Text book/s*	1. Field guide to designing communication strategy, WHO publication-2007. 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 programs. 3. Michael Favin and Marcia Griffiths 1999, Nutrition tool kit-09-Communication for Behaviour change in Nutrition projects. Human Development Network-The World Bank-1999 4. Harvard Institute of International Development (1981) Nutrition Education in Developing Countries, New York: Oelgesch lager Gunn and Hain Publishers Inc. 5. Hubley J (1993) Communicating Health. London: Teaching Aids at Low Cost, London, UK.				

		6. Academy for Educational Development (1988). Communication for Child Survival, AED, USA. 7. Facts for Life (1990). A Communication Challenge. UNICEF / WHO / UNESCO / UNFPA, UK.	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO	3	2	2	1	1	2	2
CO	3	2	1	2	1	2	2
CO	3	1	2	1	1	1	1
CO	2	1	1	1	2	2	1
CO	3	2	1	1	1	1	1

Theory Subject

School: SAHS		**Batch :** 2020-22
Program: MFN		**Current Academic Year: 2020-2021**
Branch:		**Semester: 3rd** Semester
1	Course Code	MFN 202F
2	Course Title	Food Preservation and Processing

3	Credits		
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	CO1Define use of various processing operation for preserving different kind of foods and food products CO2 To interpret the mechanism behind different food preservation techniques CO3 To assess need of novel preservation techniques in view of retention of bioactive compound in food	
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
	Unit 3	Processing of Cereal, Pulses and Oil seeds	
	A	Rice and wheat milling	CO1, CO2
	B	parboiling; processing of pulses	CO1, CO2
	C	Oilseeds processing Refining	CO2
	Unit 4	Processing of Animal origin Foods	
	A	Milk and Milk Products, Processing of fluid milk; manufacturing of various milk products-cheese, ice-cream, concentrated milk, milk powder	CO3

	B	Meat, Poultry and Egg, Slaughtering of animals and birds, Meat Products sausages, meat nuggets, meat patties;				CO3
	C	processing of egg-freezing, drying and pickling.				CO3
	Unit 5	processing of egg-freezing, dryingand pickling.				
	A	Basic concept of processing of Chutneys, Sauces and				CO3
	B	Pickles, jam, jelly and marmalade				CO3
	C	importance of pectin, Fruits beverages, squash, nectar, cordial.				CO3
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		30%	20%	50%		
	Text book/s*	• ShakuntalaManay, N., ShadakCheraswamy, M., Food Facts and Principles, Wiley EasternLtd., 1987. • 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
CO	3	2	1	1	2	2	1
CO	3	2	1	2	2	2	1
CO	3	2	1	1	2	2	1
CO	3	3	1	1	1	1	2
CO	3	2	1	1	2	1	1

Theory Subjects

School: SAHS		**Batch :** 2020-23
Program: MFN		**Current Academic Year: 2020-2021**
Branch:		**Semester: 3rd** Semester
1	Course Code	MFN 203F
2	Course Title	Food Quality Assurance

3	Credits		
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 analyze different quality parameters CO2 to apply different test methods for quality control. CO3 To able apply the knowledge of quality control tests CO4 To apply various food standards in food processing industry.	
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 program,	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
	B	Total Quality Management; GMP/GHP; GLP, GAP; Sanitary and hygienic practices; HACCP;	CO1, CO2
	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
	Unit 5	**Food Safety**				
	A	Food Safety – meaning of food safety. Importance of food quality and safety for developing countries.				CO3
	B	Food hazards – Physical, Chemical, Biological hazards associated with foods – types. Effect of processing and storage on microbial safety				CO3
	C	Types of food toxicants – Endogenous, natural, synthetic toxicants.				CO3
	Mode of examination	Theory				
	Weightage Distribution	**CA**	**MTE**	**ETE**		
		30%	20%	50%		
	Text book/s*	• A first course in food analysis – A. Y. Sathe, New Age Publications, 1999. • 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
CO	3	2	1	1	2	2	1
CO	3	2	1	2	2	2	1
CO	3	2	1	1	2	2	1
CO	3	3	1	1	1	1	2
CO	3	2	1	1	2	1	1

Theory Subjects

School: SAHS		**Batch :** 2020-23
Program: MFN		**Current Academic Year: 2020-2021**
Branch:		**Semester: 3rd** Semester
1	Course Code	MFN 204 F
2	Course Title	Food Product Development and Sensory Evaluation
3	Credits	
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 explain 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 explain the role of consumers, advertisement and marketing in food product development CO4 To Use various sensory evaluation techniques for determining quality changes of food samples as effect of storage or treatment. CO5 Describe the result of using different kind of sensory panels for evaluation	
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 couse 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
	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 Various quality control techniques (viz. total quality assurance, SQC, GMP, HACCP & ISO – 9000 series)	CO3
	B	Applicable to product development and regulatory frame work for new produce.	CO3

	C	Product launching Advertisement and marketing IPR and patents	CO3
	Unit 4	Sensory Evaluation	
	A	Selection of sensory panelists; Factors influencing sensory measurements	CO4,CO5
	B	Sensory quality parameters-Size and shape, texture, aroma, taste, color and gloss	CO4,CO5
	C	General analysis conditions for sensory evaluation Requirements of sensory laboratory	CO4,CO5
	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
	B	Hedonic rating test, composite scoring test, sensitivity threshold test, dilution test, descriptive flavor profile test	CO4,CO5
	C	Statistical analysis of sensorydata	CO4,CO5
	Mode of examination		
	Weightage Distribution		
	Text book/s*	• Arlington. Food Product Development • Desrosier NW and Desrosier JN. Economics of New Product Development • 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
CO	3	2	1	1	2	2	1
CO	3	2	1	2	2	2	1
CO	3	2	1	1	2	2	1
CO	3	3	1	1	1	1	2
CO	3	2	1	1	2	1	1

Practical Subject

1	Course Code	BND 151
2	Course Title	Food Processing and Preservation
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	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	CO-1To understand the concept of measurement of water activity in various food samples CO-2 Understand procedure of jam preparation CO-3 Understand procedure concentrated milk product CO4 Understand procedure pickling of vegetables CO5 Understand procedure Preparation of bread/ buns/ cakes/pizza			
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	Measurement of water activity in various food samples			
	A	Briefing			CO1
	B	Demo			CO1
	C	Practical			CO1
	Unit 2	Preparation of Jam/ jellies/marmalade			
	A	Briefing			CO2
	B	Demo			CO2
	C	Practical			CO2
	Unit 3	Preparation of concentrated milk product			
	A	Briefing			CO3
	B	Demo			CO3
	C	Practical			CO3
	Unit 4	Pickling of vegetables			
	A	Briefing			CO4
	B	Demo			**CO4**
	C	Practical			CO4
	Unit 5	Preparation of bread/ buns/ cakes/pizza			
	A	Briefing			CO5
	B	Demo			CO5
	C	Practical			CO5
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	