TILAK MAHARASHTRA VIDYAPEETH

(Declared as deemed to be University)

Reaccredited by NAAC with B++ Grade

M.Sc. Nutrition and Food Science

(The Late *Vaidya P.G. Nanal*,
Department of *Ayurveda* and *Yoga)*

Syllabus

As per NEP 2020

Tilak Maharashtra Vidyapeeth, Pune- 411037

The Late Vd. P.G. Nanal Department of Ayurveda & Yoga

Syllabus for M.Sc. (Nutrition and Food Science)

Programme Degree		M.Sc.
Specialization		Nutrition and Food Science
Preamble		Nutrition and dietetics are the subjects which involve food science, medical nutrition therapy, human physiology as well as psychology. But in India, nutrition science combined with traditional Indian food science has exhibited superior results in the therapeutic scenarios. Hence this unique programme of M.Sc. Nutrition and Food Science is designed by considering the modern dietetics principles amalgamated with traditional Indian food science to provide the above significant knowledge by practical oriented and research based approach. This programme not only considers the therapeutic application of the courses offered but also the mental dispositions of the patient and spiritual outlook; that's what makes this programme unique globally. At the end of this programme, the students obtain skill sets to work as nutrition care professionals in hospitals, research institutes, food industries, community service, academics and can have their own consultancy.
Programme Specific Outcomes (POs)		After successful accomplishment of this programme, learner will be able to;
	1.	Apply the knowledge of clinical nutrition amalgamated with traditional Indian food science in the medical nutrition management.
	2.	Develop capacities to be genuine health care professionals for services in various fields of clinical nutrition, medical nutrition management and related areas such as academics, research fields, food industry, community nutrition departments, training and own consultancy.
	3.	Develop abilities including analysis, critical reasoning, counselling skill sets and other soft skills such as public speaking, presentation techniques etc in related areas effectively and efficiently.
	4.	Have a necessary capabilities and abilities to pursue higher education and research in the above mentioned area of specialization.

	5.	Efficiently and responsibly carry out their role as health care professional in the betterment of community and nation.
Eligibility Criteria for the Programme	Any student with graduation from nutrition and dietetics, pure science, life science, bio chemistry, physiology, pharmacy, microbiology etc with minimum second class is eligible. Also medical practitioners (MBBS, BAMS, BHMS) are eligible for the programme.	
Intake	25	
RM: Research Methodology, OJT: On-Job Training, RP: Research Project		

M.Sc. Nutrition and Food Science

Structure of the Course

Semester I

Course Code	Course Name	Credits	Theory/ Practical
Major Core			
MSC24N-111TH	Basic Principles of Traditional Indian Diet part I	4	Theory
MSC24N-112TH	Basic Principles of Nutrition Science	4	Theory
MSC24N-113TH	Basics of Anatomy & Physiology	4	Theory
MSC24N-114TH	Nutritional Biochemistry	2	Theory
Research Methodology			
MSC24N-115TH	Research Methodology	4	Theory
Major Elective			
MSC24N-116TH	Nutrition and Immunity	4	Theory
MSC24N-117TH	Diet in Metabolic Disorders	4	Theory
Total		**22**	
END OF SEMESTER I			

M.Sc. Nutrition and Food Science

Structure of the Course

Semester II

Course Code	Course Name	Credits	Theory/ Practical
Major Core			
MSC24N-211TH	Basic Principles of Traditional Indian Diet part II	4	Theory
MSC24N-212TH	Medical Nutrition Therapy (MNT)- Part I	4	Theory
MSC24N- 213P	MNT –I (Traditional and Modern approaches of therapeutic cooking)	2	Practical
MSC24N-214TH	Basic Diet from *Kshemakutuhal*	4	Theory
Internship/ On Job Training			
MSC24N- 215P	OJT (On Job Training- 1 month's internship)	4	Practical
Major Elective			
MSC24N-216TH	Nutrition for Maternal , Child & Geriatric Health	4	Theory
MSC24N-217TH	Yogic Diet	4	Theory
Total		**22**	
END OF SEMESESTER II			
Exit with Post Graduate Diploma in Nutrition and Food Science (Recommended internship of 4 Credits in Multispecialty Hospital)			
Cumulative credits for PG Diploma (after 3 Years) Degree = 44 CR			

Major	28
Elective	08

OJT	04
Research Methodology	04
Total	**44**

M.Sc. Nutrition and Food Science

Structure of the Course

Semester III

Course Code	Course Name	Credits	Theory/ Practical
Major Core			
MSC24N-311TH	Ayurvedic Nutrition Therapy	4	Theory
MSC24N- 312P	MNT-II	2	Practical
MSC24N-313TH	Medical Nutrition Therapy (MNT) Part- II	4	Theory
MSC24N-314TH	Basic Diet from *Bhojankutuhal*	4	Theory
Research Project			
MSC24N- 315P	Minor Research Project	4	Practical
Major Elective			
MSC24N-316TH	Critical Care Nutrition	4	Theory
MSC24N-317TH	Hospital Catering Management & Diet Counselling	4	Theory
Total		**22**	
END OF SEMESESTER III			

M.Sc. Nutrition and Food Science

Structure of the Course

Semester IV

Course Code	Course Name	Credits	Theory/ Practical
Major Core			
MSC24N- 411TH	Community Nutrition	4	Theory
MSC24N- 412TH	Ayurvedic Diet Planning	4	Theory
MSC24N- 413TH	Sports and Fitness Nutrition	4	Theory
Research Project			
MSC24N- 415P	Dissertation	6	Practical
Major Elective			
MSC24N- 416TH	Functional Foods and Nutraceuticals	4	Theory
MSC24N- 417TH	Microbiome and Nutrition	4	Theory
Total		**22**	
END OF SEMESESTER IV			

Elective subjects will be offered only if there are minimum 10 students for the respective selected course.

- Nutrition in Diabetes care/ Cardio-metabolic health will be offered as values added course.
- Micronutrients and Trace elements- Value added course (compulsory) to be completed by January.

Credit for 1 year PG Degree (after 4 Year UG) = 44 CR	
Major	26

Elective	08
Research Project	10
Total	**44**

Cumulative Credit for 2 Year PG Degree = 88 CR	
Major	54
Elective	16
Research Practical	10
Research Methodology	04
OJT	04
Total	**88**

M.Sc. (Nutrition and Food Science)

Semester I

Sr. No.	Course details	Marks (Theory)		Marks (Practical)		Total	Credis
		Internal	External	Internal	External		
1.	Basic Principles of Traditional Indian Diet part I (MSC24N- 111)	40	60	-	-	100	4
2.	Basic Principles of Nutrition Science (MSC24N-112)	40	60	-	-	100	4
3.	Basics of Anatomy & Physiology (MSC24N-113)	40	60	-	-	100	4
4.	Nutritional Biochemistry (MSC24N-114)		50	-	-	50	2
5.	Research Methodology (MSC24N-115)	40	60	-	-	100	4
6.	Nutrition and Immunity (MSC24N-116)/ Diet in Metabolic Disorders (MSC24N-117)	40	60	-	-	100	4
						550	22 Credits

M.Sc. (Nutrition and Food Science)

Semester II

Sr.No.	Course details	Marks (Theory)		Marks (Practical)		Total	Credits
		Internal	External	Internal	External		
1.	Basic Principles of Traditional Indian Diet part II (MSC24N-211)	40	60	-	-	100	4
2.	Medical Nutrition Therapy (MNT)- Part I (MSC24N-212)	40	60	-	-	100	4
3.	MNT –I (Traditional and Modern approaches of therapeutic cooking) (MSC24N-213)	-	-	50	-	50	2
4.	Basic Diet from *Kshemakutuhal* (MSC24N-214)	40	60	-	-	100	4
5.	OJT (On Job Training- 1 month's internship) (MSC24N-215)	-	-	-	150	150	4
6.	Nutrition for Maternal , Child & Geriatric Health (MSC24N-216)/ Yogic Diet (MSC24N-217)	40	60	-	-	100	4
						600	22 Credits

M.Sc. (Nutrition and Food Science)

Sr.No.	Course details	Marks (Theory)		Marks (Practical)		Total	Credits
		Internal	External	Internal	External		

1.	**Ayurvedic Nutrition Therapy (MSC24N-311)**	**40**	**60**	**-**	**-**	**100**	**4**
2.	**Medical Nutrition Therapy (MNT)- Part II (MSC24N-312)**	**-**	**-**	**50**	**-**	**50**	**2**
3.	**Medical Nutrition Therapy (MNT)- Part II (MSC24N-313)**	**40**	**60**	**-**	**-**	**100**	**4**
4.	**Basic Diet from *Bhojankutuhal* (MSC24N-314)**	**40**	**60**	**-**	**-**	**100**	**4**
5.	**Minor Research Project (MSC24N-315)**	**-**	**-**	**-**	**150**	**150**	**4**
6.	**Critical Care Nutrition (MSC24N-316)/ Hospital Catering Management & Diet counselling (MSC24N-317)**	**40**	**60**	**-**	**-**	**100**	**4**
						600	**22 Credits**

Semester III

M.Sc. (Nutrition and Food Science)

Semester IV

Sr.No.	Course details	Marks (Theory)	Marks	Total	Credits

				(Practical)			
		Internal	External	Internal	External		
1.	Community Nutrition (MSC24N-411)	40	60	-	-	100	4
2.	Ayurvedic Diet Planning (MSC24N-412)	40	60	-	-	100	4
3.	Sports & Fitness Nutrition (MSC24N-413)	40	60	-	-	100	4
4.	Dissertation (MSC24N-414)	-	-	-	200	200	6
5.	Functional Foods & Nutraceuticals (MSC24N-415)/ Microbiome & Nutrition (MSC24N-416)	40	60	-	-	100	4
						600	22 Credits

SYLLABUS

MAJOR CORE

(SEMESTER I)

M.Sc. (Nutrition and Food Science) Semester I

PAPER 1: BASIC PRINCIPLES OF TRADITIONAL INDIAN DIET PART I

MSC24N- 111TH

~~Lectures: 60~~ ~~(Credits- 04)~~

A. Course Objectives: The course aims to-

a) To fulfill the essential element of vision and mission of dept by imparting quality education of traditional Indian food science.
b) To gain the knowledge of history of Indian diet and nutrition.
c) To introduce Ayurveda and its principles.
d) To understand effect of diet in physiological processes.
e) To understand the constitution of an individual in all aspects.
f) To understand the Ayurvedic aspect of physiology for further diet planning.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Understand Ayurveda and its principles.
b) Understand the constitution of an individual in all aspects.

C. Course Contents:

Module 1	**History of Ahara Nutrition**	**15 hours**
	Vedic and Madhyayugin diet and its process	1 credit
Module 2	**Basic Principle**	**15 hours**
	What is science? What is Ayurveda Aharashastra – Definition, intention area of Action Ayurvedic composition Ayurvedic components	1 credit
Module 3	**Details of Basic Principle**	**15 hours**
	Lokpurushasamya, Karyakarana Siddhanta, Samanya Vishesh Siddhanta, Panchamahabhuta Siddhanta, Swabhavoparmvada all Siddhanta In relation with diet and its importance.	1 credit
Module 4	**Doshadhatumala Vidyana**	**15 hours**
	Doshavidyana Dhatuvidyana - Tissue/ Cell metabolism Malavidyana - Excretary Vidyana Strotovidyana – Systematic circulation Dhatusarta - Cell replenishing Prakruti - Constitution Doshadhatumalavidyana – The importance of diet in physiological process.	1 credit

D. References:

- Charaka samhita and its commentaries

- Sushruta Samhita and its commentaries
- Ashtanga Hrudaya and its commentaries
- Ashtanga Samgraha and its commentaries
- Bhavaprakash Nighantu
- Yogaratnakar
- Kshemakutuhal
- Bhojanakutuhal
- Pakadarpan – Nalakrut
- Bruhan-nighanturatnakar
- Dravyaguna Vidnyan – Priyavrat Sharma

M.Sc. (Nutrition and Food Science) Semester I

PAPER - 2: BASIC PRINCIPLES OF NUTRITION SCIENCE
MSC24N- 112TH

~~Lectures: 60~~ ~~(Credits- 04)~~

A. Course Objectives: The course aims to-

a) To gain the knowledge of history and scope of modern nutrition.
b) To understand theoretical aspect of macro and micronutrients.
c) To understand the effect of food elements on human body.
d) To understand the digestion, absorption and metabolism according to modern science.
e) To learn nutritional requirements of different age groups and occupations.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Understand effect of food nutrients on human body.
b) Understand the nutritional requirements of different age groups and occupations.

C. Course Contents:

Module 1	**Introduction to Nutrition**	**15 hours**
	Definition of terms –Health, Nutrition, Malnutrition, History of Nutritional Science, Scope of Nutrition **Energy** - Energy Balance, indirect and direct calorimetry, Reference Man and Reference Woman**.**	1 credit
Module 2	**Macronutrients**	**15 hours**
	Carbohydrates - Digestion and Absorption. Functions deficiency and excess. glycemic index. **Proteins** - Protein Quality (BV, PER, NPU), Digestion and Absorption, functions, Factors affecting protein bio-availability including Anti nutritional factors. Requirements and deficiency **Lipids** - Digestion and Absorption, requirement and deficiency- Types of fatty acids, Role and nutritionalsignificance (SFA, MUFA, PUFA) **Dietary Fiber** – Classification and significance.	1 credit
Module 3	**Micronutrients and Water**	**15 hours**
	Vitamins - Physiological role, Bioavailability and RDA and deficiencies. **Minerals and Trace Elements** - Physiological role, functions, Bioavailability and RDA and deficiencies. **Water** - Functions, Requirements.	1 credit
Module 4	**Principles of Meal Planning**	**15 hours**
	Effect of cooking on digestibility and	1 credit

	nutritive value of foods. Improving nutritional value throughdifferent methods - germination, fermentation, combination of foods. **Basic principles of meal planning**. **Nutritional requirements** for planning meals (Adults - male and female, different levels of physical activity, Pregnancy and Lactation, Feeding of infants and young children 0 -3 years, Feeding preschool and school children, Feeding adolescents, Old age, Athletes)	

D. References:

- Guthrie H.: Introductory Nutrition (6th ed.) Times Mirror/Mostry College Publishing, 1986
- Robinson, Lawler: Normal & Therapeutic Nutrition (17th ed.) Macmillan Publishing Co. 1986.
- Swaminathan S.: Advanced textbook on food & nutrition Vol. 1 & n (2nd ed. Revised _ enlarged) BappCo. 1985.
- Robinson. Basic Nutrition and Diet Therapy (8th edition)
- Shills and Young. Modern Nutrition in Health and Disease.

M.Sc. (Nutrition and Food Science) Semester I

PAPER - 3: BASICS OF ANATOMY & PHYSIOLOGY
MSC24N- 113TH

~~Lectures: 60~~ ~~(Credits- 04)~~

A. Course Objectives: The course aims to-

a) To understand the structures of various body systems in humans.
b) To understand the functions of Human body in systemic way.
c) Interdependence of various systems in human body.
d) To understand the physiology of different systems in human body.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Understand structures of various body systems in humans.
b) Understand the physiology of different systems in human body.

C. Course Contents:

Module 1	**Introduction**	**15 hours**
	Introduction – cell, cell structure, cellular organelles and their functions	1 credit
Module 2	**Various systems in human body**	**45 hours**
	The Skeletal system- Bone structure & Function, Types of joints. **The Muscular System**- Types of muscles, characteristics, Similarities and Differences. **Blood and Circulatory System** - Blood and its composition, Functions of each constituent of blood, Blood groups, Blood transfusion and its importance, Coagulation of blood, Blood vessels, Structure and functionsof heart, Blood pressure, heart rate, Cardiac output and their regulation. **Lymphatic System** - Lymph, Lymph glands and its functions, Spleen - Structure and Functions. **Respiratory System** - Organs, Structure and Functions, Mechanism of Respiration, Chemical Respiration. **Digestive System** - Structure and Functions of Alimentary tract. Functions of various secretions and juices- Saliva, Gastric, Bile, Intestinal and Pancreatic. Functions of enzymes involved in digestion. Digestion of nutrients - Proteins, Fats, Carbohydrates. **Excretory System** - Structure and Functions of Kidney, Ureter, Bladder, Skin. Urine - Formation of urine, Composition of normal and abnormal urine. Role of excretory system in homeostasis,fluid balance, Regulation of body temperature. **Nervous System** - Structure of Nerve Cell, Fiber, Classification of Nervous System, CNS - Brain, Lobes of brain, Cerebrum, Cerebellum, Medulla oblongata,	3 credit

	Hypothalamus. Pituitary Gland - structure, Functions, Spinal Cord - structure and functions, Autonomic and Sympathetic nervous system. **Reproductive System** – Female and male reproductive system - organs, structure and functions. Menstrualcycle, Puberty, Menarche, Menopause, Fertilization of ovum, Conception, Implantation. **Sense Organs** - Eye ,Ear, Skin -structure and function **Glands and Endocrine System** -Liver and gall bladder- structure and function, Enterohepatic circulation, Pancreas - structure and function, Endocrine glands - structure and function. Hormone - types and functions, role in metabolism., Endocrine disorders, Regulation of Hormone Secretion	

D. References:

- Guyton & Hall Textbook of medical physiology
- Principles of Anatomy and Physiology- Gerard J. Tortora
- Essentials of medical physiology - Sembulingam

M.Sc. (Nutrition and Food Science) Semester I

PAPER - 4: NUTRITIONAL BIO-CHEMISTRY
MSC24N- 114TH

~~Lectures: 30~~ ~~(Credits- 02)~~

A. Course Objectives: The course aims to-

a) To understand the clinical biochemistry of macronutrients.
b) To understand the cellular level functions.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Understand clinical biochemistry of macronutrients and cellular functions.

C. Course Contents:

Module 1	**Metabolism of Macronutrients**	**15 hours**
	Introduction to Biochemistry - Significance of pH, Acid-Base Balance. **Carbohydrates** - Structure and properties of Mono-saccharides, Di-saccharides, Poly-saccharides. Study of metabolism of carbohydrates, Glycolysis, Aerobic, Anaerobic, TCA, Significance of TCA cycle integrating metabolism of carbohydrates protein and lipid, Gluconeogenesis, Glycogenesis, Glycogenolysis. **Proteins** - Structure, composition Classification and Function, Structure of important proteins with specialreference to Insulin, myoglobin, and hemoglobin, Binding proteins and their functions - nutritional implications, Chemistry of amino acids, Metabolism of Proteins and amino acids - Build up of amino acidpool. Urea Cycle, Creatinine and Creatine Synthesis. **Lipids** - Definition, Composition, Classification, Structure and Properties, Lipoproteins, Metabolism of Lipids, Oxidation of fatty acids, Unsaturated fatty acids, Metabolism of ketone bodies, Biosynthesis of fatty acids, Phosphoglycerides, Biosynthesis of cholesterol and regulation.	1 credit
Module 2	**Enzymes, Hormones and Antioxidants**	**15 hours**
	Enzymes and hormones- Definition, Classification specificity of enzymes - Intracellular distribution, kinetics, inhibition, Factors affecting enzyme activity, Enzymes in clinical diagnosis. Inborn errors ofmetabolism.	1 credit

	Biological Oxidation, Electron Transport Chain, Oxidative Phophorylation. **Antioxidants**- Definition, Free Radicals, Oxygen Free Radicals, Natural and Diet derived antioxidants.	

D. References:

- Lehninger, A. L., Principles of Biochemistry
- Dasgupta, S. K., Biochemistry Vol. I; n & III, Mc Millan Co. of India Limited satyanarayananU, 2006 Biochemisry, 3rd edition, Uppala Author Pub.

M.Sc. (Nutrition and Food Science) Semester I

PAPER - 5: RESEARCH METHODOLOGY
MSC24N- 115TH

~~Lectures: 60~~ ~~(Credits- 04)~~

A. Course Objectives: The course aims to-

a) Understanding the research methodology for scientific research.
b) To learn the ethics in research.
c) To know various statistical methods of data collection, analysis & presentation.
d) To gain the knowledge of process of research.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Understand and apply research process.
b) Comprehend research methodology and apply it effectively.

C. Course Contents:

Module 1	**Research**	**30 hours**
	Definition & types of Research Research Process, development of Protocol Ethics in research Evidence based medicine Importance of IT in Research	2 credit
Module 2	**Statistics**	**30 hours**
	Definition & importance of Medical Statistics Common Statistical terms, majors of central tendency- mean, mode , median Types of data presentation Analysis of data- T-test, Chi-square test, Anova test, etc. Scientific Research writing Importance & Utility of Research in Nutrition	2 credit

D. References:

- Research methodology Methods & Techniques- C.R.Kothari
- Research Methodology And Medical Statistics- Prof.Dr. Subhash Ranade, Prof.Dr. R.R. Deshpande
- Research Methodology and Medical Statistics- Nandini Dhargalkar

MAJOR ELECTIVE

(SEMESTER I)

M.Sc. (Nutrition and Food Science) Semester I

PAPER - 6: NUTRITION AND IMMUNITY

MSC24N- 116TH

Lectures: 60 **(Credits- 04)**

A. Course Objectives: The course aims to-

a) Understand the basic concepts of immune system and its components.
b) Analyze the role of macronutrients and micronutrients in immune function

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Evaluate the impact of malnutrition and specific nutrient deficiencies on immunity.
b) Examine the effects of diet and lifestyle on immune health.

C. Course Contents:

Module 1	**Introduction**	**15 hours**
	Overview of immune system, Innate vs. Adaptive immune system, Cells and organs of the immune system, Immunological memory and response.	1 credit
Module 2	**Macro- micro nutrients and immunity**	**15 hours**
	Macronutrients and Immune function- Role of proteins in immune response, Impact of carbohydrates on immune function, importance of fats in immunity. **Micronutrients** and Immune Function- Vitamins (A, C, D, E and B-complex), Minerals (Zinc, Selenium, Iron, Copper nd Magnesium). **Phytochemicals** and **antioxidants** in immune support.	1 credit
Module 3	**Malnutrition and immune system**	**15 hours**
	Effect of protein- energy malnutrition on immunity, Impact of micronutrient deficiencies on immune function, Strategies for preventing and managing malnutrition.	1 credit
Module 4	**Immunity- Diet and lifestyle**	**15 hours**
	Diet, Lifestyle and Immunity- Role of diet in modulating immune response, Influence of probiotics and prebiotics on gut health, Impact of physical activity and sleep on immune function, Effect of stress and physiological factors on immunity. **Immunity across lifespan**- Immune function in infants and children, Immune changes during pregnancy and lactation, Immunity in elderly. **Dietary guidelines** for optimal immune health, Nutritional interventions for immune support.	1 credit

D. References:

- Handbook of Nutrition and Immunity- M. Eric Gershwin, Penelope Nestel, Carl L. Keen
- Nutrition and Immunity- Maryam Mahmoudi, Nima Rezaei
- Diet, Behaviour and Immunity across Lifespan- Hale, Matthew W. (Research article)

M.Sc. (Nutrition and Food Science) Semester I

PAPER - 7: DIET IN METABOLIC DISORDERS
MSC24N- 117TH

~~Lectures: 60~~ ~~(Credits- 04)~~

A. Course Objectives: The course aims to-

a) To understand concept of pathogenesis of diseases according to Modern health science.

b) To understand methods of diet consultation & counseling.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Correlate relationship between disease and nutritional intervention.

b) Understand pathogenesis of metabolic disorders.

C. Course Contents:

Module 1	**Diseases of the Endocrine Gland**	**15 hours**
	Functions of the gland and hormones and their insufficiency, metabolic implications, clinical symptoms. **a) Hyperthyroidism and Hypothyroidism** Etiology, Pathophysiology and Diet Principles **b) Addison's syndrome** Etiology, Pathophysiology and Diet Principles **c) Cushing's Syndrome** Etiology, Pathophysiology and Diet Principles **d) PCOD** Etiology, Pathophysiology and Diet Principles	1 credit
Module 2	**Weight Management**	**15 hours**
	a) Obesity Etiology, Pathophysiology and Diet Principles **b) Underweight** Etiology, Pathophysiology and Diet Principles	1 credit
Module 3	**Cardiovascular disorders**	**15 hours**
	a) Atherosclerosis Etiology, Pathophysiology and Diet Principles **b) Hypertension** Etiology, Pathophysiology and Diet Principles	1 credit
Module 4	**Diseases of the Liver**	**15 hours**
	a) Alcoholic Liver Disease Etiology, Pathophysiology and Diet Principles **b) Non-alcoholic Liver Disease** Etiology, Pathophysiology and Diet Principles **c) Liver Cirrhosis** Etiology, Pathophysiology and Diet Principles	1 credit

D. References:

- Krause's Food & the Nutrition Care Process by L. Kathleen Mahan and Janice L. Raymond
- Clinical Dietetics Manual- Indian Dietetic Association
- Dietetics- B.Srilakshmi

MAJOR CORE

(SEMESTER II)

M.Sc. (Nutrition and Food Science) Semester II

PAPER-1: BASIC PRINCIPLES OF TRADITIONAL INDIAN DIET PART II
MSC24N- 211TH

~~Lectures: 60~~ ~~(Credits- 04)~~

A. Course Objectives: The course aims to-

a) To gain the knowledge of basic criteria to understand a Dravya.
b) To understand the basics of Ayurvedic pharmacology.
c) To gain the deep knowledge of traditional Ayurvedic culinary skills.
d) To gain the knowledge of properties of current era food stuffs & beverages.
e) To gain knowledge of diet planning according to diagnosis.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) To achieve counseling skills for future employability in the field of nutrition and diet.
b) To get thorough knowledge of classification and properties of diet according to Ayurveda.
c) To learn the history taking for diet prescription.

C. Course Contents:

Module 1	**Basics of Dravyaguna**	**30 hours**
	Dravya Guna, Veerya Karma Rasa Vipaka, Prabhav	2 credit
Module 2	**Anukta varga**	**15 hours**
	Tea Coffee Preserved Food Ice cream Bakery product	1 credit
Module 3	**Krutanna Varga & Sanskar Vichar**	**15 hours**
	Manada Peya Vilepi Yavagu Yusha Supa Siddha Jala Hima Mantha Panak, etc.	1 credit

D. References:

- Charaka samhita and its commentaries
- Sushruta Samhita and its commentaries
- Ashtanga Hrudaya and its commentaries
- Ashtanga Samgraha and its commentaries
- Bhavaprakash Nighantu
- YogaRatnakar
- Kshemakutuhal
- Bhojanakutuhal
- Dravyaguna Vidnyan – Priyavrat Sharma

M.Sc. (Nutrition and Food Science) Semester II

PAPER - 2: MEDICAL NUTRITION THERAPY (MNT) - PART I
MSC24N- 212TH

~~Lectures: 60~~ ~~(Credits- 04)~~

A. Course Objectives: The course aims to-

a) To gain knowledge of Interactions between Drugs & Nutrients.

b) To understand pathophysiology of different systemic diseases.

c) To learn nutritional therapy of different systemic disorders.

d) To prepare diet prescriptions for specific diseases.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Apply principles of nutritional therapy in the management and treatment of different systemic disorders, developing effective dietary interventions.

b) Analyze the pathophysiology of various systemic diseases.

C. Course Contents:

Module 1	**Nutritional Intervention - Diet Modifications**	**15 hours**
	Adequate normal diet as a basis for therapeutic diets Diet Prescription Modification of Normal Diet Nomenclature of Diet Adequacy of Standard Hospital Diets Psychological factors in feeding the sick person	1 credit
Module 2	**MNT for Weight Management & diseases of GI system**	**15 hours**
	Obesity: Etologies, Types, Health risks, Theories, Hormonal changes, treatment, Nutritional management **Underweight** - Etiology and Assessment, High calorie diets for weight gain, Diet plan, Suggestions for increasing calories in the diet, Anorexia Nervosa and Bulimia **Pathophysiology of GI tract diseases**- anatomic, physiologic and functional changes Flatulence, Constipation, Irritable Bowel, Haemorrhoids, Diarrhoea, Steatorrhoea, Diverticular disease, Inflammatory Bowel Disease, Ulcerative Colitis, Gastric and duodenal ulcers Foods stimulating G. I. Secretion Brief medical therapy, rest, antacids, other drugs and dietary care Treatment and Dietary Care Malabsorption Syndrome, Celiac Sprue, Tropical Sprue, Intestinal Brush border deficiencies (Acquired Disaccharide Intolerance)	1 credit

	Protein Losing Enteropathy	
Module 3	**MNT for Anemia**	**15 hours**
	Pathophysiology Risk Factors Nutritional anaemia Sickle cell anaemia Thalassemia Pathogenesis and dietary management in the above conditions	1 credit
Module 4	**Liver disorders & Interactions between Drugs, Nutrients and Nutritional Status**	**15 hours**
	Pathophysiology of **liver diseases** - Progression of liver disease metabolic and nutritional implications, role of specific nutrients and alcohol. **Diseases of the Gall Bladder and Pancreas** - Pathophysiologic changes - metabolic and nutritional implications. **Drug Nutrient interaction**- Effect of drugs on Food and Intake, Nutrient Absorption, Metabolism, and Requirements. Drugs affecting intake of food and nutrients Absorption Metabolism and excretion Effect of food, nutrients and nutritional status on absorption and metabolism of drugs	1 credit

D. References:

- Antia F. P.: Clinical Dietetics and Nutrition, 3rd ed., Oxford University, Press, Delhi, Reprinted in 1989.
- Robinson, C. H, M. R. Lawlwr, W. L. Chenoweth and A. E. Garwick:

  Normal and Therapeutic Nutrition,17th ed;, Mac Millan Pub. Co.
- Krause. Food, Nutrition & Diet Therapy.
- Shills and Young. Modern Nutrition in Health and Disease

M.Sc. (Nutrition and Food Science) Semester II

PAPER - 3: MEDICAL NUTRITION THERAPY (MNT) PART I (PRACTICAL) Ayurveda and Modern Approach
MSC24N- 213P

~~Lectures: 30~~ ~~(Credits- 02)~~

A. Course Objectives: The course aims to-

a) To gain the deep knowledge of traditional Ayurvedic culinary skills.
b) To prepare therapeutic diet recipes
c) To gain knowledge of diet planning according to diagnosis
d) To study the importance of standardization in dietetics and nutrition.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) To develop therapeutic meal plans based on dietary needs and preferences
b) Practical application in preparing balanced meals that meet standard nutritional guidelines.

C. Course Contents:

Module 1	**Krutanna Varga & Sanskar Vichar-Practicals**	**15 hours**
	Demonstration of following recipes- Manada Peya Vilepi Yavagu Yusha Hima Mantha Veshvar Shak kalpana Panaka Modak	1 credit
Module 2	**Medical Nutrition Therapy (MNT)- Part I**	**15 hours**
	Introduction to Standardization- Practical applications of standard portions in food groups, Nutrient content and recommended servings for food groups (e.g., grains, vegetables, fruits, proteins, dairy), Techniques for determining appropriate serving sizes based on nutritional requirements and guidelines. Basics of diet planning- Practical Application of Menu Planning, Development of menus for specific health conditions (Gastro Intestinal tract, Anemia, Weight Management).	1 credit

	Analysis and development of nutrition interventions based on case studies, Application of menu planning principles to address nutritional needs and health goals	

D. References:

- Charaka samhita and its commentaries
- Sushruta Samhita and its commentaries
- Ashtanga Hrudaya and its commentaries
- Ashtanga Samgraha and its commentaries
- Bhavaprakash Nighantu
- YogaRatnakar
- Krause's Food & the Nutrition Care Process by L. Kathleen Mahan and Janice L. Raymond
- Medical Nutrition Therapy: A Case Study Approach by Marcia Nelms, Sara Long Roth, and Karen Lacey

M.Sc. (Nutrition and Food Science) Semester II

PAPER 4: BASIC DIET FROM KSHEMKUTUHAL
MSC24N- 214TH

~~Lectures: 60~~ ~~(Credits- 04)~~

A. Course Objectives: The course aims to-

a) To understand about properties and functions of traditional Indian food substances

b) To gain the knowledge of traditional healthy recipes from Kshemkutuhal.

c) To gain deep knowledge of Ayurvedic nutritional therapy.

d) To get comparative knowledge of traditional & modern food items.

e) To understand the appropriate way of consuming food in traditional Indian food science.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Apply the knowledge of properties and functions of Indian foods while planning meals.

b) Prepare and suggest healthy traditional recipes.

C. Course Contents:

Module 1		**15 hours**
	Vanshavarnan- Paribhasha kathan Mahaan sopayogyopakaran Prashansan Vaidyahar Sudakara Prashansan	1 credit
Module 2		**15 hours**
	Rutu lakshanacharya Dinacharya	1 credit
Module 3		**15 hours**
	Mamsa Prashansana Matsya-mamsa Prashansana Shaakprakar Pishthanna Prakar	1 credit
Module 4		**15 hours**
	Pakvanna Kshudhbodhaka vastu Prashansana Gorasa Panakaadi	1 credit

D. References:

- Kshemkutuhal- Dr. Indradev Tripathi
- Udarbharan Nohe- Vd. Y. G. Joshi

M.Sc. (Nutrition and Food Science) Semester II

PAPER 5: ON JOB TRAINING
MSC24N- 215P

~~Lectures: 60~~ ~~(Credits- 04)~~

On Job Training (OJT) is one of the best ways to deliver type of specific and continuous learning. OJT is a form of training provided at the work place. A clinical setting provides a unique opportunity for students to gain practical experience by observing real-time patient consultations, diagnosis, and treatment processes related to nutrition. Students will become familiar with the clinical workflow, interaction with healthcare professionals, and nutritional management of health issues. This hands-on exposure helps students apply theoretical knowledge in practical scenarios, enhancing their ability to evaluate and recommend nutritional interventions.

A. Write a report on

a) Observation of patient-nutritionist interaction.
b) Study of various clinical nutrition protocols used.
c) Participate in a nutrition assessment or diet planning process.
d) Attach a letter from the supervising dietitian of clinic/hospital.
e) Write a detailed report on the experience.

B. Log Book:

A **Log Book** will be provided for the duration of the On-the-Job Training (OJT). Filling in the log book **daily is mandatory**. It should document the following:

- Routine activities
- Patient rounds
- Interactions with patients or healthcare professionals
- Procedures observed
- Any other tasks completed

Focus Areas:

a) Diabetes and Nutrition Management
b) Cardiovascular Health and Dietary Counseling
c) Clinical Nutrition in Gastroenterology
d) Malnutrition and Obesity Management in OPD
e) Nutrition Intervention in Endocrine disorders
f) Nutrition Management for Anemia
g) Nutrition intervention for Liver Diseases

At the end of the OJT, 5 case studies as per the above mentioned focus areas must be solved and included in the log book.

MAJOR ELECTIVE

(SEMESTER II)

M.Sc. (Nutrition and Food Science) Semester II

PAPER 6: NUTRITION FOR MATERNAL, CHILD & GERIATRIC HEALTH
MSC24N- 216TH

~~Lectures: 60~~ ~~(Credits- 04)~~

A. Course Objectives: The course aims to-

a) To understand Physiological changes & Health problems in aging.

b) To understand Nutritional requirements in geriatric.

c) To learn nutritional requirements of different age groups of children.

d) To gain knowledge of diet prescriptions for infant and children.

e) To get wholesome knowledge of pediatric nutrition.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Evaluate the specific nutritional requirements for the geriatric, pediatric, obstetric and lactating population and develop appropriate dietary plan Prepare and suggest healthy traditional recipes.

C. Course Contents:

Module 1	**Geriatric Nutrition**	**30 hours**
	Physiological changes in aging. Nutritional requirements Health problems Drug & Nutrient interaction	2 credit
Module 2	**Nutrition for Maternal & Child Health**	**30 hours**
	Pregnancy and lactation – changes in physiology, Nutritional requirement Physiology of lactation and maternal nutrient needs **Requirement of Neonates**, weaning and current feeding practices **Nutritional requirement of premature infants** their growth and development PEM and childhood obesity **Common problems in infancy** – diarrhoea, constipation, milk intolerance, celiac disease. NIDDM in born errors in metabolism	2 credit

D. References:

- Dietetics- B. Srilakshmi
- Krause's Food & the Nutrition Care Process by L. Kathleen Mahan and Janice L. Raymond

M.Sc. (Nutrition and Food Science) Semester II

PAPER 7: YOGIC DIET

MSC24N- 217TH

Lectures: 60 **(Credits- 04)**

A. Course Objectives: The course aims to-

a) To understand concept of Yogic diet which comprises Satvik, Rajasik, Tamsik food.
b) To understand application of concept of Yogic Diet for Holistic Yoga practices.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Evaluate Analyze the role of diet in Yogic Practices
b) Promote holistic health through nutrition

C. Course Contents:

Module 1	**Introduction**	**15 hours**
	Concept of Ayurvedic Nutrition Concept of Vedic Diet	1 credit
Module 2	**Ahara vidhi**	**15 hours**
	Aharvidhi visheshayatan Aharvidhi vidhan	1 credit
Module 3	**Ahara in Yoga Practices**	**15 hours**
	Satvik Ahar Application of satvik ahar for yoga practices Rajas Ahar Application of Rajas ahar in Yoga Practices Tamsik Ahar Application of Tamsik ahar in Yoga Practices	1 credit
Module 4	**Yogic Diet**	**15 hours**
	Yogic Diet from Gherand samhita Yogic Diet from Bhagavad Geeta Yogic Diet from Hathapradipika Diet Therapy from Hatapradipika Application of Yogic Diet	1 credit

D. References:

- Charaka samhita and its commentaries
- Sushruta Samhita and its commentaries
- Ashtanga Hrudaya and its commentaries
- Ashtanga Samgraha and its commentaries
- Gherand Samhita- Swami Niranjananand Saraswati
- Shrimad Bhagavat Geeta as it is – A.C. Bhaktivedanta Swami Prabhupada

- Hathapradipika- V. G. Devkule

MAJOR CORE

(SEMESTER III)

M.Sc. (Nutrition and Food Science) Semester III

PAPER – 1: AYURVEDIC NUTRITION THERAPY

MSC24N- 311TH

~~Lectures: 60~~ ~~(Credits- 04)~~

A. Course Objectives: The course aims to-

a) To gain the knowledge of diet for the preventive aspect.
b) To understand the proper eating habits according to Ayurveda science.
c) To understand daily regime & seasonal conducts.
d) Understand the effects of fasting on human digestion.
e) To gain deep knowledge of causative factors of different diseases
f) To understand dietary causative factors of various diseases.
g) To understand the Ayurvedic methods of diagnosis.
h) To know the Ayurvedic pathophysiology of diseases.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Apply knowledge of preventive diet.
b) Adapt daily and seasonal regimens.
c) Assess disease causative factors and dietary impact on diseases.

C. Course Contents:

Module 1	**Concept of Preventive Ayurvedic Diet**	**30 hours**
	Definition of Swasthya, Deha (Body), Prevention and maintenance of health through diet Dinacharya (Daily regime), Rutucharya (Seasonal conduct) Daily regimen and seasonal conduct applied aspect health definition, BMI, BMR, aphometery Bhojana vidhi Jalapana Langhan therapy	2 credit
Module 2	**Method of Nidana in Ayurved**	**30 hours**
	Vyadhi Utpatti, Rogamarga Vyutpatti, Definition, Nidan Panchak, Characteristics of Ayurvediya Nidan, Vyadhi Utpatti Aamotpatti, Trayo Rogamarga, Hetubhootatva of Aahar in Rogotpatti Shatkriyakal according to Sushruta, its importance in Nidan Roga- rogi Parikshan Saam- nirama dosha Samanya Chikitsa	2 credit

D. References:

- Charaka samhita and its commentaries
- Sushruta Samhita and its commentaries
- Ashtanga Hrudaya and its commentaries
- Ashtanga Samgraha and its commentaries
- Bhavaprakash Nighantu
- YogaRatnakar
- Kshemakutuhal
- Bhojanakutuhal
- Pakadarpan – Nalakrut
- Bruhan-nighanturatnakar
- Kayachikitsa- Vd. Y.G. Joshi

M.Sc. (Nutrition and Food Science) Semester III

PAPER – 2: MEDICAL NUTRITION THERAPY PART II (PRACTICAL)

MSC24N- 312P

Lectures: 30 **(Credits- 02)**

A. Course Objectives: The course aims to-

a) To understand pathophysiology of different systemic diseases.
b) To learn nutritional therapy of different systemic disorders.
c) To prepare diet prescriptions for specific diseases as per Traditional & Modern approach.
d) To understand Ayurvedic aspect of nutrition therapy of different disorders.
e) To know the diet therapy according to Ayurvedic classification of various systems
f) To understand case studies for nutritional analysis and diet planning

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Effectively apply both traditional and modern nutritional therapies for managing different systemic disorders
b) Prepare and prescribe disease-specific diets

C. Course Contents:

Module 1	**Strotsanusar Vyadhi Aharchikitsa in adults**	**15 hours**
	Pranavaha Srotas - Shwas, Kasa Annavaha - Ajirna, Grahani, Amlapitta, Arsha Raktavaha - Kamala, Pandu Mamsavaha - Karshyadi Medovaha - Santarpanotha – Sthaulya Asthivaha - Sandhigata Vata Purishvaha - Atisar Mutravaha - Ashmari, Mutrakruccha Swedavaha - Kushtha Rasavaha - Jwar Case study: Ahariya hetu,samprapti Aharia hetu basis parikshana Ahariya hetu and ahariya chikitsa	1 credit
Module 2	**Medical Nutrition Therapy of various disease:- Therapeutic diet**	**15 hours**

	Development of Diet Plans- Principles of diet planning for specific health conditions, Nutrient requirements and modifications, Meal planning strategies to achieve nutritional goals. Case Study- Review and analysis of case studies across various health conditions (Diabetes mellitus, Circulatory disorders, Renal diseases, Physiological stress, Cancer, Musculoskeletal disorders). Therapeutic Cooking.	1 credit

D. References:

- Charaka samhita and its commentaries
- Sushruta Samhita and its commentaries
- Ashtanga Hrudaya and its commentaries
- Ashtanga Samgraha and its commentaries
- Kayachikitsa- Vd. Y.G. Joshi
- Krause's Food & the Nutrition Care Process by L. Kathleen Mahan and Janice L. Raymond
- Medical Nutrition Therapy: A Case Study Approach by Marcia Nelms, Sara Long Roth, and Karen Lacey

M.Sc. (Nutrition and Food Science) Semester III

PAPER – 3: MEDICAL NUTRITION THERAPY PART II
MSC24N- 313TH

~~Lectures: 60~~ ~~(Credits- 04)~~

A. Course Objectives: The course aims to-

a) To understand pathophysiology of different health issues.

b) To gain the knowledge of nutritional therapy for different systemic diseases.

c) To understand diet planning for various health issues.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Apply knowledge of nutritional therapy to design appropriate dietary interventions for systemic diseases.

C. Course Contents:

Module 1	**MNT for DM & Hypoglycemia**	**15 hours**
	DM- Classification, symptoms, diagnosis, Management of Diabetes Mellitus (Hormonal Therapy, Oral Hypoglycaemic Agents, Exercise, Dietary care and Nutritional Therapy, Gestational DM, IDDM and NIDDM, Diabetic diets in Emergency, Illness, Diabetic coma,Insulin reaction, Juvenile diabetes, Patient Education in Diabetes. **Hypoglycaemia**- Classification, symptoms, fasting state hypoglycaemia, Postprandial orreactive hypoglycaemia.	1 credit
Module 2	**MNT for Diseases of the Circulatory System & Renal Diseases**	**15 hours**
	Cardio-vascular Diseases - Pathogenesis, role of nutrients in prevention – metabolic and nutritional implications **(Atherosclerosis**, **Ischemic heart disease**, **Congestive Heart Disease**., **Acute and Chronic Cardiac Disease** , **Hypertension**, **Cerebrovascular diseases**) **Kidney**- Physiology, classification & function. Renal Diseases- Etiology, Pathogenesis, Characteristics, Objectives, Water and electrolyte balance, Principlesof Dietary Treatment and Management. (**Glomerulonephritis**, **Nephrotic syndrome**, **Uremia** and **Renal Failure**, **Dialysis** and types, **Chronic renal failure in patients with diabetes mellitus**, **Chronic renal failure in children**, **Nephrolithiases** /kidney stone	1 credit

Module 3	MNT for Cancer and Diseases of Immunity	15 hours
	Cancer- Types, symptoms, detection, Cancer therapies and treatment - side effects and nutritional implications, Goals of care and guidelines for oral feeding, Enteral and Parenteral Nutrition, Paediatric patients with cancer **Allergy**- Definitions, symptoms, mechanism of food allergy, Diagnosis, Elimination diets, Medications, Prevention of Food Allergy and Food Intolerance. **HIV and AIDS**	1 credit
Module 4	**MNT for Diseases of Nervous System, Behavioural Disorders and Muscular Skeletal Disorders, Physiological stress and Nutrigenomics**	**15 hours**
	Diseases of Nervous System- Definition, etiology, dietary treatment andprognosis. (**Neuritis** and **polyneuritis**, **Migraine**, **headache**, **Epilepsy**, **Multiple sclerosis**) **Behavioral Disorders**- Definition, etiology, dietary treatment andprognosis. (**Hyperkinetic Behavior Syndrome, Orthomolecular psychiatry and mental illness**) **Musculo-skeletal disorders**- Definition, etiology, dietary treatment andprognosis. **(Arthritis, Rheumatoid Arthritis, Osteoarthritis, osteoporosis)** **Nutritional Regulation of Gene Expression-** Gene Expression, Role of specific nutrients in controlling gene expression.	1 credit

D. References:

- Krause's Food & the Nutrition Care Process by L. Kathleen Mahan and Janice L. Raymond
- Clinical Dietetics Manual- Indian Dietetic Association
- Dietetics- B. Srilakshmi

M.Sc. (Nutrition and Food Science) Semester III

PAPER 4: BASIC DIET FROM BHOJANKUTUHAL
MSC24N- 314TH

~~Lectures: 60~~ ~~(Credits- 04)~~

A. Course Objectives: The course aims to-

a) To understand about properties and functions of traditional Indian food substances
b) To gain the knowledge of traditional healthy recipes from Bhojankutuhal.
c) To get comparative knowledge of traditional & modern food items.
d) To understand the appropriate way of consuming food in traditional Indian food science.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Apply the knowledge of properties and functions of Indian foods while planning meals.
b) Prepare and suggest healthy traditional recipes.

C. Course Contents:

Module 1		**15 hours**
	Dhanyaprakaran Siddhannaprakaran Bhakshyaprakaran Mansaprakaran Shakprakaran	1 credit
Module 2		**15 hours**
	Phalaprakaranm Haritakiprakaran Pushpaprakaran Haritaprakaran Upadansha	1 credit
Module 3		**15 hours**
	Karcharyaha Krutrimaghrutprakaran Ksheeraprakaran Tailaprakaran Ikshuprakaran	1 credit
Module 4		**15 hours**
	Madhuprakaran Madyaprakaran Jalaprakaran Viruddhadravyaprakaran Bhojanvidhi	1 credit

D. References:

- Bhojankutuhal-Raghnathsuri

M.Sc. (Nutrition and Food Science) Semester III

PAPER 5: MINOR RESEARCH PROJECT (PRACTICAL) MSC24N- 315P

~~Lectures: 60~~ ~~(Credits- 04)~~

A. Course Objectives: The course aims to-

a) Equip students with research skills
b) To encourage critical thinking and problem-solving through data collection, analysis, and interpretation
c) Deepen students understanding of their chosen subject by engaging them in in-depth study, literature review, and exploration of specific topics.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Students will demonstrate the ability to design and conduct a research project using appropriate methodologies, tools, and techniques.
b) Students will develop strong written and oral communication skills, allowing them to present research findings clearly and effectively.
c) Upon completion, students will have a deeper understanding of their research topic, demonstrated through a thorough literature review and theoretical analysis.

This will be an **independent research** project with an **observational research** focus. At the end of the project, students will be required to **write and submit a detailed report** outlining their methodology, observations, findings, and conclusions.

C.

MAJOR ELECTIVE

(SEMESTER III)

M.Sc. (Nutrition and Food Science) Semester III

PAPER 6: CRITICAL CARE NUTRITION
MSC24N- 316TH

~~Lectures: 60~~ ~~(Credits- 04)~~

D. Course Objectives: The course aims to-

d) To understand the practical applicability of use of enteral and parenteral therapy, their benefits and indications for each.

e) To study the monitoring and evaluation of specific issues surrounding selection and supplementation of macronutrients and micronutrients and case studies.

E. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Apply the knowledge and prepare dietary guidelines and formulas for tube feeding as required.

F. Course Contents:

Module 1	**Enteral Nutrition**	**30 hours**
	Introduction and flow diagrams for nutritional planning Enteral nutrition formulations Routes and regimens of enteral feeding Monitoring of nutritional support Nutrition risk assessment International and national guidelines	2 credit
Module 2	**Parenteral Nutrition**	**30 hours**
	Indications and contraindications of parenteral nutrition Nutritional assessment Venous access and parenteral solutions Solution stability/ compatibility issues Administrating parenteral nutrition Complications and monitoring PN support at home and guidelines	2 credit

G. References:

- Krause's Food & the Nutrition Care Process by L. Kathleen Mahan and Janice L. Raymond
- Clinical Dietetics Manual- Indian Dietetic Association

M.Sc. (Nutrition and Food Science) Semester III

PAPER 7: HOSPITAL CATERING MANAGEMENT & DIET COUNSELLING
MSC24N- 317TH

Lectures: 60 **(Credits- 04)**

A. Course Objectives: The course aims to-

a) To gain the knowledge of hospital catering skills and human resource management
b) To achieve counseling skills for future employability in the field of nutrition and diet.
c) To gain the knowledge of properties of current era food stuffs & beverages.
d) To gain knowledge of diet planning according to diagnosis.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a. Apply the knowledge of properties and functions of Indian foods while planning meals.
b. Prepare and suggest healthy traditional recipes.

C. Course Contents:

Module 1	Hospital Organization & Personal Management	30 hours
	Introduction to food services and catering industry, Development of food service institutions in India, Typesof services as affected by changes in the environment. **Hospital food service** as a specialty – Characteristics, rates and services of the food production, service and management in hospitals. Role of the food service Manager/Dietitian. **Organizations** – Types of organizations and characteristics. Organizational charts. **Catering Management** – Definition, Principles and functions, Tools of Management Resources. Attributes of a successful manager. Leadership, motivation and communication. Dietitian as leader. **Approaches to Management** Traditional, Systems Approach, Total Quality Management. Management of Resources- Capital, Space, Equipment and furniture, Materials, staff, Time and Energy, Procedures Physical facility design and planning. Equipment selection. **Purchase and store room management** – Purchase systems, specifications, food requisition and inventory systems, quality assurance. **Human Resource Management** Definition, Development and policies Recruitment selection, Induction	2 credit

	Employment procedures: Employee Benefits, Training and Development, Human Relations, Jobdescriptions, Job evaluation, Personnel appraisal. Trade Union Negotiations and Settlement. **Financial Management** – Elements of Financial management, Budget Systems and accounting. Budget preparation. **Laws**- food laws, labor laws	
Module 2	**Diet Counseling**	**30 hours**
	Dietitian as part of Medical Team and outreach services. Clinical Information- Medical History and patient profile Techniques of obtaining relevant information, Retrospective information, Dietary Diagnosis, Assessing food and nutrient intakes, Lifestyles, Physical activity, stress, Nutritional status. Correlating Relevant Information and identifyingareas of need. The care process – Setting goals and objectives short term, Counselling and Patient Education, Dietary prescription. Motivating Patients. Working with; Hospitalized patients, Outpatients Follow up, Monitoring and Evaluation of outcome , Home visits	2 credit

D. References:

- Food Service mgt West, B. B. and wood, L (1979) food service in illustrations John willey,Newyork Sethi, MMalhan 1997 catering management An integrated approach new age international.
- Food Service Management: Principles and Practice- Mudit Bhojwani
- Catering Management: An Integrated Approach- S Sethi, Mohini Malhan

MAJOR CORE

(SEMESTER IV)

M.Sc. (Nutrition and Food Science) Semester IV

PAPER 1: COMMUNITY NUTRITION
MSC24N- 411TH

~~Lectures: 60~~ ~~(Credits- 04)~~

A. Course Objectives: The course aims to-

a) To understand the concept & scope of community nutrition.

b) To understand the sources of information for assessment of nutritional status.

c) To understand Status and causes of nutritional issues of community.

d) To gain the knowledge of different causes of community health hazards.

e) To get knowledge about different health programs for improvement of community health.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Analyze nutritional issues in community

b) Identify the causes if health hazards in community

c) Evaluate public health programs for Community Improvement

C. Course Contents:

Module 1	**Introduction and scope of Community Nutrition**	**15 hours**
	Concept and Scope of Community Nutrition. Food availability and factors affecting food availability and intake. Agricultural production, post harvesthandling (storage & treatment), marketing and distribution, industrialization, population, economic, regional and socio-cultural factors. Strategies for augmenting food production.	1 credit
Module 2	**Assessment of nutritional status in community**	**15 hours**
	Assessment of Nutritional status - meaning, need, objectives and importance. Use of clinical signs,anthropometry, biochemical tests, and biophysical methods. Assessment of food and nutrient intake through recall and record. Food security and adequacy of diets. Use of other sources of information for assessment. Sources of relevant statistics. Infant, child and maternal mortality rates. Epidemiology of nutritionally related diseases.	1 credit
Module 3	**Common Nutrition problems and hazards to community**	**15 hours**
	Common Nutritional Problems inIndia:	1 credit

	PEM, Micronutrient Deficiencies, Fluorosis, Correction/Improvements in Diets **Hazards to Community Health** and Nutritional status Adulteration in food Pollution of water, air Waste management Industrial effluents, sewage Pesticide residue in food Toxins present in food - mycotoxins etc.	
Module 4	**National nutrition scheme and education**	**15 hours**
	Schemes and Programs in India to combat Nutritional Problems in India. Role of International, National and Voluntary agencies and Government departments. **Health and Nutrition Education** - Steps in planning, implementation, and evaluations. Use of educational aids - visual, audio, audio-visual, traditional media etc.	1 credit

D. References:

- Park's Textbook of Preventive and Social Medicine by K. Park

M.Sc. (Nutrition and Food Science) Semester IV

PAPER 2: AYURVEDIC DIET PLANNING
MSC24N- 412TH

~~Lectures: 60~~ ~~(Credits- 04)~~

A. Course Objectives: The course aims to-

a) To gain deep insight of Ayurvedic diet planning for all age groups & gynecological conditions
b) To gain knowledge of diet prescriptions for infant and children.
c) To know the variations in diet according to geographical areas.
d) To know dos & don'ts for maintenance of health through diet.
e) To get wholesome knowledge of pediatric nutrition.
f) To understand. Regional, Continental & International dietary practices with Ayurveda perspective
g) To get the comprehensive knowledge about diet and nutritional therapy.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

d) Prepare Ayurvedic diet plans for all age groups
e) Identify the regional dietary practices and prepare a meal plan accordingly

C. Course Contents:

Module 1	**Ayurvedic Nutrition in Different stages of life**	**30 hours**
	Pathyapathya for Swasthya Rakshan – Significance and importance. Anna – prakriti- Swastha avastha aahar. Definition of Pathya, Types (according to Anna, Aushadh, Vihar, Vidhi) Anupan – Properties of Samyak Anupana, Contraindications, Anupana Dravya, Kala, according to Ritu(season) and Vyadhi. Desh Vichar, types, Dietary habits, food items according to Desh, Variations in Ahar in Maharashtra based regions. Ahara according to specific Avastha, - Ritumati, Rajasvala, Garbhini, Sootika, Rajanivrutti, Agewise (Navajaata to Vriddha) Ahar in Kseerad, Ksheerannada, Annada avastha Ahar in vruddhavastha	2 credits
Module 2	**Regional, Continental & International dietary practices with Ayurveda perspective**	**30 hours** 2 credits

D. References:

- Charaka samhita and its commentaries

- Sushruta Samhita and its commentaries
- Ashtanga Hrudaya and its commentaries
- Ashtanga Samgraha and its commentaries
- Bhavaprakash Nighantu
- Yogaratnakar
- Ayurvediya Prasuti-Tantra Evam Stri-Roga- Dr. P.V. Tiwari

M.Sc. (Nutrition and Food Science) Semester IV

PAPER 3: SPORTS NUTRITION & FITNESS NUTRITION

MSC24N- 413TH

Lectures: 60 **(Credits- 04)**

A. Course Objectives: The course aims to-

a) To understand Diet & Sports performance, Body composition & Anthropometry

b) To understand about Fitness Nutrition Physical fitness and training diets.

c) To prepare diet plans as per sport requirements.

d) To understand the sports psychology & sports injuries.

e) To understand the effect of specific nutrient on specific physical training.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Apply Analyze the relationship between diet and sports performance, body composition, and anthropometry.

b) Design and implement sport-specific diet plans.

c) Assess the impact of specific nutrients on physical training outcomes.

C. Course Contents:

Module 1	**Sport Nutrition**	**30 hours**
	Diet & Sports performance Body composition & Anthropometry Sports psychology Doping Sports injuries	2 credits
Module 2	**Fitness Nutrition**	**30 hours**
	Introduction to fitness & training benefits of exercise Substrate of exercise Effect of specific Nutrient on work performance & Physical fitness and training diets. Formulating dietary guidelines.	2 credits

D. References:

- Exercise, Physiology, Fitness and Sports Nutrition- B.Srilakshmi
- Nutritional Guidelines for Sportspersons- Geetanjali Bhide, Subhadra Mandarika
- Sports Nutrition for Health Professionals- American Council of Exercise

M.Sc. (Nutrition and Food Science) Semester IV

PAPER 4: DISSERATATION
MSC24N- 414P

~~Lectures: 90~~ ~~(Credits- 06)~~

A. Course Objectives: The course aims to-

a) To gain knowledge of applied aspect of research in the field of nutrition
b) To get practical knowledge of statistics.
c) To gain the knowledge of research in food industries.
d) To develop different food products through research-based innovations.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Apply theoretical concepts of nutrition research to practical scenarios in both observational and interventional research.
b) Demonstrate the ability to critically analyze research papers and identify relevant nutritional trends.
c) Develop skills to design, conduct, and interpret experiments related to human nutrition, public health, and food science.
d) Apply statistical tools and techniques for data analysis in nutrition research.
e) Conceptualize and develop innovative, research-based food products with a focus on nutritional quality and consumer needs.

C. Research Format:

- This will involve **independent observational and interventional research**, where students will carry out a research project on a chosen topic related to nutrition.
- By the end of the course, the research should be compiled and submitted as a **hard-bound black book** with **40 to 100 pages**. This book should include detailed research methodology, findings, analysis, and conclusions.

MAJOR ELECTIVE

(SEMESTER IV)

M.Sc. (Nutrition and Food Science) Semester IV

PAPER 5: FUNCTIONAL FOODS & NUTRACEUTICALS

MSC24N- 415TH

Lectures: 60 **(Credits- 04)**

A. Course Objectives: The course aims to-

a) Define and differentiate between functional foods and nutraceuticals.
b) To understand the bioactive compounds found in functional foods and their health benefits.
c) To understand the regulatory frameworks and marketing aspects of functional foods and nutraceuticals.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Analyze the bioactive compounds found in functional foods and their health benefits.
b) Evaluate the evidence supporting the efficacy and safety of functional foods and nutraceuticals.
c) Understand the regulatory frameworks and marketing aspects of functional foods and nutraceuticals.

C. Course Contents:

Module 1	**Introduction to Functional Foods and Nutraceuticals**	**15 hours**
	Introduction to Functional Foods and Nutraceuticals- Definitions, classifications and differences from conventional foods and dietary supplements.	1 credit
Module 2	**Bioactive Compounds in Functional Foods**	**15 hours**
	Bioactive Compounds in Functional Foods- Overview of phytochemicals, antioxidants, probiotics, prebiotics, omega-3 fatty acids, etc. Mechanisms of action and health benefits of bioactive compounds.	1 credit
Module 3	**Functional Foods in Disease Prevention and Management**	**15 hours**
	Health Effects and Evidence Base- Evidence-based research on functional foods and nutraceuticals. Functional Foods in Disease Prevention and Management- Role of functional foods in managing chronic diseases (e.g., cardiovascular disease, diabetes, obesity). Applications in promoting gastrointestinal health, immune function, and cognitive health.	1 credit
Module 4	**Regulatory frameworks and Marketing Aspects**	**15 hours**
	Regulatory and Marketing Aspects- Regulatory frameworks for functional foods and nutraceuticals (e.g.,	1 credit

	FDA, EFSA). Labeling requirements, health claims, and consumer perception. Factors influencing consumer acceptance of functional foods. Market trends, innovations, and future directions in the functional foods industry.	

D. References:

- Handbook of Nutraceuticals and Functional Foods- Robert E.C. Wildman
- Functional Foods and Nutraceuticals- Rotimi E. Aluko
- Functional Foods, Nutraceuticals and Natural products- Prof. Dhiraj A. Vattem, Vatsala Maitin

M.Sc. (Nutrition and Food Science) Semester IV

PAPER 6: MICROBIOME AND NUTRITION
MSC24N- 416TH

Lectures: 60 **(Credits- 04)**

A. Course Objectives: The course aims to-

a) To get understanding about safety and preservation of foods in food industries.
b) To understand details of food industries
c) To gain detail knowledge of microorganism affecting food.
d) Understand the basics of the human microbiome and its importance.
e) Explore how dietary factors shape microbial communities.

B. Learning Course Outcome (CO): On completion of the course, the student will be able to,

a) Evaluate current research linking microbiome health to nutritional choices.
b) Apply knowledge to propose dietary strategies for improving microbiome health.

C. Course Contents:

Module 1	**Food Microbiology**	**30 hours**
	Study of morphology, cultural characteristics and biochemical activities of Mold, Yeast, Bacteria, Viruses, Protozoa. Important microorganisms in foods industry. Growth curve of a typical bacterial cell - Effect of intrinsic and extrinsic factors on growth of organisms, pH, water activity, 0- R potential, nutritional requirements, temperature, relative, humidity and gaseous environment. Primary sources of micro-organisms in foods - Physical and chemical methods used in the destruction of micro-organisms, pasteurization, sterilization. Fundamentals of control of micro-organisms in foods - Extrinsic and intrinsic parameters affecting growth and survival of organisms. Use of high and low temperature, controlling moisture as water content, freezing, freezing-drying, irradiation, and use of preservatives in food. Storage of food- correct handling and techniques of correct storage, Temperatures at which growth is retarded and bacteria are killed, Storage temperatures for different commodities to prevent growth or contamination and spoilage. Food spoilage and contamination in different kinds of	2 credits

	foods and their prevention - Cereal and cereal products, pulses and legumes, Vegetables and fruits, Meat and meat products, Eggs and poultry, Milk and milk products.	
Module 2	**Microbiome and Nutrition**	**30 hours**
	Microbiome and Nutrition- Overview of the human microbiome, Basic concepts in nutrition and dietary impact on health Microbial Diversity and Diet- Factors influencing microbiome composition, Effects of different dietary components (fiber, fats, etc.) Nutrition and Gut Health- Role of microbiota in digestion and nutrient absorption, Gut-brain axis: How diet affects mental well-being Practical Applications of Microbiome Research- Probiotics, prebiotics, and their role in gut health, Dietary interventions for improving microbial balance Methodologies in Microbiome Studies- Introduction to sequencing techniques, Basic data analysis methods in microbiome research Emerging Trends and Future Direction- Current research in microbiome-targeted therapies, Ethical considerations and societal impact of microbiome research	2 credits

D. References:

- Food Microbiology- W. C. Frazier, D. C. Westhoff
- Fundamental Food Microbiology- Bibek Ray, Arun Bhunia
- The Gut Microbiome- Ana Maria R. Mosie
- The Gut Microbiome in Health and Disease- Dirk Haller
- Microbiome, Immunity, Digestive Health and Nutrition- Bernard William Downs, Debasis Bagchi
- WGO Handbook on Gut Microbes