

# **TILAK MAHARASHTRA VIDYAPEETH**

(Accredited by NAAC with 'B++' Grade)

**The Late Vd. P. G. Nanal**

**DEPARTMENT OF AYURVED**



**Syllabus for**

**M. Sc. in Nutrition and Food Science**

**(Duration of the Course: 2 Years, 2 months)**



**Tilak Maharashtra Vidyapeeth,**

**Mukund Nagar,**

**Pune-411037.**

# **M. Sc in Nutrition & Food Science**

**Name of course - M. Sc in Nutrition & Food Science**

**Duration** - 2 years with 2 months internship

**Eligibility** - Any medical graduate - B.A.M.S., B.H.M.S., M.B.B.S.,

B. Sc (nutrition), B.Sc (Home Science)

**Internship** - Compulsory internship program of 2 months in multispecialty reputed hospital should be done.

**Objectives** -

1. To blend goodness of Traditional knowledge and modern parameters in the food domain. Promoting Indian Diet as mentioned in Ayurveda with modern parameters like nutritional values and clinical biochemistry.
2. To Extended awareness about food & different preparatory methods like home cooking, ready to eat, hotel food, etc.
3. To Apply Diet therapy in various disease conditions from Pediatric to Geriatric population and to Promote healthy diet practice to make healthy society.
4. To Develop the Entrepreneurship skills in students and encourage them for to develop self employment. To develop counseling skills to serve the society as nutritional consultant, therapists.

# M. Sc in Nutrition & Food Science

## Semester System

### With Credits

Choice Based Credit System applied from March 2015

### Semester I

Sr. No.	Course Details	Internal Assessment	Term End Examination (Theory)	Internal Assessment (Practical)	Term End Examination (Practical)	Total	Hours	Credits	
								Theory	Practical
		100 Marks		50 Marks					
01	Basic Principles of Ayurvedic Diet (111)	40	60	20	30	150	108 hrs	4	2
02	Principles of Nutrition (112) Indology (Compulsory Elective)	30 10 = 40	45 15 = 60	20	30	150	108 hrs	4	2
03	Concept of Preventive Ayurvedic Diet & Clinical Physiology (113)	40	60	20	30	150	108 hrs	4	2
04	Classification Of Aahariya Dravya & Nutritional Bio-Chemistry (114)	40	60	20	30	150	108 hrs	4	2
						600	432 hrs	24 Credits	

## Semester II

Sr. No.	Course Details	Internal Assessment	Term End Examination (Theory)	Internal Assessment (Practical)	Term End Examination (Practical)	Total		Hours		Credits	
								Theory	Practical		
		100 Marks		50 Marks							
01	Ayurvedic Food Science and diet counseling (211)	40	60	20	30	150	108 hrs	4		2	
02	Medical Nutrition Therapy Part I (212)	40	60	20	30	150	108 hrs	4		2	
03	Microbiology & Research Methodology SPSS (Compulsory Elective) (213)	40	60	20	30	150	108 hrs	4		2	
04	Basic Diet from Kshemkutuhah & Bhojankutuhah (214)	40	60	20	30	150	108 hrs	4		2	
						600	432 hrs	24 Credits			

### Semester III

Sr. No.	Course Details	Internal Assessment	Term End Examination (Theory)	Internal Assessment (Practical)	Term End Examination (Practical)	Total	Hours	Credits	
								100 Marks	50 Marks
01	Ayurvedic Nutrition Therapy & Hospital Catering Management (311)	40	60	20	30	150	126 hrs	5	2
02	Ayurvedic Nutrition in Obstratics & Pediatrics Advanced English (Compulsory Elective) (312)	40	60	20	30	150	126 hrs	5	2
03	Ayurvedic Nutrition Therapy Part II (313)	40	60	20	30	150	126 hrs	5	2
04	Medical Nutrition Therapy Part II (314)	40	60	20	30	150	126 hrs	5	2
						600	504 hrs	28 Credits	

## Semester IV

Sr. No.	Course Details	Internal Assessment	Term End Examination (Theory)	Internal Assessment (Practical)	Term End Examination (Practical/Viva Voce)	Total	Hours	Credits	
								Theory	Practical
		<b>100 Marks</b>		<b>50 Marks</b>					
<b>01</b>	<b>Community Nutrition Ethics (Compulsory Elective) (411)</b>	<b>40</b>	<b>60</b>	<b>20</b>	<b>30</b>	<b>150</b>	<b>108 hrs</b>	<b>4</b>	<b>2</b>
<b>02</b>	<b>Ayurvedic Diet Planning (412)</b>	<b>60</b>	<b>40</b>	<b>20</b>	<b>30</b>	<b>150</b>	<b>108 hrs</b>	<b>4</b>	<b>2</b>
<b>03</b>	<b>Sports Nutrition &amp; Fitness Nutrition (413)</b>	<b>60</b>	<b>40</b>	<b>20</b>	<b>30</b>	<b>150</b>	<b>108 hrs</b>	<b>4</b>	<b>2</b>
<b>04</b>	<b>Dissertation</b>		<b>100</b>		<b>50</b>	<b>150</b>	<b>72 hrs</b>	<b>-</b>	<b>4</b>
						<b>600</b>	<b>396 hrs</b>	<b>22 Credits</b>	

# M.Sc. In Nutrition & Food Science

## Syllabus

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### Semester – I

#### PAPER - 1: BASIC PRINCIPLES OF AYURVEDIC DIET

<b>Subject name</b>	Basic principles of Ayurvedic Diet
<b>Subject code</b>	111

#### Goals :

- To fulfill the essential element of vision and mission of dept by imparting quality education of traditional Indian food science.
- To gain the knowledge of history of Indian diet and nutrition.
- Introduction to Ayurveda and its principles.
- Effect of diet in physiological processes.
- To understand the constitution of an individual in all aspects.
- To understand the Ayurvedic aspect of physiology for further diet panning.

#### A. History of Ahara Nutrition

Vedic and Madhyayugin diet and its process

#### B. Basic Principal :

What is science? What is Ayurveda

Aharashastra – Definition, intention area of Action

Ayurvedic composition

Ayurvedic components

#### C. Details of Basic Principal :-

Lokpirushasamyā, Karyakarana Siddhanta,

Samanya Vishesh Siddhanta,

Panchamahabhuta Siddhanta,

Swabhavoparmvada all Siddhanta

In relation with diet and its importance.

#### D. Doshadhatumala Vidyana

- Doshavidyana
- Dhatuvidyana - Tissue/ Cell metabolism
- Malavidyana - Excretory Vidyana
- Strotavidyana – Systematic circulation
- Dhatusarta - Cell replenishing
- Prakruti - Constitution
- Doshadhatumalavidyana – The importance of diet in physiological process.

## PAPER - 2: PRINCIPLES OF NUTRITION

<b>Subject name</b>	Principles of Nutrition
<b>Subject code</b>	112

### Goals :

- To gain the knowledge of history and scope of modern nutrition.
  - Understand theoretical aspect of macro and micronutrients.
  - Effect of food elements on human body.
  - To understand the digestion, absorption and metabolism according to modern science.
  - To learn nutritional requirements of different age groups and occupations.
- 
1. Definition of terms –Health, Nutrition, Malnutrition, History of Nutritional Science, Scope of Nutrition,
  2. Energy - Energy Balance, indirect and direct calorimetry, **Reference Man and Reference Woman.**
  3. Proteins - Protein Quality (BV, PER, NPU), Digestion and Absorption, functions, Factors affecting protein bio-availability including Anti nutritional factors. Requirements and deficiency
  4. Lipids - Digestion and Absorption, requirement and deficiency- Types of fatty acids, Role and nutritional significance (SFA, MUFA, PUFA, W-3)
  5. Carbohydrates - Digestion and Absorption. Functions deficiency and excess. glycemic index.
  6. Dietary Fiber – Classification and significance.
  7. Minerals and Trace Elements - Physiological role, functions, Bioavailability and RDA and deficiencies.
  8. Vitamins - Physiological role, Bioavailability and RDA and deficiencies.
  9. Water - Functions, Requirements.
  10. Effect of cooking on digestibility and nutritive value of foods. Improving nutritional value through different methods - germination, fermentation, combination of foods.
  11. Basic principles of meal planning.
  12. Nutritional considerations for planning meals for
    - o Adults - male and female, different levels of physical activity.
    - o Pregnancy and Lactation
    - o Feeding of infants and young children 0 -3 years
    - o Feeding preschool and school children
    - o Feeding adolescents
    - o Old age
    - o Athletes

### References:

- Charaka samhita and its commentaries
- Sushruta Samhita and its commentaries
- Ashtanga Hrudaya and its commentaries
- Ashtanga Samgraha and its commentaries



- Bhavaprakash Nighantu
  - YagaRatnakar
  - Kshemakutuhhal
  - Bhojanakutuhhal
  - Pakadarpan – Nalakrut
  - Bruhan-nighanturatnakar
  - Madhav Dravyaguna – Priyavrat Sharma
- 
- 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) Bapp Co. 1985.
  - Robinson. Basic Nutrition and Diet Therapy (8th edition)
  - Shills and Young. Modern Nutrition in Health and Disease.

## PAPER - 3: CONCEPT OF PREVENTIVE AYURVEDIC DIET & CLINICAL PHYSIOLOGY

<b>Subject name</b>	Concept of Preventive Ayurvedic Diet & clinical Physiology
<b>Subject code</b>	113

### Goals :

- To gain the knowledge of diet for the preventive aspect.
  - To understand the proper eating habits according to Ayurveda science.
  - To understand daily regime & seasonal conducts.
  - Effect of container on food elements and its effects on human body.
  - Understand the effects of fasting on human digestion.
- To know the physiology of different systems in body for clinical application

### A. Concept of Preventive Ayurvedic Diet

- 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, aphometry
- Bhojana vidhi
- Jalapana
- Patra concept
- Laghana therapy

### B. Clinical Physiology:-

1. Introduction – cell, cell structure, cellular organelles and their functions
2. The Skeletal system
3. The Muscular System - Types of muscles, characteristics, Similarities and Differences.
4. 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 functions of heart, Blood pressure, heart rate, Cardiac output and their regulation.
5. Lymphatic System - Lymph, Lymph glands and its functions, Spleen - Structure and Functions.
6. Respiratory System - Organs, Structure and Functions, Mechanism of Respiration, Chemical Respiration.
7. 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.
8. Excretory System - Structure and Functions of (a) Kidney (b) Ureter (c) Bladder (d) Skin. Urine - Formation of urine, Composition of normal and abnormal urine. Role of excretory system in homeostasis, fluid balance, Regulation of body temperature.
9. Nervous System - Structure of Nerve Cell, Fiber, Classification of Nervous System, CNS - Brain, Lobes of brain, Cerebrum, Cerebellum, Medulla oblongata, Hypothalamus. Pituitary Gland - structure, Functions, Spinal Cord - structure and functions, Autonomic and Sympathetic nervous system.

10. Reproductive System – Female and male reproductive system - organs, structure and functions . Menstrual cycle, Puberty, Menarche, Menopause, Fertilization of ovum, Conception, Implantation.
11. Sense Organs - Eye ,Ear, Skin -structure and function
12. 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

References:

- Charaka Samhita and its commentaries
- Sushruta Samhita and its commentaries
- Ashtanga Hrudaya and its commentaries
- Ashtanga Samgraha and its commentaries
- Bhavaprakash Nighantu
- YagaRatnakar
- Kshemakutuhhal
- Bhojanakutuhhal
- Pakadarpan – Nalakrut
- Bruhan-nighanturatnakar
- Madhav Dravyaguna – Priyavrat Sharma
- Guyton
- Ross and Wilson

## PAPER - 4: CLASSIFICATION OF AAHARIYA DRAVYA & NUTRITIONAL BIO-CHEMISTRY

<b>Subject name</b>	Paper - 4: Classification Of Aahariya Dravya & Nutritional Bio-Chemistry
<b>Subject code</b>	114

### Goals :

- To gain the knowledge of basic criteria to understand a Dravya.
- To understand the basics of Ayurvedic pharmacology.
- To get thorough knowledge of classification and properties of diet according to Ayurveda.
- To understand the clinical biochemistry of macronutrients.
- To understand the cellular level functions.

### A. Basics of Dravyaguna

Dravya  
Guna, Veerya  
Karma  
Rasa  
Vipaka,  
prabhav

### Varga Vichar:-

- Shukavarga
- Shimbivarga
- Shakavarga
- Lavanavarga
- Dugdhavarga
- Mansavarga
- Tailavarga
- Phalavarga
- Madhuvarga
- Jalavarga

### B. Clinical Biochemistry:-

1. Introduction to Biochemistry - Significance of pH, Acid-Base Balance,
2. 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, HMP shunt.
3. Proteins - Structure, composition Classification and Function, Structure of important proteins with special reference 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 acid pool. Urea Cycle, Creatinine and Creatine Synthesis, changes in PEM, Pregnancy, Inborn errors of metabolism.

4. 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, Bile acids and their metabolism, Plasma lipoproteins - Synthesis and Metabolism, Biochemical profile, alterations and significance, Prostaglandins. Role of carnitine in lipid metabolism
5. Enzymes and hormones- Definition, Classification specificity of enzymes -Intracellular distribution, kinetics, inhibition, Factors affecting enzyme activity, Enzymes in clinical diagnosis. Inborn errors of metabolism.
6. Biological Oxidation, Electron Transport Chain, Oxidative Phosphorylation.

#### References:

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

#### Exam Pattern:-

Paper 1, 2 , 3 and 4	40 Marks each for Internal Assessment  60 marks each for each paper
Practical/Viva	20 Marks for Internal Assessment  30 Marks for Practical/Viva Voce

## SEMESTER II

### PAPER -1: Ayurvedic Food Science and diet counseling

<b>Subject name</b>	PAPER -1: Ayurvedic Food Science & Diet Counseling
<b>Subject code</b>	211

#### Goals :

- To gain the deep knowledge of traditional Ayurvedic culinary skills.
- To achieve counseling skills for future employability in the field of nutrition and diet.
- To gain the knowledge of properties of current era food stuffs & beverages.
- To gain knowledge of diet planning according to diagnosis.
- To learn the history taking for diet prescription.

#### A. Krutanna Varga & Sanskar Vichar:-

Manada

Peya

Vilepi

Yavagu

Odana

Misshtanna

#### Anukta Varga:-

- Tea
- Coffee
- Preserved Food
- Ice cream
- Bakery product

#### **B. DIETETIC COUNSELING**

- 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 identifying areas of need.
- The care process – Setting goals and objectives short term, Counseling and Patient Education, Dietary prescription.
- Motivating Patients.
- Working with
  - A. Hospitalized patients (adults, pediatric, elderly and handicapped) adjusting and adopting to individual needs.

B. Outpatients (adults, pediatric, elderly and handicapped) patient's education, techniques and modes.

- Follow up, Monitoring and Evaluation of outcome , Home visits

## PAPER -2: MEDICAL NUTRITION THERAPY- PART I

<b>Subject name</b>	Paper -2: Medical Nutrition Therapy- Part I
<b>Subject code</b>	212

### Goals :

- To gain knowledge of Interactions between Drugs & Nutrients.
- To understand pathophysiology of different systemic diseases.
- To learn nutritional therapy of different systemic disorders.
- To prepare diet prescriptions for specific diseases.

### 1. Nutritional Intervention - Diet Modifications

- 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

### 2. Interactions between Drugs, Nutrients and Nutritional Status

- 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

### 3. Medical Nutrition Therapy (MNT) for diseases of GI system -

- Pathogenesis of G.I.
- Diseases of esophagus and dietary care
- Diseases of stomach and dietary care
- Gastric and duodenal ulcers
- Predisposing factors and Treatment
- Brief medical therapy, rest, antacids, other drugs and dietary care
- Food acidity, foods that cause flatulence, factors that damage G. I. Mucosa
- Foods stimulating G. I. Secretion
- Gastrectomy
- Intestinal Diseases



- Flatulence, Constipation, Irritable Bowel, Hemorrhoids, Diarrhoea, Steatorrhoea, Diverticular disease, Inflammatory Bowel Disease, Ulcerative Colitis.
- Treatment and Dietary Care
- Malabsorption Syndrome
- Celiac Sprue, Tropical Sprue
- Intestinal Brush border deficiencies (Acquired Disaccharide Intolerance)
- Protein Losing Enteropathy
- Dietary Care Process
- **Pathophysiology of GI tract diseases - anatomic, physiologic and functional changes, impact on nutritional status and nutritional implications, post surgical complications and management, malabsorption syndrome.**

#### **4. MNT for Diseases of the Liver, Pancreas and Biliary System**

- Nutritional care in Liver disease in the context of results of specific Liver Function Tests.
- Dietary Care & Management in Viral Hepatitis, Cirrhosis of Liver, Hepatic Encephalopathy, Wilson's disease.
- Dietary care and management in diseases of Gall Bladder and Pancreas.
- Biliary Dyskinesia, Cholelithiasis, Cholecystitis, Cholecystectomy, Pancreatitis
- **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, Dyslipidemias.**

#### **5. MNT for Anemia**

- Resulting from Acute Hemorrhage
- Nutritional anemia
- Sickle cell anemia
- Thalassemia
- Pathogenesis and dietary management in the above conditions

#### **6. MNT for diseases of the Adrenal Cortex, Thyroid gland and Parathyroid gland.**

- Functions of the gland and hormones and their insufficiency, metabolic implications, clinical symptoms.
- Dietary treatment as supportive to other forms of therapy
- Adrenal cortex insufficiency, Hyper and Hypothyroidism (goitre), Hypoglycemia.

#### **7. MNT in Weight Management**

- Regulation of energy intake and balance of body weight
- Control of appetite - Neural control, hormonal control, insulin, estrogen and other peptides and hormones.

- Types of obesity, Health risks
- Theories of obesity, Physiology of the obese state
- Thermogenesis, Thyroid hormones
- Treatment of Obesity
- Evaluation of some common diets, Protein-sparing modified fast, High protein diet
- Behavioural Modification - Psychotherapy, pharmacology, exercise & physical activity, Surgery, prevention of weight gain & obesity.
- Underweight - Etiology and Assessment, High calorie diets for weight gain, Diet plan, Suggestions for increasing calories in the diet, Anorexia Nervosa and Bulimia

**8. MNT for Metabolic Disorders, Diseases of Endocrine Glands and Inborn Errors of Metabolism.**

**References:**

- Charaka samhita and its commentaries
  - Sushruta Samhita and its commentaries
  - Ashtanga Hrudaya and its commentaries
  - Ashtanga Samgraha and its commentaries
  - Bhavaprakash Nighantu
  - YagaRatnakar
- A. Antia F. P.: Clinical Dietetics and Nutrition, 3rd ed., Oxford University, Press, Delhi, Reprinted in 1989.
- B. Robinson, C. H, M. R. Lawlwr, W. L. Chenoweth and A. E. Garwick: Normal and Therapeutic Nutrition, 17th ed., Mac Millan Pub. Co.
- C. Krause. Food, Nutrition & Diet Therapy.
- D. Shills and Young. Modern Nutrition in Health and Disease

### PAPER - 3: MICROBIOLOGY & RESEARCH METHODOLOGY

<b>Subject name</b>	Paper - 3: Microbiology & Research Methodology
<b>Subject code</b>	213

#### Goals :

- To get understanding about safety and preservation of foods in food industries.
- To gain the knowledge of process of research in the field of nutrition
- To understand details of food industries
- To understand different research methodologies in nutritional aspect.
- To gain detail knowledge of microorganism affecting food.

#### A. Microbiology:-

1. Study of morphology, cultural characteristics and biochemical activities of Mold, Yeast, Bacteria, Viruses, Protozoa Important microorganisms in foods industry.
2. Growth curve of a typical bacterial cell - Effect of intrinsic and extrinsic factors on growth of organisms, pH, water activity, O<sub>2</sub>-R potential, nutritional requirements, temperature, relative humidity and gaseous environment.
3. Primary sources of micro-organisms in foods - Physical and chemical methods used in the destruction of micro-organisms, pasteurization, sterilization.
4. 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.
5. Food spoilage and contamination in different kinds of 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.
6. Public health hazards due to contaminated foods - Food poisoning and infections -Causative agents, symptoms, sources and mode of transmission, foods involved, Method of prevention, Fungal toxins, Investigation and detection of food-borne disease outbreak.
7. Microbes used in biotechnology - Useful micro-organisms, Fermented foods - raw material used, organisms and the product obtained, Benefits of fermentation.
8. Indices of food, milk and water sanitary quality. Microbiological criteria of food, water and milk testing. Food standards, PFA, FPO, BNS, MPO, Agmark, Codex Alimentarius.
9. Hygiene and its importance and application - Personal hygiene - care of skin, hair, hands, feet, teeth, Use of cosmetics and jewellery, Grooming, Uniform, Evaluation of personal hygiene, Training staff.
10. Safe handling of food - Control measures to prevent food borne diseases and precautions to be taken by food handlers. Reporting of cold, sickness, boils, septic wounds etc.

11. Rodents and Insects as carriers of food-borne diseases. Control techniques.
12. Disinfectants, sanitizers, antiseptic and germicide. Common disinfectants used on working surfaces, kitchen equipment, dish washing, hand washing etc. Care of premises and equipment, cleaning of equipment and personal tools immediately after use, use of hot water in the washing process.
13. Waste disposal, collection, storage and proper disposal from the premises.
14. Legal administration and quality control, laws relating to food hygiene.

**B. Research Methodology:-**

Definition, Types – Ancient Research Methodology, Modern research methodology, Ayurvedic research aspect & importance statistics, Basics of dissertation

## PAPER 4: BASIC DIET FROM KSHEMKUTUHAL & BHOJANKUTUHAL

<b>Subject name</b>	Paper 4: Basic Diet From Kshemkutuhah & Bhojankutuhah
<b>Subject code</b>	214

### Goals :

- To understand about properties and functions of traditional Indian food substances
- To gain the knowledge of traditional healthy recipes from compendia.
- To gain deep knowledge of Ayurvedic nutritional therapy.
- To get comparative knowledge of traditional & modern food items.
- To understand the appropriate way of consuming food in traditional Indian food science.

### A. Kshemkutuhah

### B. Bhojankutuhah

### Exam Pattern:-

Paper 1, 2 , 3 and 4	40 Marks each for Internal Assessment  60 marks each for each paper
Practical/Viva	20 Marks for Internal Assessment  30 Marks for Practical/Viva Voce

## SEMESTER III

### PAPER – 1: AYURVEDIC NUTRITION THERAPY & HOSPITAL CATERING MANAGEMENT

<b>Subject name</b>	Paper – 1: Ayurvedic Nutrition Therapy & Hospital Catering Management
<b>Subject code</b>	311

#### Goals :

- To gain deep knowledge of causative factors of different diseases
- To understand dietary causative factors of various diseases.
- To understand the Ayurvedic methods of diagnosis.
- To know the Ayurvedic pathophysiology of diseases.
- To gain the knowledge of hospital catering skills and human resource management

#### A. Method of Nidana in Ayurved:-

Vyadhi Utpatti, Rogamarga, Shatkriyakal

1. Vyutpatti, Definition, Nidan Panchak, Characteristics of Ayurvediya Nidan, Vyadhi Utpatti
2. Aamotpatti, Trayo Rogamarga, Hetubhootatva of Aahar in Rogotpatti
3. Shatkriyakal according to Sushruta, its importance in Nidan
4. Roga- rogi Parikshan

#### Srotonurupa Aahariya Hetu :-

- |                     |   |                          |
|---------------------|---|--------------------------|
| 1. Pranavaha Srotas | - | Shwas                    |
| 2. Annavaha         | - | Ajirna                   |
| 3. Udakavaha        | - | Shotha                   |
| 4. Rasavaha         | - | Hridroga                 |
| 5. Raktavaha        | - | Kamala                   |
| 6. Mamsavaha        | - | Karshyadi                |
| 7. Medovaha         | - | Santarpanotha – Sthaulya |
| 8. Asthivaha        | - | Sandhigata Vata          |
| 9. Majjavaha        | - | Bhram etc.               |
| 10. Shukravaha      | - | Klaibya                  |
| 11. Purishvaha      | - | Atisar                   |
| 12. Mutravaha       | - | Ashmari                  |
| 13. Swedavaha       | - | Kushtha                  |
| 14. Manovaha        | - | Unmad                    |
| 15. Sadnyavaha      | - | Murchha                  |

## **B. Hospital Organization & Personal Management**

1. Introduction to food services and catering industry, Development of food service institutions in India, Types of services as affected by changes in the environment.
2. Hospital food service as a speciality – Characteristics, rates and services of the food production, service and management in hospitals. Role of the food service Manager/Dietitian.
3. Organizations – Types of organizations and characteristics. Organizational charts.
4. Catering Management – Definition, Principles and functions, Tools of Management Resources. Attributes of a successful manager. Leadership, motivation and communication. Dietitian as leader.
5. Approaches to Management Traditional, Systems Approach, Total Quality Management.
6. Management of Resources- Capital, Space, Equipment and furniture, Materials, staff, Time and Energy, Procedures Physical facility design and planning. Equipment selection.
7. Purchase and store room management – Purchase systems, specifications, food requisition and inventory systems, quality assurance.
8. Human Resource Management
  1. Definition, Development and policies
  2. Recruitment selection, Induction
  3. Employment procedures: Employee Benefits, Training and Development, Human Relations, Job descriptions, Job evaluation, Personnel appraisal.
  4. Trade Union Negotiations and Settlement.
9. Financial Management – Elements of Financial management, Budget Systems and accounting. Budget preparation.
10. Laws- food laws, labor laws/IDA Board / Membership /Contact Us

### References:

1. 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
2. Charaka samhita and its commentaries
3. Sushruta Samhita and its commentaries
4. Ashtanga Hrudaya and its commentaries
5. Ashtanga Samgraha and its commentaries
6. Bhavaprakash Nighantu

## PAPER – 2: AYURVEDIC NUTRITION IN OBSTRATICS & PEDIATRICS

<b>Subject name</b>	PAPER – 2: AYURVEDIC NUTRITION IN OBSTRATICS & PEDIATRICS
<b>Subject code</b>	312

- To provide an opportunity to develop inter-disciplinary diet prescription skills
- To gain deep insight of Ayurvedic diet planning for all age groups like & gynecological conditions
- To gain knowledge of diet prescriptions for infant and children.
- To know the variations in die according to geographical areas.
- To know dos & don'ts for maintenance of health through diet.
- To get wholesome knowledge of pediatric nutrition.
- 

### **A. Strotsanusar Vyadhi Aharchikitsa in special condition like Koumarbhritya, garbhini, sutika, etc.**

#### **Avastha , Pathyapathya, Desha, and Anupana**

1. Ahara according to specific Avastha, - Ritumati, Rajasvala, Garbhini, Sootika, Rajinivrutta, Agewise ( Navajaata to Vriddha)
2. Ahar in Kseerad, Ksheeranaada, Annada avastha
3. Ahar in vrudhavasatha
4. Pathyapathya for Swasthya Rakshan – Significance and importance.  
Anna – prakriti- Swastha avastha aahar.  
Definition of Pathya, Types (according to Anna, Aushadh, Vihar, Vidhi)
5. Desh Vichar, Typesa, Dietary Habits, Food items according to Desh, Variation in Ahar in Maharashtra based on regions.
6. Anupan – Properties of Samyak Anupana, Contraindications, Anupana Dravya, Kala, according to Ritu (season) and Vyadhi.  
Jala – Pathyapathya Vichar

### **B. Pediatric Nutrition:-**

1. Pregnancy and lactation – changes in physiology, Nutritional requirement  
Physiology of lactation and maternal nutrient needs
2. Requirement of Neonates, weaning and current feeding practices
3. Nutritional requirement of premature infants their growth and development
4. PEM and childhood obesity
5. Common problems in infancy – diarrhea, constipation, milk intolerance, celiac disease.
6. NIDDM in born errors in metabolism.



## PAPER- 3: AYURVEDIC NUTRITION THERAPY -PART II

<b>Subject name</b>	Paper- 3: Ayurvedic Nutrition Therapy -Part Ii
<b>Subject code</b>	313

### Goals :

- To understand Ayurvedic aspect of nutrition therapy of different disorders.
  - To understand Physiological changes & Health problems in aging.
  - To understand Nutritional requirements in geriatric.
  - To gain deep knowledge of Ayurvedic diet prescriptions for geriatric conditions.
- To know the diet therapy according to Ayurvedic classification of various systems

### A. Strotsanusar Vyadhi Aharchikitsa in adults:-

1. Pranavaha Srotas - Shwas
2. Annavaha - Ajirna
3. Udakavaha - Shotha
4. Rasavaha - Hridroga
5. Raktavaha - Kamala
6. Mamsavaha - Karshyadi
7. Medovaha - Santarpanotha – Sthaulya
8. Asthivaha - Sandhigata Vata
9. Majjavaha - Bhram etc.
10. Shukravaha - Klaibya
11. Purishvaha - Atisar
12. Mutravaha - Ashmari
13. Swedavaha - Kushtha
14. Manovaha - Unmad
15. Sadnyavah - Murchha

### B. Geriatric Nutrition:

Physiological changes in aging.

Nutritional requirements

Health problems

Drug & Nutrient interaction

## PAPER 04: MEDICAL NUTRITION THERAPY PART II

<b>Subject name</b>	Paper 04 : Medical Nutrition Therapy Part I
<b>Subject code</b>	314

### Goals :

- To understand pathophysiology of different health issues.
- To gain the knowledge of nutritional therapy for different systemic diseases.
- To understand diet planning for various health issues.
- To understand the role of diet in immunity.
- To understand role of diet in endocrine & metabolic disorders.

### 1. MNT for DM

- Classification
- Physiological symptoms and disturbances, diagnosis (FBG and OGTT)
- Management of Diabetes Mellitus
- Hormonal Therapy
- Oral Hypoglycemic Agents
- Glycosylated Hemoglobin
- Urine Testing
- Exercise
- Dietary care and Nutritional Therapy - The Diet Plan, Meal planning with and without Insulin, Special Dietetic Foods, Sweeteners and Sugar Substitutes
- Gestational DM, IDDM and NIDDM, Diabetic diets in Emergency, Illness, Diabetic coma, Insulin reaction, Juvenile diabetes, Patient Education in Diabetes

2. **MNT for Hypoglycemia** - Classification, symptoms, fasting state hypoglycemia, Postprandial or reactive hypoglycemia.

### 3. MNT for Diseases of the Circulatory System

- Atherosclerosis - Etiology, risk factors, diet
- Hyperlipidemias .
- Clinical and nutritional aspects of Hyperlipidemias
- Classification and Dietary care of Hyperlipidemias
- Nutritional care in Cardiovascular disease (Ischemic heart disease Pathogenesis of sodium and water retention in Congestive Heart Disease. Acute and Chronic Cardiac Disease, Acute - Stimulants, food & consistency, Chronic - Compensated and decompensated states, Sodium Restriction in Cardiac Diseases, Diet in Hypertension - Etiology, Prevalence, Renin-Angiotensin mechanism, Salt and Blood pressure, Drugs and Hypertension, Cerebrovascular diseases and diet in brief).

- **Cardio-vascular Diseases - Pathogenesis, role of nutrients in prevention - metabolic and nutritional implications, Dyslipidemias.**

#### 4. MNT for Renal Diseases

- Physiology & function of normal kidney - a brief review
- Diseases of the kidney, classification
- Glomerulo nephritis - Acute and Chronic - Etiology, Characteristics, Objectives, Principles of Dietary Treatment and Management
- Nephrotic syndrome - objectives, principles of Dietary Treatment and Management.
- Uremia and Renal Failure
- Acute Renal Failure - Causes, dietary management fluid, sodium and potassium balance, protein and energy requirements
- Chronic renal failure medical treatment, Renal transplants. Dialysis and types hemodialysis, Peritoneal Dialysis & Continuous Ambulatory Peritoneal Dialysis (CAPD). Dietary Management in conservative treatment, dialysis and after renal transplantation.
- Use of Sodium and Potassium Exchange lists in Renal
- Chronic renal failure in patients with diabetes mellitus
- Chronic renal failure in children
- Nephrolithiasis /kidney stone- Etiology, types of stones, Nutritional care, alkaline-ash diets
- **Diseases of the renal system - etiology and pathogenesis - changes in function with progression of diseases, metabolic and nutritional implications, water and electrolyte balance.**

#### 5. MNT for Allergy

- Definitions, symptoms, mechanism of food allergy
- Diagnosis - History, Food record
- Biochemical and Immunotesting (Brief)
- Elimination diets
- Food selection
- Medications (brief)
- Prognosis food Allergy in infancy - Milk sensitive enteropathy; Colic, Intolerance to breast milk, prevention of Food Allergy.
- **Immunity and infection - diarrhea, AIDS, Respiratory problems.**

#### 6. MNT for Diseases of Nervous System, Behavioral Disorders and Muscular Skeletal System

- Neuritis and polyneuritis
- Migraine, headache
- Epilepsy
- Multiple sclerosis
- Hyperkinetic Behavior Syndrome
- Orthomolecular psychiatry and mental illness (Brief) Definition, etiology, dietary treatment and prognosis in the above conditions.
- Arthritis –
- Rheumatoid Arthritis
- Osteoarthritis
- Symptoms, dietary management
- **Musculo-skeletal problems, arthritis, osteoporosis.**

## 7. Nutrition in Cancer

- Types, symptoms, detection
- Cancer therapies and treatment - side effects and nutritional implications
- Goals of care and guidelines for oral feeding
- Accommodating side effects
- Enteral tube feeding - Nasogastric, Gastrostomy, Jejunostomy
- Parenteral Nutrition
- Pediatric patients with cancer
- The terminal cancer patient
- **Cancer - carcinogenesis - pathogenesis and progression of cancer, role of nutrients, foodstuffs and food additives in cancer. Therapies and their clinical and metabolic implications.**

## 8. Nutrition in Physiological Stress

- Physiological stress and its effect on body, nutritional implications.
- Fevers and infections
- **Stress and Physiologic effects.**
- Surgery and Management of Surgical Conditions
- Parenteral Nutrition - Types, mode, and composition of feeds
- Tube feeding - Routes, modes, composition, care to be taken during feeding
- Dietary guidelines
- Burns
- Metabolic implications - nutritional requirement
- Management and nutritional care
- Nutritional Management of Patients with HIV, AIDS

- **Normal cellular processes, Injury and response of cells to injurious agents, Cellular adaptations**

**Exam Pattern:-**

Paper 1, 2 , 3 and 4	40 Marks each for Internal Assessment  60 marks each for each paper
Practical/Viva	20 Marks each for Internal Assessment  30 Marks each for Practical/Viva Voce

## SEMESTER IV

### PAPER -1: COMMUNITY NUTRITION

<b>Subject name</b>	Paper -1: Community Nutrition
<b>Subject code</b>	411

#### Goals :

- To understand the concept & scope of community nutrition.
  - To understand the sources of information for assessment of nutritional status.
  - To understand Status and causes of nutritional issues of community.
  - To gain the knowledge of different causes of community health hazards.
  - To get knowledge about different health programs for improvement of community health.
1. Concept and Scope of Community Nutrition.
  2. Food availability and factors affecting food availability and intake. Agricultural production, post harvest handling (storage & treatment), marketing and distribution, industrialization, population, economic, regional and socio-cultural factors. Strategies for augmenting food production.
  3.
    - a. 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, record, weighment.
    - b. Food security and adequacy of diets.
  4. Use of other sources of information for assessment.
    - a. Sources of relevant statistics.
    - b. Infant, child and maternal mortality rates.
    - c. Epidemiology of nutritionally related diseases.
  5. Nutritional problems of communities and implications for public health. Common Nutritional Problems in India.
    - a. PEM
    - b. Micronutrient Deficiencies
    - c. Fluorosis
    - d. Correction/Improvements in Diets
  6. Schemes and Programs in India to combat Nutritional Problems in India. Role of International, National and Voluntary agencies and Government departments.

7. Hazards to Community Health and Nutritional status

- a. Adulteration in food
- b. Pollution of water, air
- c. Waste management
- d. Industrial effluents, sewage
- e. Pesticide residue in food
- f. Toxins present in food - mycotoxins etc.

8. Health and Nutrition Education - Steps in planning, implementation, and evaluations. Use of educational aids - visual, audio, audio-visual, traditional media etc.

**References:**

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

## **PAPER-2 : AYURVEDIC DIET PLANNING**

<b>Subject name</b>	Paper-2 : Ayurvedic Diet Planning
<b>Subject code</b>	412

### **Goals :**

- To understand. Regional, Continental & International dietary practices with Ayurveda perspective
- To understand case studies for nutritional analysis and diet planning
- To get the comprehensive knowledge about diet and nutritional therapy.
- To understand dietary causative factors & pathophysiology according to disease.

### **A. Case Study**

Case study: Ahariya hetu,samprapti aharia hetu basis,parishana and aharia hetu and aharia chikitsa

### **B. Regional, Continental & International dietary practices with Ayurveda perspective**



## PAPER- 3: SPORTS NUTRITION & FITNESS NUTRITION

<b>Subject name</b>	paper- 3: Sports Nutrition & Fitness Nutrition
<b>Subject code</b>	413

### Goals:

- To understand Diet & Sports performance, Body composition & Anthropometry
- To understand about Fitness Nutrition Physical fitness and training diets.
- To prepare diet plans as per sport requirements.
- To understand the sports psychology & sports injuries.
- To understand the effect of specific nutrient on specific physical training.

### A. Sport Nutrition:-

- Diet & Sports performance
- Body composition & Anthropometry
- Sports psychology
- Doping
- Sports injuries.

### B. Fitness Nutrition

- 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.

**PAPER – 4: DISSERTATION:**

<b>Subject name</b>	paper- 4: Dissertation
<b>Subject code</b>	414

**Goals:**

- To gain knowledge of applied aspect of research in the field of nutrition
- To develop different food products by research
- To get practical knowledge of statistics.
- To gain the knowledge of research in food industries.

**Exam Pattern:-**

Paper 1, 2 3	40 Marks each for Internal Assessment 60 marks each for each paper
Dissertation	100 marks for dissertation 50 marks for viva
Practical	20 Marks each for Internal Assessment 30 Marks each for Practical/Viva Voce