

M.Sc. Nutrition and Dietetics (2018-19 Onwards)
Curriculum Framework

Semester	Course Code	Course Title	Hours/Week	Credit	University Examination			Exam Hours
					I	E	T	
I	Core 01	Nutrition Through Life Cycle	5	4	25	75	100	3
	Core 02	Human Nutrition I	4	4	25	75	100	3
	Core 03	Nutritional Biochemistry	5	4	25	75	100	3
	Core 04	Diet in Disease I	4	4	25	75	100	3
	Core 05	Nutrition Management Practical	4	2	40	60	100	4
	Core 06	Diet in Disease I Practical	4	2	40	60	100	4
	Elective 01	Food Science	4	4	25	75	100	4
		Total		30	24	205	495	700
II	Core 07	Human Nutrition II	4	4	25	75	100	3
	Core 08	Physiological Aspects of Nutrition	4	4	25	75	100	3
	Core 09	Diet in Disease II	4	4	25	75	100	3
	Core 10	Diet in Disease II Practical	4	2	40	60	100	4
	Core 11	Nutritional Biochemistry Practical	4	2	40	60	100	4
	Core 12	Food Analysis Practical	4	2	40	60	100	4
	EDC	Nutritional Management (for other Department Students)	4	4	25	75	100	3
		Human Rights	2	2	25	75	100	3
	Total		30	24	245	565	800	
III	Core 13	Community and Public Health Nutrition	4	4	25	75	100	3
	Core 14	Nutrition in Exercise and Sports	4	4	25	75	100	3
	Core 15	Institutional Food Management	4	4	25	75	100	3
	Core 16	Research Methodology and Statistics	4	4	25	75	100	3
	Core 17	Assessment of Nutritional Status in the Community	5	2	40	60	100	6
	Core 18	Assessment of Food Management in the Organization	5	2	40	60	100	6
	Core 19	Hospital Internship	-	4	40	60	100	6
	Elective 02	Food Processing and Preservation	4	4	25	75	100	3
	Total		30	28	245	555	800	
IV	Core 20	Diet Counselling	4	4	25	75	100	3
	Core 21	Nutraceuticals and Functional Foods	4	4	25	75	100	3
	Core 22	Dissertation and Viva Voce	18	4	25	75	100	6
	Elective 03	Food Safety and Standards	4	4	25	75	100	3
		Total		30	16	115	285	400

SEMESTER I

Core 01: Nutrition Through Life Cycle

Objectives

This paper will enable the students to

1. Understand the Computation of allowances.
2. Understand the importance of nutrition during life span.

UNIT-I

Nutrition during Pregnancy: Prenatal growth and development, Nutritional requirements, RDA, Weight gain during pregnancy, Relationship between maternal and foetal nutrition, Teenage pregnancy and diet, General gastro intestinal problems, complications of pregnancy.

UNIT-II

Nutrition during Lactation: Physiological process of lactation, Nutritional requirements, RDA, Breast feeding- Colostrum and mature milk. Advantages of breast feeding- Nutritional benefit, hormones and growth, immunological benefits, psychological and economic, environmental benefits, infant and child morbidity. Barriers to breast feeding, Low milk production.

UNIT-III

Nutrition during Infancy: Infant growth and Physiological development, Nutritional requirements for growth, RDA, Artificial feeding. Low birth weight and Preterm baby- Nutritional requirements, feeding the preterm baby, feeding problems. Weaning- Need for weaning, types of supplementary foods, problems in weaning. Nutrition in Preschool children: Growth and development, nutritional requirements, RDA, feeding dental problems and decay. Nutrition related problems of preschool children – Protein energy malnutrition- Types, symptoms, nutritional requirements and treatment.

Unit –IV

Nutrition in School children: Nutritional requirements, RDA, Feeding problems, Packed lunches, Supplementary foods. Nutrition in Adolescents; Growth and development, Nutritional requirements, RDA, Nutritional problems- Obesity, eating disorders, predisposition to osteoporosis, anaemia, under nutrition, pre-menstrual syndrome, mal nutrition due to early marriage.

Unit –V

Nutrition in Adults: Growth and development, Nutritional requirements, RDA. Nutrition in Old age: General physiological changes, Theories on the causes of aging, Nutritional requirements, Nutrition related problems of old age, Degenerative diseases. Alzheimer's disease- Cause, physical effects and nutrition consideration. Guidelines for promoting healthful eating in old age, Exercise in old age.

References:

1. Gordon. M. Wardlaw et.al; Contemporary Nutrition, 2nd edition, Publishing by Mosby, 2004.
2. Srilakshmi. B; Dietetics, 7th edition, New Age International (P) Limited Publishers, 2014.
3. William's; Nix; Basic Nutrition and Diet therapy, 14th edition, Publishing by Mosby, 2013.
4. Mahtab S. Bamji, Prasad Rao, N. Vinodini Reddy; Textbook of Human Nutrition, Second Edition Oxford and IBH Publishing Co. Pvt .Ltd, 2003.
5. Nutrient Requirement and Recommend Dietary Allowances for Indians by Indian council of Medical research, National Institute of nutrition, Hyderabad.
6. Judith E. Brown., Nutrition New, 2nd edition, West / Wadsworth west / Wadsworth, An International Thomson publishing company, 1998.

Core 02: Human Nutrition I

Objectives

1. To understand the structure and functions of macronutrients in human body.
2. To understand the effects of deficiency and excess of macronutrients in human body

UNIT I

Carbohydrates – Introduction, Classification - Basis of degree of polymerization, based on digestive fate of carbohydrates. Functions, Food sources, Requirements Digestion, absorption and metabolic utilization of carbohydrates, Regulation of blood glucose concentration. Glycemic index -Factors affecting GI of foods.

Dietary fibre -Introduction, Types, Properties, RDA and Components of dietary fibre. Role of fibre in human nutrition.

UNIT II

Lipid-Introduction, Classification, Function, Food sources, Requirements, RDA, digestion, absorption, transport and storage. Lipids and gene expression. Dietary fat and coronary heart disease. Fatty acid-Types, Functions, Requirements, food sources and deficiency.

Omega fatty acids – Classification, role in good health, daily values, food sources, fortification of omega fatty acids.

UNIT III

Proteins- Introduction, Classification, Functions, Requirements and RDA, Food sources, Digestion, absorption and metabolic utilization of protein, Quality of proteins.

Amino acid - Types, functions, food sources, requirements, deficiency. Therapeutic applications of specific amino acids. Peptides of physiological significance. Proteins, amino acids and gene expression.

UNIT IV

Energy – Introduction, Units, determination of energy value of food, physiological fuel value, Benedict's Oxy-calorimeter, relation between oxygen required and calorimeter value. Basal Metabolic rate – Introduction, measurement of basal metabolism determination of basal metabolic rate by calculation energy requirement, during work, Thermic effect of food, Total energy requirement – Meaning, Measuring total energy requirement. Factors affecting physical activity, basal metabolic rate and thermic effect of food, Dietary source, RDA.

UNIT IV

Water and electrolytes – Introduction, water, electrolytes and body composition, body water distribution, body electrolyte content: Distribution and exchangeable fractions, Intracellular water and the body cell mass concept, regulation of body water compartments, metabolic links: glucose, water and sodium. Body water compartments in chronic starvation, Impact to acute pathological conditions on the ICW, Body water in acute illness, water and electrolyte metabolism during refeeding, Implications of water and sodium metabolism in nutrition therapy for specific clinical condition.

References

1. Michael. J. Gibney etal; Clinical Nutrition, Blackwell Science, 2005.
2. Shubhangini. A. Joshi; Nutrition and Dietetics III edition, McGraw Hill Education (India) private limited
3. Srilakshmi.B; Nutrition Science, 15th edition, New Age International (P) Limited, Publishers, 2016.
4. Swaminathan. M; Advanced Text-Book on Food and Nutrition, Volume I 2nd edition. The Bangalore Printing and Publishing Co., LTD, Reprint 2015.
5. Sunetra Roday; Food Science and Nutrition, 2nd edition, Oxfore University Prerss, 2013
6. Carol Byrd – Bredbenner; Wardlaw's perspeccctives in Nutrition, 9th edition MCGraw – Hill International Edition 2013

Core 03: Nutritional Biochemistry

Objectives

1. To develop students' knowledge, understanding and skills in nutritional biochemistry and the role of metabolism in human.

UNIT 1

Water & electrolytes: Fluid compartments, distribution, water Intake & output, water balance, Composition of electrolytes in fluid compartments, buffer system, acid base balance-blood & kidney, imbalance disorders-dehydration & oedema. Enzymes – Classification and Role of Enzymes.

UNIT 2

Carbohydrate metabolism: Classification, Review of digestion and absorption. oxidation of glucose – glycolysis, oxidative decarboxylation, citric acid cycle. Pentose phosphate pathway. Glycogen-Glycogenesis, Glycogenolysis. Gluconeogenesis. Inborn errors of metabolism. Glycogen storage diseases.

UNIT 3

Protein metabolism: Classification of protein, Review of digestion and absorption. Deamination, transamination, trans-deamination, decarboxylation, deamidation, Urea cycle, inborn errors of amino acid metabolism.

UNIT 4

Nucleic acid metabolism: Classification, Biological oxidation, Electron transport chain, nucleic acid metabolism, structure of DNA & RNA, genetic code, DNA replication, bio synthesis of protein.

UNIT 5

Lipid metabolism: Classification, Oxidation of fatty acid- α , β , & ω . Bio synthesis of fatty acid & TGL, Cholesterol synthesis & synthesis of bile acids & bile pigments, ketosis, ketone bodies, acidosis & fatty liver.

References

1. Deb. A.C., Fundamental of Biochemistry, New Centruy Book Agency (P) Ltd, Reprint 2004.
2. Ambika Shanmugam, Fundamentals of biochemistry for Medical students, Karthik Pprinters, 7thedition, 1992.
3. U.Sathyanarayana and U.Chakrabani, Biochemistry, Third Edition, Uppala-Author Publishers, 2007.
4. Mahtab. S.Bamji, Kamala Krishnaswamy and G.N.V Brahmam, Text Book of Human Nutrition, Oxford and IBH Publishing Company, Third Edition.2009

Core 04: Diet in Disease I

Objectives

1. To understand the etiology, physiological, metabolic anomalies, nutritional management of acute and chronic disorders / diseases

UNIT-I

Principles of clinical nutrition – Introduction, the spectrum of nutritional problems and management pathways. Perspectives on the future. Drug and Diet Interaction, Diet therapy and types of therapeutic diets, Role of dietitian and Indian Dietetic Association. The influence of drugs on the nutritional status of patients. Special Feeding Method: Intravenous feeding, tube feeding, gastrostomy, jejunostomy – Meaning, objectives, Technique, Nutrients and Diet.

UNIT-II

Nutritional therapy during energy imbalance: Over nutrition and under nutrition - Introduction, etiology, clinical assessment, treatment approaches – general principles, lifestyle changes and nutritional management.

Eating disorders: Anorexia nervosa, bulimia nervosa, binge eating disorder – History, etiology, clinical features, epidemiology and nutritional management.

UNIT-III

Adverse reaction to foods; Introduction, food intolerance, food allergy, types of food allergy, patterns of food allergic responses, diagnostic criteria for food allergy, specific food allergies, multiple food allergy, scientific background: The basic mechanisms of immune response to dietary antigen.

Infection and fevers – defense mechanisms in the body, Role of Nutrition in Infections, effects of infection on body mechanisms, effects of infection on nutrition, definition of fever, nutritional modification in infection and fever.

Unit –IV

Metabolic disorder: Diabetes Mellitus – Introduction, types, pathophysiology of insulin resistance, symptoms, biochemical tests, complications, hypoglycemic drugs, dietary management, patient education, the diabetic association of India.

Unit –V

Gastro intestinal tract disorders: Dyspepsia, peptic ulcer, diarrhoea, constipation, inflammatory bowel disease – definition, epidemiology, pathogenesis, clinical features and diagnosis, dietary management.

Diseases of Liver - Hepatitis, (A, B, and C), Cirrhosis - Causes, symptoms, dietary management and Prevention.

References

1. Michael. J. Gibney et al; Clinical Nutrition Blackwell Science, 2005.
2. Shubhangini. A. Joshi; Nutrition and Dietetics, 3rd edition, McGraw Hill Education (India) Private Limited.
3. Srilakshmi . B; Nutrition Science, 15th edition, New Age International (p) Limited, publishers, 2016.
4. Swaminathan. M; Advanced Text-Book on Food and Nutrition, Volume I and 11 2nd Edition, The Bangalore printing and publishing co., LTD, Reprint 2015.
5. Sunetra Roday; Food Science and Nutrition, 2nd edition, Oxford University press, 2013.
6. Carol Byrd – Bredbenner; Wardlaw's perspectives in Nutrition, 9th edition McGraw – Hill International Edition, 2013.

Core 05: Nutrition Management Practical

Objectives

1. To impart learning on menu planning strategy, nutrient intake analysis and analysis on sufficiency of food intake.

Exercises

1. Weights and Measures
2. Food Exchange list
3. Menu plan for pregnancy
4. Menu plan for lactation
5. Menu plan for infants
6. Menu plan for preschool children
7. Menu plan for school children
8. Menu plan for adolescent boys and girls
9. Menu plan for an adult
10. Menu plan for Nutritional Deficiencies
 - a. Protein Calorie Malnutrition
 - b. Anaemia
 - c. Iodine Deficiency
 - d. Flourosis
 - e. Vitamin A Deficiency
 - f. Scurvy
 - g. Angular Stomatitis
 - h. Calcium Deficiency

The above mentioned exercises will provide learning on planning a menu, collection of basic information of a person, portion size, amount of nutrients required, food plan, meal distribution, menu plan, nutrient calculation and matching with requirement, preparation and display of a meal.

References

1. Amy E. Galena, Msh Rd. 2013. Eat to Your Good Health: Exchange Lists and Meal Planning for Eating Disorders. USA
2. Peggy S. Stanfield, Peggy Stanfield, Y. H. Hui. 2010. Nutrition and Diet Therapy: Self-Instructional Approaches. 5th edition. Jones and Bartlett publishers. Canada.
3. B Srilakshmi. 2014. Dietetics. New Age International publishers.

Core 06: Diet in Disease I Practical

Objectives

1. To impart learning on dietary management for various diseases.

Exercises

- I. Standardization of common food preparations.
- II. Planning, preparation and calculation of nutritive value for the following diets (SOAP Format)
 1. Normal diet.
 2. Liquid diet
 3. Soft diet
 4. Enteral formulas
 5. High fibre and low caloric diet
 6. Diet for Energy imbalance
 7. Diet for Diabetes Mellitus
 8. Diet for Gastrointestinal diseases
 9. Diet for Liver diseases
 10. Diet for Infections and fevers.

References

1. Amy E. Galena, Msh Rd. 2013. Eat to Your Good Health: Exchange Lists and Meal Planning for Eating Disorders. USA
2. Peggy S. Stanfield, Peggy Stanfield, Y. H. Hui. 2010. Nutrition and Diet Therapy: Self-Instructional Approaches. 5th edition. Jones and Bartlett publishers. Canada.
3. B Srilakshmi. 2014. Dietetics. New Age International publishers.

Elective 01: Food Science

Objectives

1. To understand the composition and nutritive value of cereals, pulses, milk and milk products, vegetables, fruits, fats, oils, nuts and spices.

UNIT –I

Definition of Food Science, Food, **Colloids** – Types and Properties; Sols – Properties; Gels – Properties and factors influencing gel formation; Emulsion – Types, formation, properties and stability of emulsions; Foams – formation, Stability and anti-foaming agents.

Cereals: General structure, composition, Nutritive value of rice, wheat, maize, oats and jowar. Cereal cookery: Cereal protein- Gluten formation and factors affecting; Cereal starch, effect of moist heat – Gelatinisation, factors affecting gelatinisation Changes in cooked starches- Gel formation, Retrogradation and syneresis; Effect of dry heat- Dextrinisation; Effect of cooking on nutritive value.

Millet: Composition, Nutritive value and uses of pearl millet, finger millet, proso millet.

UNIT-II

Pulses: Composition and nutritive value, Digestibility of pulses and factors affecting the digestibility of pulse proteins, Toxic constituents in pulses and their elimination; commonly used pulses. Pulse cookery: Effect of cooking, Factors affecting cooking quality.

Milk and Milk products: Composition of milk, Nutritive value of milk and milk products, Physical and chemical properties of milk, Types of milk available in the market.

UNIT-III

Meat: Classes of meat, structure, composition and nutritive value; post-mortem changes in meat, ageing, tenderising, curing; cuts and grades of meat. Meat cookery: Factors affecting cooking quality, changes in meat on cooking, tenderness and juiciness of meat.

Fish: Classification, composition and nutritive value, selection. Fish cookery: Principles and methods.

Poultry: Classification, composition and nutritive value, processing and cooking.

Egg: Structure, composition and nutritive value, quality of egg – factors determining and evaluation. Egg cookery: Effect of cooking on nutritive value, effect of heat on egg protein, factors affecting coagulation of egg proteins, effect of other ingredients on egg proteins.

UNIT-IV

Vegetables: Classification, composition and nutritive value, pigments, organic acids, enzymes, flavour compounds, bitter compounds, selection of vegetables. Vegetables cookery: Changes during cooking, loss of nutrients during cooking, effect of cooking on pigments.

Fruits: Classification, composition and nutritive value, pigments, cellulose and pectic substances, changes during cooking, flavour constituents, polyphenols, bitterness, post-harvest changes and ripening. Browning: Types and prevention.

UNIT-V

Nuts and Oilseeds: Classification, composition and nutritive value, toxins present in nuts, role in cookery. Fats and oils: Nutritional importance of fats and oils, functions of oils and fats in foods, flavour changes – Rancidity – types and prevention, reversion.

Sugar: Sources, properties, types, forms, liquid sweeteners, reactions of sugar Crystallisation: Factors affecting, role of sugar in cookery, stages of sugar cookery, crystalline and non-crystalline candies.

Spices: Classification, general functions, commonly used spices and herbs, role of spices in cookery.

Aromatics – Composition and uses.

Beverages: Classification and points to be considered while preparing beverages.

References:

1. Srilakshmi. B; Food Science, 6th edition New Age International (p) Limited Publishers 2015.
2. Shakunthala manay N; Shadakshara swamy. M; Foods Facts and Principles, Third edition, New Age International (p) Limited Publishers, 2014.
3. Lillian Hoagland meyer, Food chemistry, CBS Publishers and distributors, 2004.
4. Arindam Ramaswamy, Elements of Food Science, Oxford book company, 2010.
5. Norman N. Potter, Joseph H. Hotchkiss, and food science, fifth edition, CBS publishers and distributors, 1996.
6. B. Sivasankar, Food Processing and Preservation, PHI Learning Private Limited, 2011.

M.Sc. NUTRITION AND DIETETICS (2018-2019)
SEMESTER - II

Core Paper- 05

Human Nutrition II

Theory: 4 Hours/Week

Objectives:

- 1 To understand the basis of RDA Intakes for micronutrients
- 2 To understand the effects of deficiency and excess of micro nutrients in human body.

UNIT-I

Fat soluble Vitamins: Introduction, functions, digestion, absorption, transport, storage, bioavailability, requirements, food sources, deficiency and toxicity. Interactions with other nutrients.

UNIT-II

Water soluble Vitamins : Thiamin, Riboflavin, Niacin, Pyridoxine, Folic acid, Vitamin-B12, Biotin, Pantothenic acid, Vitamin-C- Introduction, functions, absorption, transport, storage, bioavailability, requirements, food sources, deficiency and toxicity. Interactions with other nutrients.

UNIT-III

Major minerals: Calcium, Phosphorus and Magnesium - Introduction, functions, absorption, transport, storage, bioavailability, requirements, food sources, deficiency and toxicity. Interactions with other nutrients.

Electrolytes: Sodium, Potassium and Chloride- Sources, functions, deficiency and toxicity.

UNIT-IV

Trace Minerals: Iron, Copper, Fluoride, Selenium, Manganese, Zinc, Iodine-Introduction, functions, absorption, transport, storage, bioavailability, requirements, food sources, deficiency and toxicity. Interactions with other nutrients.

UNIT-V

Interaction of Nutrition, Immunity and Infection: Host defense mechanisms and nutrients essential in the development of immune system. Effect of infections on the nutritional status of an individual.

Nutrition for space, mines and underwater.

Role of free radicals and antioxidants in health and disease.

REFERENCE:

1. Michael. J. Gibney etal; Clinical Nutrition Black well Science, 2005.
2. Shubhangini. A. Joshi; Nutrition and Dietetics, 3rd edition, McGraw Hill Education (India) Private Limited.
3. Srilakshmi . B; Nutrition Science, 15th edition, New Age International (p) Limited, publishers, 2016.
4. Swaminathan. M; Advanced Text-Book on Food and Nutrition, Volume I and 11 2nd Edition, The Bangalore printing and publishing co., LTD, Reprint 2015.
5. Sunetra Roday; Food Science and Nutrition, 2nd edition, Oxford University press, 2013.
6. Carol Byrd – Bredbenner; Wardlaw's perspectives in Nutrition, 9th edition McGraw – Hill International Edition, 2013
7. Bamji, M.S., Krishnaswamy K. Brahmam G.N.V. (Eds.) (2017). Textbook of Human Nutrition. 4th Edition. New Delhi : Oxford and IBH Publishing Co. Pvt. Ltd.
8. Chadha R., Mathur P. (Eds.) (2015). Nutrition: A Lifecycle Approach. New Delhi: OrientBlackswan
9. FAO/WHO. (2004). Vitamin and Mineral Requirements in Human Nutrition. Report of a Joint Expert Consultation.
10. FSSAI (2016). Food Safety and Standards (Food or Health Supplements, Nutraceuticals,
11. Foods for Special Dietary Uses, Foods for Special Medical Purpose, Functional Foods and Novel Food) Regulations. <http://www.fssai.gov.in/home/fss-legislation/fssregulations>.
12. Simopoulos A.P., Ordovas J.M. (Eds.) (2004). Nutrigenetics and Nutrigenomics. USA:Karger.

M.Sc. NUTRITION AND DIETETICS (2018-2019)

SEMESTER - II

Core Paper 06 Physiological Aspects of Nutrition Theory: 4 Hours/Week

Objectives:

1. To enable the students to understand the integrated functions of all system and the grounding of nutritional science in Physiology.
2. To apply this knowledge for planning nutritional care of individuals.

UNIT-I

Digestive system: Structure and functions of gastrointestinal tract and gastrointestinal secretions. Role of enzymes in digestion and role of prebiotics and probiotics in the maintenance of health of digestive system. Regulation of food intake –hunger, appetite and satiety.

Liver: Structure and functions of liver.

UNIT-II

Respiratory system: Structure of lungs and gaseous exchange (transport of oxygen and carbon-di-oxide).

Nervous system: Structure and functions of brain (briefly) and spinal cord; structure and functions of neuron; conduction of nerve impulse, role of neurotransmitters; blood brain barriers, CSF, hypothalamus and its role in various body functions.

Musculo skeletal system: Structure and functions of bone; physiology of muscle contraction.

UNIT-III

Cardio vascular system: Blood composition and functions, structure and function of heart and blood vessels, regulation of cardiac output and blood pressure, heart failure and hypertension.

Excretory system: Structure and functions of kidney, structure of nephron, physiology of urine formation, micturition.

UNIT-IV

Endocrine system: Structure, function, role of hormones, regulation of hormone secretion and disorders – pituitary, thyroid, adrenal, pancreas and parathyroid glands. Functions and deficiency of insulin.

UNIT-V

Reproductive system: Ovaries- Structure of ovaries, functions of estrogens and progesterone. Function of Uterus, Hormonal control of menstrual cycle, physiological changes in pregnancy, parturition, lactation and menopause.

Testes: Structure of Testes, functions of testosterone, deficiency of testosterone.

REFERENCE:

1. Ganongs. W.F; Review of medical physiology, 1985.
2. Campbell. E.J et al; Clinical and applied physiology,1984.
3. Guyton AC and Hall JB; Textbook of medical physiology, 1996.
4. Guyton AC; Functions of human body, 1985.
5. Wilson KJW and Waugh A; Ross and Wilson. Anatomy and Physiology in health and illness, 8th edition, 2003.
6. Judith E. Brown., Nutrition New, 2nd edition, West / Wadsworth west / Wadsworth, An International Thomson publishing company, 1998.

M.Sc. NUTRITION AND DIETETICS (2018-2019)

SEMESTER - II

Core Paper 07

Diet in Disease II Theory: 4 Hours/Week

Objectives:

1. To enable the students to remain updated on recent advances in diet therapy for various diseases.
2. To gain knowledge to recommend nutritional care for prevention treatment of various diseases.

UNIT-I

Diet for kidney diseases: Etiology, symptoms, diagnosis and dietary management of : Glomerulonephritis, Nephrotic Syndrome, Acute and chronic renal failure and Urinary calculi.

Dialysis: Hemodialysis and Peritoneal dialysis- Advantages, disadvantages and Dietary management.

Kidney Transplant: Diagnosis and dietary management.

UNIT-II

Diet for pulmonary diseases: Etiology, symptoms, diagnosis and dietary management of Chronic obstructive Pulmonary disease, asthma, pneumonia, and tuberculosis.

Rheumatoid Arthritis: Types, etiology, symptoms and dietary management

Osteoarthritis: Types, etiology, symptoms and dietary management

Gout: Etiology, symptoms and dietary management.

UNIT-III

Dietary management for cardio-vascular diseases: Atherosclerosis, coronary heart disease, hypotension, hypertension, stroke, cardiac arrest- Risk factors, definition, epidemiology, pathogenesis, clinical features, diagnosis and dietary management.

UNIT-IV

Cancer: Types, mechanism, etiology, metabolic changes and dietary management during cancer treatment (drugs, chemotherapy and radio therapy).

AIDS: Causes, symptoms, metabolic changes, diagnosis, treatment and dietary management

Nutrition for children with special needs: Ketogenic diet – Epilepsy. Neutropenic diet – marrow transplant and Nutrition for Autism.

UNIT-V

Surgery and Critical Care: Metabolic & clinical aberrations, diagnosis, complications, treatment, dietary management of Surgery, Burns, Sepsis, Trauma and Critical care.

Nutrient – Drug interactions.

REFERENCE:

1. Ganongs. W.F; Review of medical physiology, 1985.
2. Campbell. E.J et al; Clinical and applied physiology,1984.
3. Guyton AC and Hall JB; Textbook of medical physiology, 1996.
4. Guyton AC; Functions of human body, 1985.
5. Wilson KJW and Waugh A; Ross and Wilson. Anatomy and Physiology in health and illness, 8th edition, 2003.
6. Judith E. Brown., Nutrition New, 2nd edition, West / Wadsworth west / Wadsworth, An International Thomson publishing company, 1998.
7. Clinical Dietetics and Nutrition – F P Anita and Philip Abraham.
8. Food, Nutrition and Diet Therapy – Kathleen Mahan & Krause, Sylvia Escott Stump.
9. Normal and Therapeutic Nutrition – Robinson & Lawler, 17th edition, Mac Millan Publishers.
10. Clinical Nutrition – Ed Michael J Gibney, Marinos Elia, Olle Ljungqvist and Julie Dowsett.
11. Nutrition in Clinical Practice – David L. Katz, Lippincott, Williams & Wilkins.
12. Text Book of Human Nutrition – Mahtab S Bamji, N Prahlad Rao, Vinodini Reddy, 2nd edition, Oxford & IBH Publishing Co. Pvt. Ltd.
13. Modern Nutrition in Health & Disease – Eds – Maurice E. Shils, James A.

M.Sc. NUTRITION AND DIETETICS (2018-2019)
SEMESTER - II
Core Practical 03 – Diet in disease II 4 Hours/Week

Objectives

To enable students to develop skill in nutritional diagnosis, planning and providing suitable therapeutic diets for various diseases

Planning & preparation of diets for the following conditions: (Using SOAP format)

1. Nephritis
2. Nephrosis
3. Renal Failure
4. Renal calculi
5. Dialysis
6. Pulmonary diseases –TB
7. Asthma
8. Rheumatoid Arthritis
9. Hypo/Hyper tension
10. Atherosclerosis
11. Burns
12. Cancer
13. AIDS

REFERENCE :

1. Vimala(2012) Advanced diet therapy, New age international.
2. Escott-Stump, S. (2002) Nutrition and Diagnosis Related Care. 5th ed. Williams.

M.Sc. NUTRITION AND DIETETICS (2018-2019)
SEMESTER - II
Core Practical 04 Nutritional Biochemistry 4 Hours/Week

Objectives

1. To enable students to understand the role of nutrients in the body.

I. Analysis of Blood / Serum

1. Blood glucose
2. Serum iron
3. Serum cholesterol
4. Serum protein
5. Blood Haemoglobin

II. Analysis of urine

1. Creatinine
2. Urea
3. Total nitrogen
4. Calcium
5. Phosphorus

III. Qualitative Analysis

A. Qualitative analysis of sugars

1. Reactions of Monosaccharide (Glucose, fructose, galactose, mannose and ribose)
2. Reactions of disaccharides (Maltose and lactose)
3. Reactions of polysaccharides (Starch and dextrin)
4. Analysis of unknown sugar

B. Qualitative analysis of amino acids

1. Reactions of individual amino acids (Tyrosine, tryptophan, arginine, histidine, cystine and methionine)
2. Analysis of unknown amino acids

REFERENCE :

1. Raghuramulu N., Madhavan Nair K., Kalyanasundaram S.(2003). *A Manual of Laboratory Techniques*. Hyderabad: National Institute of Nutrition.

M.Sc. NUTRITION AND DIETETICS (2018-2019)
SEMESTER - II
Core Practical 05 - Food Analysis 4 Hours/Week

Objectives

1. This course will enable students to determine nutrients in foods.

I. Quantitative Analysis

1. Protein by Lowry's method
2. Nitrogen by Kjeldahl method
3. Iodine Number of oil
4. Saponification/ Acid number of oil
5. Fat by Soxhlet method
6. Ash content
7. Iron
8. Phosphorus
9. Calcium
10. Vitamin –C
11. Crude fibre
12. Moisture by hot air oven method
13. Energy value by Bomb calorimeter(Demo)

REFERENCE :

1. Raghuramulu N., Madhavan Nair K., Kalyanasundaram S.(2003). *A Manual of Laboratory Techniques*. Hyderabad: National Institute of Nutrition.

PATTERN OF THEORY QUESTION PAPER

M.Sc - NUTRITION AND DIETETICS

THEORY (EXTERNAL EXAM)

Time: 3 Hours Maximum Marks: 75

PART A (5 X 5 = 25 MARKS)

Answer ALL Questions (Internal Choice)

PART B (5 X 10 = 50)

Answer ALL Questions (Internal Choice)

INTERNAL ASSESSMENT (THEORY)

MARKS DISTRIBUTION

Test : 10marks

Assignment : 5 marks

Seminar : 5 marks

Attendance : 5 marks

25 marks

Passing minimum (Internal Assessment) – 50% - 12 marks

Passing minimum (External Assessment) – 50% - 38 marks

50 marks

PRACTICAL MARKS DISTRIBUTION

External : 60 marks

Internal : 40 marks

Practical external marks

Practical : 50 marks

Record : 10 marks

Practical Internal marks

Attendance: 10 marks

Practical : 30 marks

Passing minimum (Internal Assessment) – 50% - 20 marks

Passing minimum (External Assessment) – 50% - 30 marks

50 marks

SEMESTER-III

COMMUNITY AND PUBLIC HEALTH NUTRITION

Core paper:08

SUB CODE: 18PND08

Marks: 100

Hours: 4

Credit: 4

Objectives

Study of this paper will enable the students to

1. Remain updated on recent advances in policies and program.
2. Develop an understanding about various programs and agencies involved for the improvement of nutritional status of the community.

UNIT – I

Nutrition and national development: National Nutrition Policy – aims and objectives; Demographic Profile: Population trends in India, density of population, age structure, sex ratio, family size, literacy and education, life expectancy. Nutrition and Infection: Vicious cycle of malnutrition and infection, effect of malnutrition on immunity.

UNIT – II

Nutrition education: Scope of nutrition education, steps in planning, conducting and evaluating nutrition and health education programmes; methods of imparting nutrition education; monitoring and evaluation of effectiveness of nutrition and health education programmes.

UNIT – III

National and International Organisations: Engaged in food and nutrition activities – ICMR, NIN, NNMB, ICAR, CFTRI, FAO, WHO, UNICEF, UNESCO.

UNIT – IV

Community health care centre(CHC)- Objectives and service delivery in CHCs.

Non-communicable disease control programme-Diabetes, cardiovascular disease and cancer- Objects, program component strategies and management structure.

UNIT- V

National vector borne disease control: Malaria, Japanese encephalitis, Dengue and Chikungunya- An overview of programme.

National Aids control programme – Goal, objectives, package of services, organization structure and management system.

National programme on occupational diseases- Occupational injuries and illness in India, National occupational safety and health systems and programmes.

REFERENCE:

1. Park K., Preventive and social medicine, Bamarasidas Bahnot Publishers, Jabalpur.
2. Jellilife D. B., Infant nutrition in tropics and subtropics, WHO, 1965.
3. Bamji M. S., Prahalad Raov, Reddy V, Text book on human nutrition, Oxford and IBM publishing co. Pvt. Ltd.
4. Proceeding of Nutrition Society of India, NIN.
5. Technical reports of ICMR .
6. P.K. Shukla, Nutritional problems of India, Prentice Hall, India.
7. Sabarwal B., Applied Nutrition and Health education, common wealth publishers, New Delhi.
8. www.government national policies.

SEMESTER-III

NUTRITION IN EXERCISE AND SPORTS

Core paper: 09

Hours: 4

Credit: 4

SUB CODE: 18PND09

Marks: 100

Objectives

Study of this paper will enable the students to

1. Understand the characteristics, physiology and body composition needs of strength sports.
2. Impart knowledge on sports specific nutrition guidelines.

UNIT – I

Overview of nutrition for fitness and sports - Exercise for health promotion o Exercise guidelines Human energy requirements for exercise. Major human energy systems - Components of energy expenditure, Fatigue during exercise.

Carbohydrates and exercise - Role of CHO in energy systems during exercise, Dietary CHO recommendations and strategies for exercise performance

UNIT – II

Fats and exercise - Role of lipids in energy systems during exercise, Dietary fat recommendations and strategies for exercise performance.

Protein and exercise- Role of protein in energy systems during exercise o Dietary protein recommendations and strategies for exercise performance.

Energy, Fluid, electrolytes, temperature regulation and exercise

UNIT – III

Nutrition for child, adolescent and master athletes- -Process of growth and development during childhood and adolescence, Factors influencing with special emphasis of exercise -Physiology of ageing and factors influencing; -Nutritional problems of younger and master athletes -Nutritional guidelines and Nutritional Requirements for younger and older athletes. Nutritional concerns of travelling and vegan athletes Athletes performing under altered climatic conditions-High altitude, Mountaineers, High and low climatic temperature etc.

UNIT – IV

Nutritional Management of clinical conditions among sports – -Diabetes Mellitus - Etiology, Pathophysiology, metabolic alterations, Complications, Assessment and Management. -Hypertension and Heart disease -Prevalence, Pathophysiology, Role of Macro & Micronutrients.

UNIT- V

Planning of diets for Individuals and team sports -Cricket ,Hockey, Football, Kabbadi and Basket ball.

REFERENCE:

1. Slater, G., & Phillips, S. M. (2011). Nutrition guidelines for strength sports: sprinting, weightlifting, throwing events, and bodybuilding. *Journal of sports sciences*, 29(sup1), S67- S77.
2. Helms, E. R., Aragon, A. A., & Fitschen, P. J. (2014). Evidence-based recommendations for natural bodybuilding contest preparation: nutrition and supplementation. *Journal of the International Society of Sports Nutrition*, 11(1), 20.
3. Maughan, R. J., & Burke, L. M. (2012). Practical nutritional recommendations for the athlete. In *Sports Nutrition: More Than Just Calories-Triggers for Adaptation* (Vol. 69, pp. 131-150). Karger Publishers .
4. Jeukendrup, A., & Gleeson, M. (2010). *Sport nutrition: an introduction to energy production and performance* (No. Ed. 2). Human Kinetics.

SEMESTER-III
INSTITUTIONAL FOOD MANAGEMENT

Core paper: 10
Hours: 4
Credit: 4

SUB CODE: 18PND10
Marks:100

Objectives

Study of this paper will enable the students to

1. Gain knowledge on requirements and management of various food service establishments.
2. Learn to purchase, receive and store different food

UNIT – I

Food service organisation- Development of food service institution, objectives and classification. Food service management- Principles and functions

UNIT – II

Food Service Industry: Definition- Types of catering-Hotel, Motel, Restaurant, Cafeteria and Chain Hotels
Welfare- Hospital, School lunch, Residential establishment and Industrial catering.

UNIT – III

Food Management-Food purchasing, Menu planning, Food production and cleaning and waste management.

UNIT – IV

Financial management – Costing and budgeting, pricing and accounting. Personnel management- Concepts, staff employment and employment benefits

UNIT- V

Spaces: Planning and Organisation-Kitchen spaces, storage spaces and services areas
Equipment- Catering equipment, selection equipment, equipment design, purchasing equipment and care and maintenance of equipment

REFERENCE:

1. Sethi M and Mahan S (Revised 2nd edition, 2007)). Catering Management, An Integrated Approach. New Age International (P) Ltd
2. Andrews S (2009) Food and beverage service : Training Manual 2nd edition. New Delhi Tata McGraw Hill.
3. Bessie Brooks West and Levelle Wood MS (1988). Food Service in Institutions (6th ed.). John MacMillan Publishing Co., New York
4. Harris N (1984) Meal management (6th ed.). New York : Mac Mill

SEMESTER-III
Research Methodology and Statistics

Core paper: 11
Hours: 4
Credit: 4

SUB CODE: 18PND11
Marks: 100

Objectives

1. To make students to learn on types of research, research process, formulation of research problem, research design, sampling and collection of data, analysis and interpretation of data
2. To educate the students on various statistical measures to be applied for analysis of data

UNIT I

Meaning of research; purpose of research; types of research – application, objectives and mode of enquiry perspective; application of research; steps in research process; conceptualization of research – from ideas to action: reviewing the literature, formulating the research problem, identifying variables and constructing the hypothesis.

UNIT II

Qualitative Research Designs – key features, uses and limitations, types – case studies, ethnographic research, narrative research, action research; Quantitative Research Designs – key features, uses and limitations, Experimental and non-experimental research; Mixed research design – key features, uses and limitations; Cross sectional and longitudinal studies, Epidemiological methods.

UNIT III

Research methods– Methods of collecting the data in qualitative and quantitative research – primary and secondary data, construction of the research tools, reliability and validation of research tools, pilot testing. Sampling design – principles of sampling, sampling terminology, types of sampling and calculating the sample size. Ethical issues in data collection.

UNIT IV

Editing and coding the data; Organization of data- classification, meaning and objectives, types of classification; Tabulation – parts of a table, general rules of tabulation, types of tables; Representation of data – Diagrammatic and graphical representation, significance of diagrams and graphs, general rules for constructing diagrams, types of diagrams and graphs; Format of research report, different referencing system and writing the bibliography.

UNIT V

Measures of Central Tendency, Measures of Dispersion, Standard Error, ‘t’ distribution, Chi-square distribution and F- distribution, Types of correlation and application, Types of regression and application.

References

1. Kothari, C.R., (2004), Research Methodology, Methods and Techniques, Second Revised Edition, New Age International Publishers, New Delhi.
2. Ranjit Kumar, (2011), Research Methodology: a step-by-step Guide for Beginners, Third Edition, SAGE Publications, New Delhi.
3. Beverley Moriarty, (2018), Research Skills for Teachers – From Research Question to Research Design, Allen & Unwin Publishers, Australia.
4. Rajendra Kumar, C. (2008), Research Methodology, APH Publishing Corporation, New Delhi

5. Pagadala Suganda Devi (2017), Research Methodology: A Handbook for Beginners, Notion Press, Chennai.
6. Vijayalakshmi Ponnuraj and Sivaprakasam, C. (2008), Research Methods: Tips and Techniques, MJP Publishers.
7. Anantarayanan Raman, Jayashree Nimmagadda, (2006), A Handbook of Research Process, Macmillan Publishers.
8. Gina Wisker, (2008), Post Graduate Research Handbook, Second Edition, Palgrave Macmillan, New York.
9. Douglas C.Montgomery, (2009), Introduction to Statistical Quality Control, Sixth Edition, John Wiley & Sons, Inc.
10. S.P.Gupta, (2014), Statistical Methods, SultanChand & Sons, 43rd Edition.
11. S.M.Shukla and S.P. Sahai, (2017), Statistical Methods, Sahitya Bhawan Publications.

ASSESSMENT OF NUTRITIONAL STATUS IN THE COMMUNITY

Core paper: 12
Hours: 5
Credit: 2

SUB CODE:
Marks: 100

Objectives

1. To empower the learners on assessing their nutritional status, planning balanced meal, family food budgeting, purchase of good quality food and conservation of nutrients

Activities

Students have to do the following assessments by taking one family in each income group

1. Assessment of Nutritional Status
 - a. Height (cm)
 - b. Weight (kg)
 - c. BMI (kg/m^2)
 - d. Waist Circumference (cm)
 - e. Hip circumference (cm)
 - f. Waist to Hip Ratio
 - g. Height for Age
 - h. Weight for Age
 - i. Height for Weight
 - j. Percent of abdominal fat according to W/H ratio
 - k. Skin fold thickness (Triceps) (cm)
2. Individual daily meal analysis on balanced diet (inclusion of basic five food groups) – 24 hour recall
3. Influence of Nutritional Knowledge, Intelligent buying and Home Production and Processing on economy of food budgeting
4. Preparation of short term monthly budget based on balanced diet for individual in the family
5. Application of selection criteria for purchase of good quality food
6. KAP survey on storage method of perishable, semi-perishable and non-perishable foods
7. Creating the awareness on measures to minimize and prevent nutrient loss in food preparation

References

eGyanKosh, National Digital Repository on Nutrition for the Community, Designed and Maintained by Indira Gandhi Open University, New Delhi, Accessed on 16.05.2018.

EVALUATION PATTERN

Report on internship will be evaluated as stated below.

External marks	- 60
Internal marks	- 40

Total marks	- 100

Internal mark components

Marks awarded by the guide - 40 marks

External mark components

Report preparation - 20 marks
Report presentation - 20 marks
Viva voce - 20 marks

Assessment of Food Management in the Organisation

Core paper: 13
Hours: 5
Credit: 2

SUB CODE:
Marks: 100

Objectives

1. To make the students to learn on management of food in the institutional kitchen/cafeteria/hotels

Activities

1. Assess and report the routine activities and procedures on handling the food in each of the following areas of any one of the food production unit (Institutional kitchen/Cafeteria/Hotels)
 - a. Purchase area
 - b. Receiving area
 - c. Storage area
 - d. Pre-Preparation area
 - e. Preparation area
 - f. Holding area
 - g. Packaging area
 - h. Service area
 - i. Pan and Pot washing area
 - j. External Delivery system
 - k. Waste disposal area
2. Develop a HACCP Plan for an Indian Recipe. Identify Critical control points and corrective measures.

References

1. <https://www.acs.edu.au/download/samples/foodbevless.pdf>, Accessed on 14.06.2019
2. Wailey BH (1986) Production Management Handbook. U.K. : Gower Publishing.
3. Sethi M and Mahan S (Revised 2nd edition, 2007)). Catering Management, An Integrated Approach. New Age International (P) Ltd
4. Andrews S (2009) Food and beverage service : Training Manual 2nd edition. Tata McGraw Hill, New Delhi.

EVALUATION PATTERN

Report on internship will be evaluated as stated below.

External marks	- 60
Internal marks	- 40

Total marks	- 100

Internal mark components

Marks awarded by the guide - 40 marks

External mark components

Report preparation - 20 marks
Report presentation - 20 marks
Viva voce - 20 marks

HOSPITAL INTERNSHIP

Core paper: 14

SUB CODE: 18PNDIP01

Marks: 100

Credit: 4

AIM:

Internship is a phase of training wherein a graduate is expected to conduct actual practice of diet management and health care and acquire skills under supervision of a Practicing dietician so that he/she may become capable of functioning independently.

OBJECTIVES:

At the end of the Internship Training, the student shall be able to:

1. Manage Diet prescription independently for clinically common disease conditions encountered to higher level.

Period of Internship:

One months internship in a multispecialty hospital with dietary department.

Case Studies:

Five to ten case studies of different disease conditions have to be taken up during the Internship.

Report to be submitted in the hospital and Institution.

INTERNSHIP REPORT: EVALUATION PATTERN

Report on internship will be evaluated as stated below.

External marks -	60
Internal marks -	40

Total marks -	100

Internal mark components

Marks awarded by the training institution- 20 marks

Marks awarded by the guide - 20 marks

External mark components

Report preparation - 20 marks

Report presentation - 20 marks

Viva voce - 20 marks

FOOD PROCESSING AND PRESERVATION

Elective paper: 15

SUB CODE: 18PNDE02

Hours: 4

Marks: 100 Credit: 4

Objectives

Study of this paper will enable the students to

1. Understand and apply the food processing and preservation techniques.
2. Develop an understanding about the latest developments in techniques.

UNIT – I

Scope of food processing in India with National and International perspectives, Food deterioration and control, Principles of food processing and preservation

UNIT – II

Principles and methods of food preservation. Preservation by use of High temperatures- Factors affecting heat resistance, heat resistance of microorganism and their spores, determination of heat resistance, thermal-death-time curves, 12D concept, heat penetration, determination of thermal processes, heat treatments employed in processing foods.

UNIT – III

Thermal preservation- Blanching, pasteurization, commercial sterilization. Canning and bottling of foods – Type of containers, Canning and bottling of fruits and vegetables, Spoilage in canned food.

UNIT – IV

Retort processing of food – Types, new packages development, advances in retort technology future trends. Aseptic processing and packaging – Types and advantages and disadvantages.

UNIT- V

Low temperature preservation and processing –Chilling and freezing- types and effects of various factors. Chemical preservation in food processing.

REFERENCE:

1. Srilakshmi. B; Food Science, 6th edition, New Age International (P) Limited Publishers, 2015.
2. Shakunthala Manay. N; Shadakshara Swamy.M; Foods Facts and Principles, 3rd edition, New Age International (P) Limited Publishers, 2014.
3. Lillian Hoagland Meyer, Food chemistry, CBS Publishers and Distributors, 2004.
4. Subbulakshmi. G and Shobha. A.U; Food processing and preservation, New Age International (P) Limited Publishers, 2014.
5. Norman. N Potter, Joseph H. Hotchkiss, Food Science, 5th edition, CBS Publishers and Distributors, 1996.
6. Sivasankar. B; Food Processing and Preservation, PHI Learning Private Limited, 2011.

M.Sc. NUTRITION AND DIETETICS

SEMESTER - IV

Core Paper-

Diet Counselling

Theory: 4 Hours/Week

Objectives:

To enable students to:

1. Know the importance of counselling skills.
2. Knowledge about dietary concepts of different diseases.

UNIT-I

Counselling: Introduction ,definition and Importance. Types of counselling, advantage and disadvantage. Principle of counselling, the process of counselling, qualities of an effective counselling.

UNIT-II

Counselling skills for dietician: Introduction, dietician using counselling skills, qualities of a dietician, developing a counselling approach, different approaches to counselling.

Diet counselling steps: assessment components, planning components, Implementation components and evaluation components.

UNIT-III

Role of counselling in hospital, Role of counselling in community, Organizing health camps -hospital level and community level, Diet counselling for pregnancy, lactation and child care , Patient follow up / home visits.

UNIT-IV

Diet counselling for adolescent, adults and old age Diet counselling for obese people, Infectious diseases, and AIDS

UNIT-V

Diet counselling for Diabetics, CVD, Gastrointestinal diseases, liver diseases and cancer.

REFERENCES:

1. Gibson, R.L., Mitchell, M.H.(2005). Introduction to counselling and guidance (6th Ed).
2. Judey gable, (2005). Counselling skills for dietitians, 2nd edition, black publishing.
3. WHO, (2014). NACS, A programme guide.
4. WHO, (2018). NACS, module 3 counselling guide.

**M.Sc. NUTRITION AND DIETETICS
SEMESTER - IV**

Core Paper- Nutraceuticals and Functional Foods Theory: 4Hours/Week

Objectives:

To enable students to:

1. Know the importance of Nutraceuticals and Functional Foods
2. Impart knowledge on the health benefits

UNIT-I

Nutraceuticals : Definition, history, classification, market trends, sources. Demand drivers for health supplements and nutraceuticals in India. Development of nutraceuticals incorporated food products- Tailoring diets for special needs, critical steps , stability and bio availability of bio actives substances in food matrices.

UNIT-II

Functional foods: Definition, history and types. Health benefits of functional foods and future promises in Indian diet. Future research and develop of functional foods- Qualified studies, modern technologies and appropriate consumer communication. Safety and Regulatory aspects of functional foods.

UNIT-III

Probiotics and Prebiotics: Definition, types, source and Health benefits. Recent advances in probiotics and prebiotics. FAO/WHO Standards/ guidelines on probiotics and prebiotics .

UNIT-IV

Carotenoids: beta carotene, lycopene and lutein – sources and uses.

Terpenes: terpenoids, saponin, tocotriols– sources and uses.

Allyl-s-compounds and phenolic compounds– sources and uses.

UNIT-V

Curcumin for prevention and treatment of chronic diseases- Introduction, mechanism of action of curcumin, role of curcumin in cancer, CVDs, neurological diseases, pulmonary diseases, diabetes, rheumatic diseases and infection diseases.

REFERENCES:

1. Dilip ghosh et al(2006). Clinical aspects of functional foods and nutraceuticals, CRC Press.
2. Mahtab S Bamj, N Prahlad Rao, Vinodini Reddy(2005). Text book of Human Nutrition –, Second• Edition, Oxford and IBH Publishing Co.Pvt.Ltd.
3. Wilman(2007). Hand book of Nutraceuticals and functional foods, second editin.CRC press.
4. Gibson GR and Williams CM(2000). Functional Foods - Concept to Product.

M.Sc. NUTRITION AND DIETETICS
SEMESTER - IV
Dissertation and Viva Voce 18 Hours/Week

An independent research project work undertaken by student under the guidance of an supervised by a member of the teaching faculty of the concerned department, can either be a survey or Laboratory oriented research. The research should be submitted at the end of semester IV in the form of a thesis.

EVALUATION PATTERN:

INTERNAL EXAMINATION: 25 MARKS

25 marks are based on day-to-day work of the concern student in terms of project designing, Practical performance in the laboratory, interpretation of the results obtained, regularity and any other criteria relevant to the study. Presentation of the work in front of the faculty of the department at least one time during this project work.

EXTERNAL EXAMINATION: 75 MARKS

75 marks are based on the following criteria

- a. Thesis report :25 marks
- b. Presentation through PPT: 25 marks
- c. viva-voce conducted by external examiner :25 maks

M.Sc. NUTRITION AND DIETETICS

SEMESTER - IV

Elective paper-3 Food Safety and Standards Theory: 4 Hours/Week

Objectives:

To enable students to:

1. Know the importance of food safety and hygiene.
2. Knowledge about food standards.

UNIT-I

Safe food: Introduction, definition and manufacture of hygienic food. Type of hazards. Factors affecting food safety and Importance of safe foods.

UNIT-II

Relationship of microorganisms to sanitation: Introduction, microorganisms common to food, effects of microorganism on food borne illness- aeromonas hydrophila, bacillus cereus, botulism, campylo bacteriosis, clostridium perfringens, escherichia coli, listeriosis, salmonellosis, staphylococcal, trichinosis and mycotoxins.

UNIT-III

Food safety: Indicators of food microbial quality and safety - Coliforms, enterococci, bifidobacteria, coliphages/enterviruses, predictive microbiology/microbial modelling. Personal hygiene and sanitary food handling in food service establishments. Sanitizing methods: Thermal, radiation, high hydrostatic pressure, vacuum and chemical sanitizing.

UNIT-IV

Risk assessment and management during food preparation – HACCP-prerequisite programmes, definitions, HACCP principles and flow diagrams, application and limitations of HACCP.

Risk assessment and management during food preparation- Food safety objective (FSO), Microbiological criteria, definitions, sampling plans.

UNIT-V

Microbiological criteria for various food products – Sea foods, milk products, spices, fruits and vegetables.

Food laws and standards: FAO, Codex alimentarius, ISO, Indian food laws and standards, prevention of food adulteration(PFA)act, fruit products order(FPO), meat products order(MPOO, cold storage order(CSO), BIS and Agmark.

REFERENCES:

1. Raveendra reddy et al(2018). Food safety and microbial standards, Archarya NG Ranga agricultural university.
2. Lawlwy, et al(2004). The food safety hazard guidebook, RSC publishing.
3. Marriott, Norman G(2005). Principles of food sanitation, AVI, Newyark.
4. Forsythe, SJ(2000). Microbiology of safe food, Blackwell science, oxford.