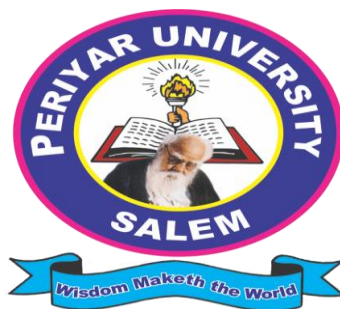


PERIYAR UNIVERSITY
Periyar Palkalai Nagar, Salem-636011

Department of Nutrition and Dietetics



M.Sc. Clinical Nutrition and Dietetics
[Choice Based Credit System (CBCS)]

REGULATIONS AND SYLLABUS
(EFFECTIVE FROM 2026-2027)

Introduction

The Department of Nutrition and Dietetics at Periyar University has adopted Outcome Based Education (OBE) to improve the employability of graduates. This is achieved through curriculum reforms aligned with a learning outcome-based framework, along with the enhancement of academic resources and the learning environment.

Learning outcomes clearly define what students are expected to know, understand, and be able to perform upon completing a programme of study. This approach is based on the principle that higher education qualifications should be awarded based on the achievement of clearly defined outcomes, including knowledge, understanding, skills, attitudes, and values. These outcomes also support effective interaction among stakeholders. Unlike input-based education, which focuses on the teaching process, OBE emphasizes measurable results and student achievements.

Outcome Based Education (OBE) is a structured approach to designing and implementing a curriculum that focuses on the achievement of clearly defined learning outcomes by every student. It emphasizes organizing all aspects of education around what learners are expected to successfully demonstrate at the end of their learning experience. In OBE, curriculum design and instructional methods are guided by the expected exit outcomes that students should attain upon completing a course or programme. By the end of the learning period, each student is expected to achieve these specified outcomes.

The Learning Outcomes-based Curriculum Framework (LOCF) for M.Sc Clinical Nutrition and Dietetics supports this approach by aligning curriculum with measurable learning goals. One of the main aims of OBE is to promote continuous improvement of this M.Sc CND programme by ensuring their relevance and responsiveness to stakeholder needs. This framework incorporates a systematic outcomes assessment process to be followed by the department of Nutrition and Dietetics.

Vision and Mission of Department of Nutrition and Dietetics

VISION

To impart a solid understanding of standards of clinical nutrition and dietetics practice and develop essential leadership skills to play a pivotal role to promote nutrition and healthy lifestyle choices in our society and beyond.

MISSION

- To develop experts in clinical nutrition practice from a wide range of perspectives within the health system, from disease prevention to palliation.
- To generate a team of well-equipped clinical nutrition practitioners to help the community in maintenance of optimal health and well-being.
- To expose students to research and practice in the field of nutrition and dietetics by developing newer food formulas in the prevention and treatment of lifestyle diseases.

Graduate Attributes (GA) for Clinical Nutrition and Dietetics Programme

GA1: Acquire comprehensive and in-depth knowledge of clinical nutrition, dietetics, human physiology, and therapeutic nutrition for the prevention and management of diseases.

GA2: Apply critical thinking skills to analyze nutritional problems and develop evidence-based solutions for clinical and public health challenges.

GA3: Demonstrate the ability to use contemporary research methods, tools, and techniques to assess nutritional status, interpret data, and contribute to evidence-based practice.

GA4: Communicate effectively with patients, caregivers, and healthcare professionals, and deliver appropriate nutrition education and counselling for behavior change.

GA5: Work collaboratively in multidisciplinary healthcare teams and exhibit leadership qualities in clinical, institutional, and community settings.

GA6: Demonstrate proficiency in nutritional assessment techniques (anthropometric, biochemical, clinical, and dietary) and apply therapeutic diet principles in diverse settings.

GA7: Adhere to ethical standards, maintain confidentiality, and demonstrate integrity and professionalism in clinical practice and research.

GA8: Promote sustainable dietary practices and understand the interrelationship between food systems, environmental health, and resource conservation.

GA9: Identify and address societal needs related to food, nutrition, health, sanitation, and gender equity, and actively participate in community-based interventions.

GA10: Utilize modern digital tools, nutrition software, and telehealth platforms for dietary assessment, planning, monitoring, and data management.

GA11: Engage in self-directed learning and continuous professional development to keep pace with advancements in clinical nutrition and healthcare.

GA12: Demonstrate innovative and entrepreneurial skills in developing nutrition-based products, services, and interventions for health promotion and disease prevention.

Program Educational Objectives (PEO):

At the end of the program the students will obtain:

PEO1: Technical Proficiency

Apply knowledge and demonstrate technical competence in clinical nutrition and dietetics to succeed as clinical nutritionists and dietitians, contributing effectively in the field of Medical Nutrition Therapy.

PEO2: Professional Growth

Demonstrate commitment to lifelong learning and engage in higher education and continuous professional development in the field of nutrition and dietetics.

PEO3: Management Skills

Apply managerial and entrepreneurial skills in an ethical and innovative manner to establish and manage diet clinics and nutrition-related services.

PROGRAM SPECIFIC OUTCOME (PSO)

The Post Graduates of Clinical Nutrition and Dietetics Program will be

PSO1: Apply domain knowledge and procedural skills in clinical nutrition and dietetics, along with related disciplines, to contribute effectively to societal well-being.

PSO2: Apply principles of dietetics in planning food and nutrition programmes and administer meal preparation in hospitals and other food service establishments.

PSO3: Educate the community on appropriate dietary modifications based on the severity of ailment and disease complications.

PSO4: Demonstrate continuous professional development through lifelong learning, contributing to improved human health either as independent nutrition counsellors or as part of a multidisciplinary healthcare team.

PSO5: Apply research skills and evidence-based approaches in clinical nutrition and dietetics to assess nutritional problems, interpret data, and improve patient care outcomes.

PROGRAMME OUTCOMES (PO) FOR CLINICAL NUTRITION AND DIETETICS

On completion of M.Sc. programme, the students are expected to

PO1: Critical Thinking: Identify and apply knowledge of clinical nutrition and dietetics to address scientific issues related to disease prevention and management. Formulate problems, evaluate research literature, and demonstrate the ability to address nutritional deficiencies using principles of clinical nutrition, physiology, food science, biochemistry, and related disciplines. Apply appropriate techniques, resources, and modern tools to compute nutritional needs with due consideration of limitations.

PO2: Effective Communication: Demonstrate effective communication with patients and healthcare teams by explaining disease complexity, nutritional care, and feeding challenges. Apply communication skills through report writing, presentations, and documentation to educate individuals and communities on health and nutrition.

PO3: Social Interaction: Identify and evaluate societal, environmental, health, safety, and cultural issues related to food and nutrition in local and global contexts.

PO4: Effective Citizenship: Demonstrate active participation in patient care as a clinical or community dietitian, and apply professional knowledge in multidisciplinary teams to report and evaluate the nutritional status of individuals and communities.

PO5: Professional Ethics: Demonstrate ethical responsibility and apply professional standards, regulations, and norms in clinical nutrition and dietetics practice.

PO6: Sustainability: Apply knowledge to develop and evaluate innovative food products, substitutes, and solutions that promote sustainability and societal well-being.

PO7: Self-Directed and Lifelong Learning: Demonstrate the ability to identify learning needs and apply independent learning strategies for continuous professional development in clinical nutrition and dietetics.

PSO–PO Mapping Matrix

(3 – High, 2 – Moderate, 1 – Low correlation)

PSOs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
PSO1	3	2	2	3	2	2	2
PSO2	3	2	1	3	2	2	1
PSO3	2	3	3	2	2	1	1
PSO4	2	2	2	3	3	1	3
PSO5	3	2	2	2	2	2	3

GA–PO Mapping Matrix*(3 – High, 2 – Moderate, 1 – Low correlation)*

GAs \ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
GA1	3	1	1	2	1	1	2
GA2	3	1	1	2	1	1	2
GA3	3	1	1	2	1	2	2
GA4	1	3	2	2	2	1	1
GA5	1	2	2	3	2	1	2
GA6	3	1	1	3	2	1	2
GA7	1	1	1	2	3	1	2
GA8	1	1	2	2	1	3	1
GA9	1	2	3	3	2	1	1
GA10	2	2	1	2	1	2	2
GA11	2	1	1	2	2	1	3
GA12	2	1	1	2	1	3	2

DEPARTMENT OF NUTRITION AND DIETETICS
M.Sc. CLINICAL NUTRITION AND DIETETICS

SYLLABUS

Choice Based Credit system (CBCS)

Subject code	Title of the Paper	Weekly contact Hours	Credits	Internal Marks	External Marks	Total Marks
SEMESTER –I						
26UPCND1C01	Human Physiology	5	4	25	75	100
26UPCND1C02	Applied Food Science	5	4	25	75	100
26UPCND1C03	Clinical Nutrition and Dietetics-I	6	5	25	75	100
26UPCND1CP01	Applied Food Science Practical's	3	2	40	60	100
26UPCND1CP02	Clinical Nutrition and Dietetics -I Practical's	3	2	40	60	100
26UPCND1E01	Nutritional epidemiology	4	4	25	75	100
26UPCND1E02	Food Service Management	4	4	25	75	100
	Total	30	25			
SEMESTER –II						
26UPCND1C04	Clinical Nutrition and Dietetics -II	6	5	25	75	100
26UPCND1C05	Clinical Biochemistry	7	6	25	75	100
26UPCND1E03	Nutrition for Physical Fitness and sports	5	4	25	75	100
26UPCND1CP03	Clinical Nutrition and Dietetics-II Practical's	3	2	40	60	100
26UPCND1CP04	Clinical Biochemistry Practical's	3	2	40	60	100
26UPPGC1H01	Fundamentals of Human Rights	2	1	25	75	100
26UPCND1SM01	SWAYAM/MOOC online course	4	3	-	100	100
	Total	30	23			
SEMESTER –III						
26UPCND1C06	Research Methods and Statistical applications	5	5	25	75	100
26UPCND1C07	Human Development and Nutrition	5	4	25	75	100
26UPCND1C08	Public Health Nutrition	4	4	25	75	100
26UPCND1E04	Hospital administration and practices	4	4	25	75	100
26UPCND1CP05	Research Methods and Statistical applications Practical's	3	2	40	60	100
26UPCND1E05	Contemporary Perspectives in Home Science	4	4	25	75	100
26UPCND1S01	Supportive paper	3	3	25	75	100
26UPGENIV01	Peace education	2	2	25	75	100
	Total	30	26			
SEMESTER –IV						
26UPCND1C09	Functional foods and Nutraceuticals	5	5	25	75	100
26UPCND1CP06	Advanced Functional foods practical's	3	2	40	60	100
26UPCND1PR01	Project and Viva-voce	22	12	50	150	200
26UPCND1EA01	Extension Activity	-	1	100	-	100
	Total	30	20			
SELF STUDY COURSES / INTERNSHIPS						
26UPCND1SC01	Hospital Dietary internship training (Mandatory)	45 days	8	-	-	-
	Total		102	-	-	-

Total Credits for this M Sc Programme: 102

Supportive Papers offered to other PG departments

1. Diet therapy in life style diseases
2. Basic concepts in clinical dietetics
3. Life cycle nutrition
4. Nutrition science

Subject code	Title of the Paper	Weekly contact Hours	Credits	Internal Marks	External Marks	Total Marks
26UPCND1S01	Diet therapy in life style Diseases	3	3	25	75	100
26UPCND1S02	Basic concepts in clinical Dietetics	3	3	25	75	100
26UPCND1S03	Life cycle Nutrition	3	3	25	75	100
26UPCND1S04	Nutrition Science	3	3	25	75	100

SWAYAM/MOOC online courses (preferred based on the availability)

Subject code	Title of the Paper
26UPCNDSM01	Food microbiology and Food Safety
26UPCNDSM02	Home Science
26UPCNDSM03	Communication Technologies in Education
26UPCNDSM04	Science of Clothing Comfort
26UPCNDSM05	Principles of Human Resource Management
26UPCNDSM06	Child Development

Value added/Add on Courses

Subject code	Title of the Paper
26UPCNDVA01	Artificial Intelligence in Nutrition & Healthcare
26UPCNDVA02	Probiotics & Gut Health
26UPCNDVA03	Food Product Development & Entrepreneurship
26UPCNDVA04	Communication Skills for Dieticians

DETAILS OF THE COURSE

1.	No. of Core papers with practical's	15
2.	No. of Elective papers	5
3.	Supportive courses	1
4.	SWAYAM /MOOC online courses	1
5.	Human Rights	1
6.	Hospital Dietary Internship Training	1
7.	Project and Viva voce	1
8.	Extension Activity	1

SCHEME OF EXAMINATIONS

The scheme of examinations for different semesters shall be as follows:

Theory Paper

External : 75 Marks

Internal: 25 Marks

Total : 100 Marks

Time : 3 hours

Pattern of Question Paper:

PART – A -Objective type; answer all questions 20 X 1 = 20 Marks

PART – B -Analytical Questions (3 out of 5) 3X 5 =15 Marks

PART –C -Either or type descriptive questions 5 X8 =40 Marks

Procedure followed for Internal Marks:**For Theory Papers**

Best two tests out of 3	: 10 Marks
Seminar	: 5 Marks
Assignment	: 5 Marks
Attendance	: 5 Marks
Total	: 25 Marks

For Practical's

Practical Internal	
Test Best 2 out of 3	: 40 Marks
Practical External	
Record	: 10 Marks
Practical exam	: 50 Marks
Total	: 100 Marks

For Project and *viva voce*

Components of evaluation are as follows

Component – I (C1): Periodic Progress and progress reports (15%)

Components – II (C2): results of work and draft report (15%)

Components – III (C3): final viva-voce and evaluation (70%). The report evaluation is for 40% and the Viva-voce examination is for 30%.

Total : 100 Marks

PASSING MINIMUM

- There shall be no Passing Minimum for Internal.
- For External Examination, Passing Minimum shall be of 50% (Fifty Percentage) of the maximum marks prescribed for the paper.
- In the aggregate (External + Internal) the passing minimum shall be of 50% for each Paper/Practical/Project and Viva-voce.
- Grading shall be based on overall marks obtained (internal + external).

RANKING

Candidates who pass all the examinations prescribed for the course in the first appearance itself alone are eligible for Ranking / Distinction. Provided in the case of candidates who pass all the examinations prescribed for the course with a break in the First Appearance due to the reasons as furnished in the Regulations under “Requirements for Proceeding to subsequent Semester” are only eligible for Classification.

M.Sc. Clinical Nutrition and Dietetics Course
SEMESTER-I

Course Name	Human Physiology		
Course Code	26UPCND1C01		
Type of Course	Core		
Class	I M.Sc.	Semester	I
Course Objectives	• To understand the structure and functions of major body systems • To relate physiological processes to health, disease, and nutrition. • To apply basic physiology knowledge in clinical nutrition and dietetics		

Unit	Content	Number of Hours
I	Physiology of Cell - General cell structure. - Structure and functions of the organelles, - Cell membrane. - Structure and function of tissues and their characteristics - Body fluid compartment, - Inter cellular communication – - Structure, function and role of sensory organs.	10
II	Respiratory, Digestive and Excretory system - Physiology of respiration - Mechanism of respiration - Measurement of Respiratory parameters - Anatomy of digestive tract and process of digestion - Absorption and assimilation of food - Composition and functions of secretion of digestive juices and accessory organs and glands- Salivary, liver, gall bladder, intestine and pancreas - Physiology of kidney and nephron - Formation of urine - Voiding of urine	14
III	Endocrine and Reproduction - Structure and functions of endocrine glands-Pituitary, thyroid, adrenal, pineal and parathyroid glands - Mechanism of hormonal action - Structure and functions of male and female reproduction - Pregnancy, Parturition, Menopause, Mammary glands and location - Hypo and Hyper secretions of glands	12

IV	Heart and Blood Circulation a) Anatomy of Heart b) Components of cardiovascular system c) Cardiac cycle, Cardiac arrest, Heart rate and regulation d) Blood pressure and factors affecting blood pressure Blood a) Composition of Blood b) Development and function of blood cells a) Blood groups and coagulation of blood	12
V	Nervous System and Special Senses a) Spinal cord: Structure and functions, ascending and descending tracts, reflex action. b) Brain: Structure and functions of cerebrum, optic thalamus, mid brain, pons, medulla oblongata, hypothalamus, cerebellum. a) Immunity and its types-Innate and adaptive immunity	12
	Total Hours	60

References

Textbooks

- Sembulingam. K, Prema Sembulingam (2019)- 9th Edition “Human Physiology: From Cells to Systems”, Cengage Learning.
- Ganong, W.F. (2010): Review of Medical Physiology, 23rd Edition, Lange Medical Publication.
- Guyton, A.G. and Hall, J.B. (2010): Text Book of Medical Physiology, 23rd Edition, W.B.Sanders Company, Prism Books (Pvt.) Ltd., Bangalore.
- Wilson, K.J.W and Waugh, A. (2022): Ross and Wilson Anatomy and Physiology in Health and Illness. 14th Edition, Churchill Livingstone.
- Jain, A.K.: Textbook of Physiology. Vol. I and II. Avichal Publishing Co., New Delhi -9th edition, 2021.
- McArdle, W.D., Katch, F.I. and Katch V.L (2022): Exercise Physiology. Energy, Nutrition and Human Performance, 9th Edition, Williams and Wilkins, Baltimore.
- Datta, Chandrani Sanyal (2018): Essentials of human physiology: AITBS.
- Marieb, Elaine N. (2021): Pearson Human anatomy & physiology, 11th edition.
- GK Pal- Textbook of Physiology, Vol 1 & 2, 3 -4th edition 2022, Jaypee Brothers Medical Publishers.
- Essentials of Medical Physiology – Anil Baran Singha Mahapatra, 5th edition, 2021.

Web Resources

- <http://physiology.forumshealth.com/>
- <https://www.pdfdrive.com/physiology-books.html>
- <https://www.ncbi.nlm.nih.gov>

Course Outcomes	On completion of the course, students should be able to CO1: Understand the structure and functions of the cell CO2: Explain the functions of respiratory, digestive, and excretory systems in maintaining health. CO3: Understand the role of endocrine glands and reproductive systems in growth and body regulation. CO4: Describe the structure and functions of heart, blood, and circulation. CO5: Explain the functions of the nervous system and special senses like vision and hearing.
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Course Outcomes (CO) –with PO Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Understand the structure and functions of the cell	U	1,3,4
2	Explain the functions of respiratory, digestive, and excretory systems in maintaining health.	U	1,3,4
3	Understand the role of endocrine glands and reproductive systems in growth and body regulation.	U	1,3,4
4	Describe the structure and functions of heart, blood, and circulation.	U	1,3,4
5	Explain the functions of the nervous system and special senses like vision and hearing.	U	1,3,4
*Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	10	10	20	20
Understand	10	10	15	15
Apply	20	20	25	25
Analyse	10	10	15	15
Evaluate	-	-	-	-
Create	-	-	-	-
Total	50	50	75	75

Course Name	Applied Food Science		
Course Code	26UPCND1C02		
Type of Course	Core		
Class	I M.Sc.	Semester	I
Course Objectives	The Course aims • To assist the students to apprehend the composition, classification and function of various food groups. • To analyse the factors affecting cooking and keeping quality of food. • To impart the scientific knowledge of food principles required to become successful food scientists and nutritionist who can work in industry, government or academia or as entrepreneurs.		

Unit	Content	Number of Hours
I	Cereals and Millets - Structure of wheat - Composition, Nutritive Value and Functionality of rice and wheat in food system. - Composition, and Nutritive Value of millets Starch Cookery - Sources, structure and composition of starch - Modified food starches-structure and composition - Gluten formation and Factors affecting gluten formation - Gelatinization and Factors affecting gelatinization Introduction to Indian Knowledge System - Definition, history and significance of Indian Knowledge System - Characteristics and uniqueness of Indian foods - Interdisciplinary nature of IKS (Science, Health, Agriculture, Philosophy) - Rice and sprouted grains in Ayurveda and Siddha	15
II	Pluses - Important pulses, Composition, and Nutritive value - Methods of processing and textured vegetable protein - Toxic constituents, Pulse cookery Milk and milk products - Milk Components - Effect of physical and chemical factors on milk components - Physiochemical properties of milk, - Fermented and Non-fermented Milk products. Eggs - Structure, Composition and nutritional qualities - Quality grading, changes during storage - Functional properties-Foaming, factors affecting foam formation	10
III	Flesh foods Meat Structure, Composition and Nutritive value	15

	b) Post-mortem changes, Ripening of meat and Tenderizing of meat c) Cooking of meat, Changes produced during cooking of meat Poultry a) Desi Birds, Classification, Poultry Processing b) Composition and Nutritive Value Marine foods (Fish and Seaweeds) a) Types, Composition and Nutritive value of fish and seaweeds b) Fish and seaweed products c) Fish Spoilage, Preservation and Processing	
IV	Vegetables and Fruits a) Structure, Composition b) Pectin's and Plant acids c) Types of pigments. d) Effect of cooking on colour and texture of vegetables. e) Browning reactions-Enzymatic & non-enzymatic and its prevention. Fats and Oils a) Composition of food fats b) Functions of Oil and Fats in Foods c) Processing of Oil and Fats d) Rancidity- Types, Mechanism and prevention. Sugar and Jaggery a) Types of granulated sugars, Physical and chemical Properties b) Reactions of sugar- Caramelization, Hydrolysis, Crystallization c) Stages of sugar cookery and role in Indian traditional sweet preparations	10
V	Evaluation of Food Quality a) Sensory characteristics of foods - Appearance, Colour and Flavour b) Types of sensory test, sensitivity test and objective evaluation. Food additives a) Definition and Needs for food additives b) Different food additives c) Role of colours and flavours in food Products Packaging and Labelling a) Importance, functions & types of packaging and labelling material. Post-Harvest Technology a) Post-harvest losses, reasons for losses, techniques to overcome losses.	10
	Total Hours	60

References

Text Books:

- Srilakshmi B. (2018): Food Science, New Age International (P) Ltd. Publishers, New Delhi.
- N. Shakuntala Manay and M. Shadaksharaswamy (2020): Foods, Facts and Principles, New Age International (P) Ltd., New Delhi.
- Potter, N. and Hotchkiss, J.H. (1998): Food Science, Fifth ed., CBS Publishers and Distributors, New Delhi.

Reference Books

- Meyer L.J. (2006): Food Chemistry, CBS Publishers and Distributors, New Delhi.
- Lee Frank A. (2007): Basic Food Chemistry, Westpot Connecticut: AVI Publishers.
- Swaminathan M (1979) : Food Science And Experimental Foods, Ganesh And Company Madras,
- Peckham G. And Freei and-Graves, G.H. (1979) : Foundation of Food Preparation, Mac Millian Company
- Griswold, R.M. (1979): The Experimental Study of Food, Houghton Mifflin Boston.
- Girdharilal, G.S. Sidappa and G.L. Tandon (1986): Preservation of Fruits and Vegetables, (2nd Ed), New Delhi: Indian Council of Agricultural Research.
- Charley M. J (1982): Food Science (2nd Ed), John Wiley and Sons.
- Belle Lowe (1963) : Experimental Cookery, John Wiley And Sons Inc., New York
- Paul P.C. And Palmer H.H. (1972) : Food Theory And Application John Wiley And Sons, London
- Bennion, Marion and O. Hughes (1986): Introductory Foods, Edi: mac millian N. Y.
- Mahindru, S.N.: Food Additives, Characteristics, Detection and Estimation, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
- Acharya, K.T.: A Historical Dictionary of Indian Foods, Oxford Publishing Co.
- Belitz, H.D. and Grosch W., (1999) : Food Chemistry, (2nded), Springer, New York.

Web Resources

- Food Technology Abstracts, Central Food Technological Research Institute Mysore.
- Food Technology, Journal of the Institute Of Food Technology, Illinois, USA.
- Food Digest, CFTRI Mysore.
- Journal of Agriculture and Food Chemistry.
- Cereal Science.
- Indian Food Industry AFSTI, CFTRI, Mysore.
- Journal of Food Science and Technology CFTRI, Mysore.
- Indian Food Packer, All Indian Food Preserves Association, Delhi.
- Journal of Dairy Science.10. Advances in Food Research.

Course Outcomes	On completion of the course, students should be able to CO1: Understand the composition and nutritive value of cereals, millets, pulses, milk, eggs, and meat. CO2: Explain basic cooking methods and changes that occur in foods during processing and preparation. CO3: Understand the properties of vegetables, fruits, fats, oils, and sugars and their role in food preparation. CO4: Evaluate food quality using sensory characteristics like colour, taste, and texture. CO5: Understand the importance of food additives, packaging, and labelling in food safety. CO6: Apply basic knowledge of food processing and post-harvest techniques to reduce food losses.
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Course Outcomes (CO) –with PO Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Understand the composition and nutritive value of cereals, millets, pulses, milk, eggs, and meat.	U	1,6
2	Explain basic cooking methods and changes that occur in foods during processing and preparation.	U / A	1,4,6
3	Understand the properties of vegetables, fruits, fats, oils, and sugars and their role in food preparation.	U	1,3,6
4	Evaluate food quality using sensory characteristics like colour, taste, and texture.	E	1,2,4
5	Understand the importance of food additives, packaging, and labelling in food safety.	U / An	1,3,5
6	Apply basic knowledge of food processing and post-harvest techniques to reduce food losses.	A	1,3,6,7
*Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests(Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	5	10	20	20
Understand	15	10	15	15
Apply	10	15	15	15
Analyse	10	10	15	15
Evaluate	10	5	10	10
Create	-	-	-	-
Total	50	50	75	75

Course Name	Clinical Nutrition and Dietetics-I		
Course Code	26UPCND1C05		
Type of Course	Core		
Class	I M.Sc.	Semester	I
Course Objectives	• To facilitate the students to realize the principles of diet. • To expertise in the dietary modifications for different diseases. • To understand the concept of medical coding with relevance to disease conditions.		

Unit	Content	Number of Hours
I	Clinical Nutrition and Dietetics a) Definition and history of dietetics. b) Dietitian as part of the Medical Team c) Nutrition Care Process (NCP): steps and application in clinical practice Diet, Nutrient and Drug Interaction a) Effect of drugs on ingestion, Digestion, Absorption and metabolism of nutrients. b) Drug - Nutrient interaction c) Drug –drug interaction Artificial Intelligence a) In use of digital technologies in clinical nutrition b) In Dietary assessment c) In Nutrients Science Research - In health care	15
II	Diet Modifications a) Normal diet as a basis for therapeutic diets b) Routine Hospital Diet c) Feeding methods- Enteral and Parenteral Nutrition Dietary management in febrile condition a) Classification and etiology of fever/infection, symptoms, diagnostic tests, Metabolic changes during infection and dietary treatment for – Typhoid, Influenza, Malaria, Tuberculosis and AIDS Diet for weakened immune system a) Neutropenic diet, COVID and Dengue Dietary management in allergy a) Definition, Symptoms and Diagnostic tests b) Types of reaction and Mechanism c) Elimination diets and Treatment d) Common food allergens and Prevention of food allergy	14

III	Dietary management in Surgery - Stage of Convalescence - Nutrition and Dietary management for pre-and post-surgical diets. Dietary management in Burns - Classification and Complications - Metabolic changes in protein and electrolytes - Medical coding for burns Dietary management in Trauma - Physiological, metabolic and hormonal response to injury - Dietary management in trauma - Medical coding for trauma Dietary management in Sepsis - Definition and Dietary management of Sepsis with or without Multiple Organ Dysfunction Syndrome (MODS) - Medical coding of Sepsis, Severe Sepsis, and Septic Shock Infections resistant to antibiotics	15
IV	Nutrition for weight management: Disorders of energy balance Obesity - Pathophysiology - Regulation of body weight-hunger, satiety and role of neurotransmitters - Obesity: causes, types, assessment and health risks - Management and treatment of obesity - Prevention Underweight - Pathophysiology - Causes, assessment, health risks and effect on nutritional status - Dietary Management	14
V	Dietary Management in Musculoskeletal disorders Gout - Aetiology, Role of proteins and purines, clinical features and complications, Management of gout Osteoporosis and Osteomalacia - Prevalence, Types, Etiology and Role of Calcium, Phosphate & Vitamin D in Osteoporosis and Osteomalacia. Rheumatoid disorders-Osteo arthritis, rheumatic arthritis and scleroderma - Aetiology, dietary management and prevention - Medical coding for diseases of the Musculoskeletal System	14
Total Hours		72

References

Text Books

- B.Srilakshmi- Dietetics, 2023, 9th Edn, New Age International Pvt .Ltd. New Delhi.
- Kumud Khanna, Sharda Gupta, Santosh jain Passi and Rama Seth-Textbook of Nutrition and Dietetics-2nd Edition, Elite Publishing House pvt. Ltd, Delhi
- Anita Jatana- Clinical Nutrition Handbook, 2022, Jaypee Brothers Medical

Publishers, New Delhi

- Dharsan Sohi-A Comprehensive Textbook of Applied Nutrition and Dietetics, 3rd Edition, 2022, Jaypee Brothers Medical Publishers, New Delhi
- Antia F.P. And Philip Abraham- Clinical Nutrition and Dietetics, 4th edition- 2001, Oxford Publishing Company.
- Swaminathan S- Advanced Textbook On Food & Nutrition, 2015, Bappa

Reference Books

- Mahan L.K., Sylvia Escott-Stump - Krause's Food Nutrition and Diet Therapy 11th Edition, 2016, W.B. Saunders Company London.
- Passmore P. And M.A. Eastwood- Human Nutrition and Dietetics, Churchill Living Stone.
- Raheena M. Begum - A Text Book of Foods Nutrition and Dietetics, 3 edition 2009, Sterling Publishers Pvt. Ltd
- Robinson Ch., M.B. Lawlea, W.L., Chenoweth, and A.E., Carwick: Normal and Therapeutic Nutrition, 17th Edn, Macmillan Publishing Company.
- Krause's., Kathleen Mahan., Marian T. Arlin: Food Nutrition & Diet Therapy, 8th Edition 1992, W.B. Saunders Company.
- Shills and Young Modern Nutrition in Health and Disease, 2012, Lippincott Williams and Wilkins.
- Bennion M.: Clinical Nutrition, 2nd edition-2013, John Wiley & Sons.
- Whitney, E. N. and C. B. Cataldo, Understanding Normal and Clinical Nutrition, 8th edition-2008, West Pub.
- Williams S.R. Essentials of Nutrition and Diet Therapy, 12th edition, 2018, Mosby College Pub. S. Louis.

Web Resources

- <https://stacks.cdc.gov/view/cdc/250974>
- www.anme.com.mx/libros/PrinciplesofNutrition.pdf
- <https://2012books.lardbucket.org/pdfs/an-introduction-to-nutrition.pdf>
- krishikosh.egranth.ac.in

Course Outcomes	On completion of the course, students should be able to CO1: Understand the basic concepts of clinical nutrition, role of dietician, and diet–drug interactions including use of AI in healthcare. CO2: Explain diet modifications, hospital diets, and feeding methods like enteral and parenteral nutrition. CO3: Apply diet therapy in managing infections, allergies, surgery, burns, trauma, and sepsis. CO4: Analyse and manage nutritional problems related to obesity and underweight. CO5: Explain dietary management and medical coding of musculoskeletal disorders such as gout, osteoporosis, and arthritis.
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Course Outcomes (CO) –with PO Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Understand the basic concepts of clinical nutrition, role of dietitian, and diet–drug interactions including use of AI in healthcare.	U	1,3,5
2	Explain diet modifications, hospital diets, and feeding methods like enteral and parenteral nutrition.	U / A	1,4
3	Apply diet therapy in managing infections, allergies, surgery, burns, trauma, and sepsis.	A	1,4,7
4	Analyse and manage nutritional problems related to obesity and underweight.	An	1,3,4
5	Explain dietary management and medical coding of musculoskeletal disorders such as gout, osteoporosis, and arthritis.	U / A	1,4,5
Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	5	5	10	10
Understand	15	15	15	20
Apply	10	10	15	15
Analyse	10	10	15	15
Evaluate	10	10	10	10
Create	-	-	10	5
Total	50	50	75	75

Course Name	Applied Food Science Practical's		
Course Code	26UPCND1CP01		
Type of Course	Core Practical		
Class	I M.Sc.	Semester	I
Course Objectives	- To understand the basic properties and behavior of different foods through experiments. - To develop skills in sensory evaluation and food quality assessment. - To encourage preparation and development of new food products.		

S.No	Content	Number of Hours
	Applied Food Science Practical	
1.	Starch- Microscopic structure and gelatinization. Factors affecting gelatinization –sag test, gluten formation	3
2.	Pulses-Determination of physical properties of pulses- size, 100 grain weight, true density, bulk density and porosity	3
3.	Fruits -Adequacy of blanching of fruits/ vegetables, enzymatic browning, pectin test, firmness of gel	3
4	Vegetables- Effect of various cooking methods on fat soluble and water-soluble pigments	3
5	Milk-Detecting the pH, presence of starch, soda, starch, urea in milk samples. Effect of acid on milk. Maillard reaction.	6
6	Egg- Effect of various additives on the stability of egg white foam	3
7	Food colours- Detecting the presence of synthetic food colours in the food sample	3
8	Sugar-Stages of sugar cookery. Effect of dextrose, jaggery, honey and cream of tartar on sucrose.	3
9	Sensory evaluation -Taste threshold for various sensations, descriptive analysis, Hedonic scale and facial scale and food action sale	3
10	Development of a new food product	6
Total hours		36

References

Text Books:

- Srilakshmi B. (2018): Food Science, New Age International (P) Ltd. Publishers, New Delhi.
- N. Shakuntala Manay and M. Shadaksharaswamy (2020): Foods, Facts and Principles, New Age International (P) Ltd., New Delhi.
- Potter, N. and Hotchkiss, J.H. (1998): Food Science, Fifth ed., CBS Publishers and Distributors, New Delhi.

Course Outcomes	On completion of the course, students should be able to CO1: Perform food experiments to study food properties CO2: Analyse effects of processing and cooking on foods CO3: Conduct sensory evaluation and interpret results CO4: Formulating a new food product
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Course Outcomes (COs) – Programme Outcomes (POs) Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Perform food experiments to study food properties	A	1,4,7
2	Analyse effects of processing and cooking on foods	An	1,3,4,6,7
3	Conduct sensory evaluation and interpret results	A/An	1,2,3,4,7
4	Formulating a new food product	C	1,2,4,6,7
Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	-	-	-	-
Understand	10	10	10	10
Apply	20	20	20	20
Analyse	15	15	15	15
Evaluate	10	10	10	10
Create	5	5	5	5
Total	60	60	60	60

Course Name	Clinical Nutrition and Dietetics-I Practical's			
Course Code	26UPCND1CP02			
Type of Course	Core Practical			
Class	I M.Sc	Semester	I	
Course Objectives	To provide training in the planning and preparation of therapeutic diets using software for different disease conditions.			

S. No	Content	Number of Hours
1.	Nutrition assessment screening- MNA, MUST, lifestyle assessment methods	3
2.	Menu planning and computation of nutrients for Diet Therapy: Clear fluid diet, Full liquid diet and soft diet	3
3.	Menu planning and computation of nutrients for Typhoid, Malaria, and Tuberculosis	6
4.	Menu planning and computation of nutrients for weakened immune system- Neutropenic diet, COVID, Dengue	6
5.	Menu planning and computation of nutrients for Pre & post-surgery patients	3
6.	Menu planning and computation of nutrients for post burn condition patients with different percentage of burns	3
7.	Menu planning and computation of nutrients for obese subjects with and without diabetes, and underweight with and without TB	3
8.	Menu planning and computation of nutrients for GOUT	3
9.	Menu planning and computation of nutrients for Osteoporosis	3
10.	Menu planning and computation of nutrients for Rheumatoid Arthritis	3
Total hours		36

References

Text Books

- Akansha Yadav, Monika Arora, Swayam Siddha-Practical Manual of Nutrition and Dietetics, 2019, Kalpaz Publications, New Delhi
- Supriya V -Clinical Nutrition and Dietetics Manual for Nurses, 2017, 1st Edition, Jaypee Brothers Medical Publishers, New Delhi
- Dr. S Nasreen, Syeda Uzma Nabeela, Zainab Bano- Clinical Dietetics (Theory & Practical), <https://www.flipkart.com/clinical-dietetics-theory-practical/p/itm872d1dadf5abf>
- Antia F.P. And Philip Abraham-Clinical Nutrition and Dietetics, 2001, Oxford Publishing Company.
- Swaminathan S- Advanced Textbook On Food & Nutrition, 2015, Bappco
- B. Srilakshmi- Dietetics, 2019, 8thEdn, New Age International Pvt. Ltd. New Delhi.

Web Resources

- id=com.cdac.nindietaryguide&hl=en
- <https://apps.mgov.gov.in/descp.do?appid=1066&action=0>
- [id=com.ionicframework.myapp863035](https://play.google.com/store/apps/details?id=com.ionicframework.myapp863035)

Course Outcomes	On completion of the course, students should be able to CO1: Understand and use nutrition screening and assessment tools like MNA and MUST CO2: Plan therapeutic diets and compute nutrients using software for different clinical conditions. CO3: Analyse and prepare the diets for diseases such as infections, surgery, burns, obesity, and musculoskeletal disorders.
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Course Outcomes (CO) –with PO Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Understand and use nutrition screening and assessment tools like MNA and MUST.	U	1,3,4
2	Plan therapeutic diets and compute nutrients using software for different clinical conditions.	A	1,4,7
3	Analyse and prepare the diets for diseases such as infections, surgery, burns, obesity, and musculoskeletal disorders.	An	1,4,7
Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	-	-	-	-
Understand	10	10	10	10
Apply	20	20	20	20
Analyse	15	15	15	15
Evaluate	10	10	10	10
Create	5	5	5	5
Total	60	60	60	60

Course Name	Nutritional Epidemiology		
Course Code	26UPCND1E01		
Type of Course	Elective		
Class	I M.Sc.	Semester	I
Course Objectives	- To understand the basic concepts and methods of epidemiology and nutritional epidemiology - To relate diet, health, and disease using epidemiological approaches. - To apply methods of nutritional assessment and public health practices for disease prevention		

Units	Topic and Details	Number of Hours
I	Concepts of Epidemiology, Health and Disease - Definition, scope and purpose of epidemiology - Concepts, definition and dimensions of health - Quality of life, Determinants of health - Epidemiological triad - Natural history of disease, Surveillance - Levels of prevention - Modes of intervention	10
II	Epidemiological Studies - Tools of measurement- mortality, morbidity and disability – rates, ratios and proportions - Types of epidemiological studies - Non- experimental/Observational Study-Descriptive epidemiology, Case control analytical study - Experimental study- Randomized control trial, non-randomized control trial - Ethical aspects of research in nutritional epidemiology	8
III	Screening of Diseases and Immunisation - Screening- Definition, aims and objectives, Screening/Diagnostic tests - Concept of lead time - Screening tests- Types, uses, criteria, evaluation - Immunization-Importance, schedule for pregnancy, children, adult, Foreign travellers	10
IV	Measurements of Exposure and Outcomes in Nutritional Epidemiology - Nutritional exposures- Relevant direct and indirect measures of nutrition and health assessment - Critical review of diet assessment methods - Assessment of food consumption at different levels, measurement errors, strengths and limitations, - Reproducibility and validity of methods measuring food consumption of individuals- 24 dietary recall, diet record and food frequency methods/Analysis of dietary patterns. - Analysis and interpretation of dietary data.	12

	c) Nutritional status assessment: Critical review of anthropometric and various direct measures of nutritional status- clinical, biochemical, biophysical and measures of body composition. - Sources of errors, strengths and limitations of various measures. - Relevance and use of various indices and indicators of nutritional status for risk assessment. d) Ecological assessment of nutritional status, socio-economic, demographic, cultural and political factors.	
V	Epidemiology and environmental health a) Epidemiology of nutrition related disease, study of epidemiological approaches, determinant of diseases, preventive and social means and prevalence rate of disease. b) Community of food protection, epidemiology of food borne disease-mode of transmission, control and prevention c) Community water and waste management: - Water borne infections agent, safe drinking water, potable water, waste and waste disposed. d) Sewage treatment, solid & liquid waste disposal.	8
	Total	48

References

Text Books:

- Bonita, R., Beaglehole, R., Kjellström T. (2006) Basic Epidemiology, 2nd Edition, WHO, 2006 http://whqlibdoc.who.int/publications/2006/9241547073_eng.pdf
- Willett, W. (2013) Monographs in Epidemiology and Biostatistics, Third Edition, Oxford University Press.
- Park, K. (2017) Park's Textbook of Preventive and Social Medicine, 24th ed. Jabalpur M/s. Banarsidas Bhanot

Reference Books

- Moon, G., Gould, M. (2000). Epidemiology: An Introduction. Philadelphia, Open University Press
- Langseth L. (1996). Nutritional Epidemiology: Possibilities and Limitations. Washington DC, ILSI Press.
- Gordis L. Epidemiology. 5th ed. Philadelphia, PA: Saunders Elsevier, 2013
- Aschengrau A., Seage G.R. (2014) Essentials of Epidemiology in Public Health. 3rd ed. Sudbury, MA: Jones & Bartlett.
- Vir, S. (2011) Public health nutrition in developing countries, Woodhead Publishing India limited
- Gibney, M.J., Margetts, B.M., Kearney, J.M., Arab, L. (Eds) (2004) Public Health Nutrition. NS Blackwell Publishing
- Gibson, R. S. (2005). Principles of Nutritional Assessment. 2nd ed. Oxford University Press
- Acharya, K.T.: A Historical Dictionary of Indian Foods, Oxford Publishing Co.
- Belitz, H.D. and Grosch W., (1999) : Food Chemistry, (2nded), Springer, New York.

Course outcome	On completion of the course, students should be able to CO1: Understand the basic concepts and methods of epidemiology and nutritional epidemiology. CO2: Explain the relationship between diet, health, and disease using epidemiological approaches. CO3: Apply dietary assessment and nutritional status evaluation methods in nutrition studies. CO4: Analyse public health issues related to food safety, water, sanitation, and environmental health.
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Course Outcomes (CO) –with PO Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Understand basic concepts, measurements, and study methods in epidemiology and nutritional epidemiology.	U	1,3
2	Explain diet–disease relationships and apply epidemiological approaches in nutrition research.	U / A	1,3,6
3	Apply methods for dietary assessment, nutritional status evaluation, and interpretation of data.	A / An	1,4,7
4	Analyse environmental and public health issues including food safety, water sanitation, and disease prevention.	An	1,3,4
Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	5	5	15	15
Understand	15	15	20	20
Apply	10	10	15	15
Analyse	10	10	15	15
Evaluate	10	10	10	10
Create	-	-	-	-
Total	50	50	75	75

Course Name	Food Service Management		
Course Code	26UPCND1E02		
Type of Course	Elective		
Class	I M.Sc.	Semester	I
Course Objectives	• To develop core knowledge in key areas of various Food Service Systems, its development and also in administration. • To gain efficacy in sanitation and hygiene • To progress in hospital food production, marketing and accounting		

Unit	Content	Number of Hours
I	Food service Institutions and management a) History and development b) Definition and importance c) Factors affecting development of Food Service institutions d) Principles of management, Functions of management- planning, organizing, directing, co-ordinating, evaluating, and controlling e) Recent trends in food service institutions Various types of food service institutions a) Indian Food Service Market-Organization Structure and Management b) Types of Commercial Food Service Operators c) Catering Services-Meaning and Types d) Non-Commercial Food Service Operators	10
II	Food Service Unit Layout and Design a) Steps and different types of Planning, b) Site Selection, various phases of layout and various factors influencing layout design c) Impact of Design on Efficiency and Safety d) Work pattern. Equipment's a) Classification, Selection and Design b) Factors influencing selection of various equipment's c) Equipment Layout 1. Effective Layout 2. Hot Food Prep d) Base materials and finishes in food industries e) Installation and operation f) Care and maintenance of equipment's.	8
III	Food production and food service management a) Menu Planning: Importance of menu, Factors affecting menu planning and types of menus	12

	b) Types of budgets, Records for purchase, Receiving, Storage and Production, income and expenditure record c) Quantity food production: Standardization of recipes, Recipe adjustment and portion control, Techniques of quantity food production d) Food Service Management - Principles and Techniques of Effective Management, Leadership and Managerial Abilities. e) Tools of Food Management - Organizational Chart of the Food Service Team in Hospital.	
IV	Food Service, safety and sanitation a) Food Service: Principles, objectives and scope of food service management. b) Styles of food service in restaurants- Self-Service, Tray Service, Waiter-Waitress Service, Vending and Mobile Food Service System. c) Food service in hospitals and Food service in institutions d) Safety-General safety rules, types of accidents and its prevention, review of first aid, safety tips for employees and kitchen equipment safety. a) Sanitation and Hygiene - Principles of food sanitation, safety and hygiene, Sources of food contamination, Environmental Hygiene & Sanitation, Safe Food Handling Practices, Personal Hygiene.	10
V	Human Resource Management, Marketing and Dietary Accounting a) Human Resource Management - Recruitment & Selection, Induction, Training, Performance Appraisal, Leadership, Communication, Employee Benefits, Laws Governing Food Service Establishment. b) Marketing and E-Marketing – definition, function, marketing mix, sales promotion, selling techniques and advertisement, Franchise systems in the hospitality industry. c) Dietary Accounting - Definition and Principles, Journal and Ledger. d) Book of Account – Cash Book, Purchase Book, Sales Book, Purchase Returns & Sales Returns Book	8
	Total Hours	48

References

Text Books

- West, B. B. and Wood, L. - Food Service in Institutions, 6th edition, 1988, John Wiley, New York
- Wood, C; Kluge, E, Annsem, P.E-The Anatomy of Food Service Design, 1978,

C.B.I. Publishing Co Inc.

- Sethi, M; Malhan, S. - Catering Management; An integrated approach, 1997, New Age International.
- Kotler, P., (2019), Principles of Marketing, 13th edition, Pearson.
- Kinton, R., Cessarani, V and Foskett, D, the Theory of Catering, Hodder and Stoughton, 2000.
- Tripathi, P.C. Personnel Management and Industrial Relations, Sultan Chand and Sons, 2000.

Reference Books

- Food service Organizations: A Managerial and Systems Approach, (9th ed.), Pearson, London (2017)
- Livingston, G.E.-Food Service Systems-Analysis, Design and Implementation, 1979, Academic press
- Powers, T. F. and Powers, T. M. - Food Service Operations Planning and Control, 1984, John Wiley & Sons.
- Buchanan, R.D- The Anatomy of Food Service Design, 1975, CAHNERS Publ. Co. Inc.
- Boella, M. J. - Personnel Management in the Hotel and Catering Industry, 1983, Hutchinson, London.
- Yadav, C, P. Management of Hotel and Catering Industry, Anmol publications Pvt
- T.Ramaswamy- Principles of Management, 2014, Himalaya publishing house.
Methodological Approaches to Designing Integrated Systems of Management of Food Service Enterprises.
- Hitchcock, M.J-Food Service Systems Administration, 1980, Prentice Hall.

Web Resources

- <https://theicn.org/management-and/inventory-tracking-and-managment-guide.pdf>
- <https://www.scribd.com/document/119449120/History-of-Food-Service-Industry>
- cte.sfasu.edu Hospitality and Tourism Practicum in Culinary Arts

Course Outcomes	On completion of the course, students should be able to CO1: Understand the basic concepts, types, and organization of food service institutions CO2: Explain planning, layout, equipment selection, and food production in food service units. CO3: Apply principles of menu planning, styles of service, and sanitation in food service. CO4: Describe the Food Service Management in Hospitals CO5: Analyse marketing and dietary accounting in food service institutions.
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Course Outcomes (CO) –with PO Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Understand the basic concepts, types, and organization of food service institutions.	U	1,3
2	Explain planning, layout, equipment selection, and food production in food service units.	U / A	1,4
3	Apply principles of menu planning, quantity cooking, and material management in food service.	A	1,4,6
4	Describe the Food Service Management in Hospitals	U/A	1,4
5	Analyse marketing and dietary accounting in food service institutions.	An	1,3,4
Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	5	5	10	10
Understand	15	15	15	20
Apply	10	10	15	15
Analyse	10	10	15	15
Evaluate	10	10	10	10
Create	-	-	10	5
Total	50	50	75	75

SEMESTER-II

Course Name	Clinical Nutrition and Dietetics -II		
Course Code	26UPCND1C04		
Type of Course	Core		
Class	I M.Sc.	Semester	II
Course Objectives	• To apprehend the etiology, symptoms and complications of diseases. • To enable the students to recommend and provide appropriate nutritional care for prevention and treatment of the various diseases. • To gain efficacy in medical coding for different non-communicable diseases.		

Unit	Content	Number of Hours
I	Dietary Management of Cardiovascular Diseases Blood Pressure- Regulation, Short term and long term Hypertension - Definition, Classification and Causes - Signs, Symptoms and Complications - Dietary management Cardio Vascular Diseases - Prevalence, Causes and Risk Factors - Clinical diagnostic tests and dietary management for - Hyperlipidemia, Hyperlipoproteinemia, Atherosclerosis, Angina Pectoris, Myocardial Infarction, Congestive Cardiac Failure and Cardiac Cachexia - Prevention- Lifestyle modifications - Medical coding for diseases of circulatory system	14
II	Dietary Management of Gastro Intestinal Diseases Upper Gastro Intestinal Diseases - Etiology, signs, symptoms, diagnostic test and complications - Dietary management for - Gastritis, Peptic ulcer, Dyspepsia, Esophagitis and Dumping Syndrome. Lower Gastro Intestinal Diseases - Etiology, signs, symptoms, diagnostic test and complications - Dietary management for - Diarrhoea, Dysentery, Constipation, Celiac disease, Steatorrhea, Irritable bowel syndrome, Diverticular disease, Ulcerative colitis and Crohn's Disease.	15

III	Dietary Management of Hepato-Biliary Tract Diseases Liver Disease - Types, Causes, Symptoms and Complications - Functions of liver - Liver function tests - Metabolic consequences of alcohol consumption - Dietary management for - Hepatitis, Cirrhosis, Hepatic coma and Liver transplant. Gall Bladder Diseases - Functions of gall bladder - Gall bladder function tests - Dietary management for - Cholecystitis, Cholelithiasis, Acute Cholangitis and Cholestasis Pancreatic Disorders - Exocrine Pancreatic Functions - Pancreatic function tests - Dietary management for - Pancreatitis and Zollinger- Ellison Syndrome	15
IV	Dietary Management of Diabetes Mellitus - Prevalence, Types, Causes, Signs and Symptoms - Factors affecting normal blood glucose levels - Diagnostic test for Diabetes - Complications Management of Diabetes - Food exchange list - Glycaemic index, resistant starch, glycaemic load, carbohydrate count - Artificial sweeteners and sugar substitutes - Oral hypoglycaemic drugs and Insulin - Lifestyle modifications - Dietary management - With and without Insulin, during sickness, hypoglycaemia and hyperglycaemia - Medical coding for diabetes mellitus Dietary Management of Cancer - Types, causes, signs, symptoms, and diagnosis of Cancers - Cancer therapy and its complications - Chemotherapy, Radiation therapy and Surgery - Dietary management, recent developments in Nutrition and Cancer - Medical coding for neoplasm	14
V	Dietary Management of Renal Diseases - Aetiology, signs and Symptoms - Functions of kidney	14

	c) Kidney function tests d) Types of Kidney Diseases - Glomerulonephritis, Nephrotic Syndrome, Acute Renal Failure, Chronic Renal Failure, End Stage Renal Disease-Dialysis and Kidney Transplant, Nephrolithiasis e) Dietary Management and Use of sodium, potassium and phosphorus exchange list for renal conditions f) Medical coding for kidney diseases	
	Total Hours	72

References

Text Books

- Antia F.P. And Philip Abraham-Clinical Nutrition and Dietetics, 2002 , 4th edition.
- Swaminathan S- Advanced Textbook On Food & Nutrition, 2015, Bappco
- B. Srilakshmi- Dietetics, 2023, 9th Edition, New Age International Pvt. Ltd. New Delhi.
- RSSDI Diabetes Update 2020, Banshi Saboo, Ch Vasanth Kumar, Sanjay Agarwal.
- Timmanpyati.S, 2nd edition-2022, Clinical nutrition in cancer, Practical guidelines and dietary Recommendations.

Reference Books

- Mahan L.K., Sylvia Escott-Stump - Krause's Food Nutrition and Diet Therapy 11th Edition, 2016, W.B. Saunders Company London.
- Passmore P. And M.A. East Wood - Human Nutrition and Dietetics, 2007, Churchill Living Stone.
- Raheena M. Begum - A Text Book of Foods Nutrition and Dietetics, 3 edition 2019, Sterling Publishers Pvt. Ltd
- Robinson Ch., M.B. Lawlea, W.L., Chenoweth, and A.E., Carwick: Normal and Therapeutic Nutrition, 17th Edn, Macmillan Publishing Company.
- Shills and Young- Modern Nutrition in Health and Disease, 2013, 11th edition, Lippincott Williams and Wilkins.
- Bennion M.: Clinical Nutrition, John Wiley & Sons.
- Whitney, E. N. and C. B.Cataldo, Understanding Normal and Clinical Nutrition, 1983, West Pub.
- Sharon RadyRolfes, Eleanor Noss Whitney, Kathryn Pinna , Understanding Normal and Clinical Nutrition 12th edition, 2021.
- Williams S. R. Essentials of Nutrition and Diet Therapy, 12th edn, 2018, Mosby College Pub. S. Louis.
- Krause's., Kathleen Mahan., Marian T. Arlin: Food Nutrition & Diet Therapy, 8th Edition 1992, W.B. Saunders Company. H

Web Resources

- <https://stacks.cdc.gov/view/cdc/250974>
- www.anme.com.mx/libros/PrinciplesofNutrition.pdf
- <https://2012books.lardbucket.org/pdfs/an-introduction-to-nutrition.pdf>

- krishikosh.egranth.ac.in
- <https://kdigo.org/guidelines/>
- <https://www.kidney.org/professionals/guidelines>
- <https://www.espen.org/guidelines-home/espen-guidelines>
- https://www.nutritioncare.org/Guidelines_and_Clinical_Resources/Clinical_Guidelines/
- <https://diabetes.org/newsroom/press-releases/2022/american-diabetes-association-2023-standards-care-diabetes-guide-for-prevention-diagnosis-treatment-people-living-with-diabetes>

<https://www.ahajournals.org/doi/10.1161/CIR.0000000000001063>

Course Outcomes	On completion of the course, students should be able to CO1: Explain dietary management and medical coding of circulatory system diseases. CO2: Explain signs, symptoms, and dietary management of gastrointestinal diseases. CO3: Understand hepato-biliary diseases and their nutritional aspects. CO4: Apply dietary management and medical coding for metabolic and degenerative diseases CO5: Determine dietary needs and medical coding for renal diseases
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Course Outcomes (CO) –with PO Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Explain dietary management and medical coding of circulatory system diseases.	U / A	1,4,5
2	Explain signs, symptoms, and dietary management of gastrointestinal diseases.	U	1,3,4
3	Understand hepato-biliary diseases and their nutritional aspects.	U	1,3,4
4	Apply dietary management and medical coding for metabolic and degenerative diseases	A	1,4,5,7
	Determine dietary needs and medical coding for renal diseases	An/A	1,3,4,5,7
Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	5	5	10	10
Understand	15	15	15	20
Apply	10	10	15	15
Analyse	10	10	15	15
Evaluate	10	10	10	10
Create	-	-	10	5
Total	50	50	75	75

Course Name	Clinical Biochemistry		
Course Code	26UPCND1C05		
Type of Course	Core		
Class	I M.Sc.	Semester	I
Course Objectives	• To understand the biochemical basis of human physiology and metabolism in relation to clinical nutrition. • To interpret biochemical parameters and laboratory investigations for nutritional assessment. • To apply biochemical knowledge to understand metabolic regulation and its nutritional implications in health and disease.		

Unit	Content	Number of Hours
I	Blood, Enzymes and Body Fluid Balance Blood - Plasma proteins and blood components: clinical significance - Normal reference ranges and interpretation of hematological and biochemical parameters including CBC, plasma proteins, electrolytes, and selected enzymes (ALT, AST, ALP, CK-MB, amylase, lipase). Enzymes - Definition, types, mechanism of action, factors affecting enzyme activity, coenzyme, role of B vitamin as coenzyme. - Clinically important enzymes and their diagnostic significance Water and Electrolyte Balance - Regulation of water and electrolyte balance - Acid–base balance (hydrogen ion homeostasis)	19
II	Carbohydrates and Their Metabolism Carbohydrates - Overview of classification, digestion, absorption and biological significance Carbohydrate Metabolism - Glycolysis and gluconeogenesis - Glycogenesis and glycogenolysis - Aerobic and anaerobic pathways of glucose utilization - Krebs cycle, pentose phosphate pathway, and pyruvate dehydrogenase complex - Cori cycle and interconversion of hexoses - Regulation of carbohydrate metabolism - Normal values and interpretation of blood glucose parameters	15

III	Protein Metabolism - Overview of classification, digestion, absorption, nitrogen balance and biological importance - Normal values and interpretation of serum proteins (albumin, globulin) and blood urea - General reactions of amino acid metabolism (transamination, deamination, decarboxylation) - Metabolism of selected amino acids (glycine, tyrosine, tryptophan, methionine) - Urea cycle and its regulation - Inborn errors of amino acid metabolism Nucleic Acids - Biosynthesis and degradation of purines and pyrimidines and their regulation	15
IV	Lipids and Their Metabolism Lipids - Overview of lipids - classification, digestion, absorption and biological importance Lipid Metabolism - Biosynthesis of fatty acids (saturated and unsaturated) β-oxidation of fatty acids - Biosynthesis of triglycerides, phospholipids, and cholesterol - Regulation of lipid metabolism and ketone body formation - Lipoproteins and their clinical significance - Normal values and interpretation of lipid profile components (total cholesterol, triglycerides, HDL, LDL). Free Radicals and Antioxidants - Role of free radicals and antioxidants in health	20
V	Intermediary Metabolism - Overview of intermediary metabolism of carbohydrates, protein and lipid. - Hormonal regulation of carbohydrate protein and fat metabolism and their integration in physiological conditions - Structural components and functions of nucleic acid, Structure of DNA, DNA replication, RNA synthesis – types and functions and metabolism, translation. - Principles of recombinant DNA technology. Metabolism of xenobiotics and their biological significance. - Concepts of nutrigenomics and gene–nutrient interactions.	15
	Total Hours	84

References

Textbooks

- Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2000) : 25th Ed. Harpers Biochemistry, Macmillan Worth Publishers.
- Nelson D.L. and Cox, M.M. (2000) : 3rd Ed. Lehninger's Principles of Biochemistry, Macmillan Worth Publishers.
- Devlin, T.M. (1997): 4th Ed. Text book of Biochemistry with Clinical

Correlations, Wiley Liss Inc.

- Stryer, L. (1998): 4th Ed. Biochemistry, W.H. Freeman and Co.
- Conn, E.E., Stumft. P.K. Bruening, G. and Doi, R.H. (2001): 5th Ed. Outlines of Biochemistry, John Wiley and Sons.
- Voet, D. Voet, J.G and Prat, C.W., (1999) : Fundamentals of biochemistry.
- Oser, B.L., (1965) : 14th Ed. Hawk's Physiological Chemistry, Tata McGraw - Hill Publishing Co. Ltd.
- Varley, H., Gowecklock, A.H. and Bell, M. (1980): 5th Ed. Practical Clinical Biochemistry, Heinemann Medical Books Ltd.
- Tietz, N.W., (1976) : Fundamentals of Clinical Chemistry, W.B. Saunders Co.
- Vogel, A.I., (1962) : 3rd Ed. A Textbook of Quantitative Inorganic Analysis. The English Language Book Society and Longman.
- Raghuramulu, N., Madhavan Nair and K. Kalyanasundaram, S. (1983) A manual of Laboratory Techniques NIN, ICMR.
- King, E.J. and Wootton, I.D.P., (1956): 3rd Ed. Micro-Analysis in Medical Biochemistry, J. and A. Churchill Ltd.
- Plummer, D.T., (1987): 3rd Ed., An Introduction to Practical Biochemistry, McGraw- Hill Book Co.
- Winton, A.L., and Winton, K.B., (1999) Techniques of Food Analysis Allied Scientific Publishers.

Reference Books

- Berg, Jeremy M. et al. "Biochemistry", 6th Edition, W.H. Freeman and Co., 2006.
- Voet, D. and Voet, J.G., "Biochemistry", 4th Edition, John Wiley and Sons Inc., 2011.
- Murray, R.K., et al "Harper's Illustrated Biochemistry", 30th Edition, McGraw-Hill, 2015
- Devin.T.M- Textbook of Biochemistry with Clinical Correlations, 1997, 4th Ed., Wiley Liss Inc.
- Voet and Prat- Fundamentals of Biochemistry, 8th Edn, 2004, John Wiley & Sons
- Conn, stumpf et al. Outlines of Biochemistry, 2001, 5th Ed John Wiley and Sons.
- Murray et al. - Harpers Illustrated Biochemistry, 2000, 25th Edn, Macmillan Worth Publishers.
- Henry. R. D: Clinical Chemistry- Principles and Techniques (Harfer and Row)

Web Resources

- www.virutallibrarybiochemistry
- <http://themedicalbiochemistrypage.org>

Course outcome	On completion of the course, students should be able to CO1: Explain the clinical significance of blood components, enzymes, and fluid–electrolyte balance. CO2: Describe carbohydrate metabolism and interpret blood glucose levels. CO3: Explain protein metabolism and assess related biochemical parameters. CO4: Describe lipid metabolism and interpret lipid profile values. CO5: Explain the intermediary metabolism of carbohydrates, protein and lipid.
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Course Outcomes (COs) – Programme Outcomes (POs) Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Explain the clinical significance of blood components, enzymes, and fluid–electrolyte balance	U	1,3,4,
2	Describe carbohydrate metabolism and interpret blood glucose levels	U/An	1,3,4,7
3	Explain protein metabolism and assess related biochemical parameters.	U/A	1,3,4,7
4	Describe lipid metabolism and interpret lipid profile values.	U/An	1,3,4,7
5	Explain the intermediary metabolism of carbohydrates, protein and lipid.	U/E	1,3,4,5,7
Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	5	5	10	10
Understand	15	15	15	20
Apply	10	10	15	15
Analyse	10	10	15	15
Evaluate	10	10	10	10
Create	-	-	10	5
Total	50	50	75	75

Course Title	Nutrition for Physical Fitness and Sports		
Course code	26UPCND1E03		
Type of Course	Elective		
	I M.Sc.	Semester	II
Course Objectives	• To develop knowledge on the concepts, role of nutrition in physical fitness. • To understand the physiology of sports with its impact on fitness • To gain knowledge about special topics in the field of sports nutrition.		

Unit	Content	Number of Hours
I	Introduction to physical fitness - Physical Fitness: Definition, concept and goal - Assessment of Physical Fitness: Anthropometry, Body composition, Cardio -respiratory endurance, muscular fitness, musculoskeletal flexibility - Benefits of physical fitness on wellness dimensions - Healthy life style: strategies, factors that promote life style changes - Nutrition, Exercise, Physical Fitness and Health – their interrelationship - Self-management skills to attain physical fitness; its benefits and disadvantages. - Factors affecting Physical Work Capacity and Work Efficiency	13
II	Fitness and exercise nutrition - Definition, basic components of physically active life style, - Physical fitness tests – for flexibility, muscle endurance and cardio vascular endurance. - Approaches to the management of fitness and health. - Diet and exercise – Effect of specific nutrients on work performance and physical fitness. - Energy input and output – Different energy systems for endurance and power activity. Fuels and nutrients to support physical activity (metabolic pathway) - Mobilization of fats stores during exercise.	13
III	Sports Physiology - Sports physiology- concept and importance in fitness - Types of exercise and their impact on fitness - Effect of exercise on the musculoskeletal system - Muscle fatigue- causes, prevention and recovery - Effect of exercise on cardiac cycle, cardiac output, blood pressure and on the respiratory system - Hypoxia and hypercapnia: causes and effects	12

	g) Lung function tests and spirometry	
IV	Important micronutrients for exercise a) B complex vitamin and specific minerals. b) Antioxidant effects to reduce exercise induced oxidative stress;- Antioxidant requirements for exercise. c) Female athletic triad and Sports anemia-Assessment for fat; Dietary guidelines and suggestions for fat. Eating disorder. d) Ergogenic Supplements. e) Doping control and Supplement testing	10
V	Sports Nutrition and Health a) Energy requirement for, aerobic and anaerobic exercises, carbohydrate loading, water and dehydration. b) Significance of physical fitness and nutrition in prevention and management of weight control diabetes mellitus, CVD, bone health and cancer. c) Special foods - Nutrition and performance of athletes and players, dietary modifications and diet plan, sports supplementation. d) Sports specific requirement, Diet manipulation, Pre-game, during and post-game meals. e) Sports drink- Hypo, Iso and Hypertonic drink for hydration/energy and recovery drink f) Alternative system for health and fitness like-Yoga and its types, Meditation, advantages of Vegan and Traditional Diets.	12
	Total Hours	60

References

Text books

- Bamji, S.M., Rao, N.P., and Reddy, V. (1998). *Textbook of Human Nutrition*. Oxford & IBH Publishing, New Delhi.
- Mahan, L.K. & Escott-Stump, S. (2000). *Krause's Food, Nutrition and Diet Therapy*.
- Shils, M.E., Olson, J.A., Shike, M., and Ross, A.C. (Ed.) (1999). *Modern Nutrition in Health & Disease* (9th ed.). Williams & Wilkins.
- Gibney, J.M., Macdonald, A.I., and Roche, H.M. (2003). *Nutrition and Metabolism*. Blackwell Publishing.
- Williams, M.H. (2007). *Nutrition for Health, Fitness and Sports* (8th ed.). McGraw-Hill.

Reference Books

- Fink, H.H., Mikesky, E.A., and Burgoon, A.L. (2012). *Practical Applications in Sports Nutrition* (3rd ed.). Jones & Bartlett Learning, USA.
- Burke, L., and Deakin, V. (2006). *Clinical Sports Nutrition*.
- Wolinsky, I. (Ed.) (1998). *Nutrition in Exercise and Sports* (3rd ed.). CRC Press.
- McArdle, W., Katch, F., and Katch, V. (1996). *Exercise Physiology: Nutrition and Human Performance* (4th ed.). Williams & Wilkins, Philadelphia.

Web Resources

- Australian Sport Institute: www.ausport.gov.au/ais/nutrition

- <http://www.aco.org.nz/pdf/nutrition-for-sports>
- https://www.researchgate.net/publication/258630492_Sports_Nutrition_Book_2013

Course Outcomes	On completion of the course, students should be able to CO1: Explain concepts of physical fitness and evaluate overall health and wellness. CO2: Relate the role of nutrition in physical fitness CO3: Explain the importance of exercise and its effects on fitness CO4: Describe nutritional requirements for different sports activities
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Course Outcomes (CO) –with PO Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Explain concepts of physical fitness and evaluate overall health and wellness	U/E	1,3,4,7
2	Relate the role of nutrition in physical fitness	U	1,3,4,6,7
3	Explain the importance of exercise and its effects on fitness	U	1,3,4,7
4	Describe nutritional requirements for different sports activities	U/A	1,3,4,6,7
Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests(Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	5	5	10	10
Understand	15	15	15	20
Apply	10	10	15	15
Analyse	10	10	15	15
Evaluate	10	10	10	10
Create	-	-	10	5
	50	50	75	75

Course Name	Clinical Nutrition and Dietetics-II Practical's		
Course Code	26UPCND1CP03		
Type of Course	Core practical		
Class	I M.Sc.	Semester	II
Course Objectives	To train students in planning and preparing therapeutic diets for various diseases using software.		

S.No	Content	Number of Hours
1.	Menu planning and computation of nutrients for Hypertension	3
2.	Menu planning and computation of nutrients for Hyperlipidemia and Atherosclerosis	3
3.	Menu planning and computation of nutrients for Upper Gastro Intestinal Disorders- Peptic ulcer	3
4.	Menu planning and computation of nutrients for Lower Gastro Intestinal Disorders- Diarrhea, Constipation and Celiac disease	6
5.	Menu planning and computation of nutrients for the Liver – Hepatitis and Cirrhosis	3
6.	Menu planning and computation of nutrients for the Gall bladder disorders- Cholelithiasis	3
7.	Menu planning and computation of nutrients for the Pancreatic disorders- Pancreatitis	3
8.	Menu planning and computation of nutrients for the Individuals with Diabetes Mellitus - Type 1 Diabetes, Type 2 Diabetes and Gestational Diabetes.	6
9.	Menu planning and computation of nutrients for Cancer patients.	3
10.	Menu planning and computation of nutrients for Renal Disorders- Glomerulonephritis and Nephrotic Syndrome,	3
	Total Hours	36

References

Text Books

- Antia F.P. And Philip Abraham-Clinical Nutrition and Dietetics, 2001, Oxford Publishing Company.
- Swaminathan S- Advanced Textbook On Food & Nutrition, 2015, Bappco
- B. Srilakshmi- Dietetics, 2019, 8thEdn, New Age International Pvt. Ltd. New Delhi.

Web Resources

- id=com.cdac.nindietaryguide&hl=en
- <https://apps.mgov.gov.in/descp.do?appid=1066&action=0>
- id=com.ionicframework.myapp863035

Course Outcomes	On completion of the course, students should be able to CO1: Apply diet principles to determine dietary needs for recovery from critical illness. CO2: Apply diet principles to determine dietary needs for metabolic diseases. CO3: Plan and prepare menus for different disease conditions. CO4: Compare and analyse nutritive values with RDA using either manual or software.
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Course Outcomes (COs) – Programme Outcomes (POs) Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Apply diet principles to determine dietary needs for recovery from critical illness.	A	1,4,7
2	Apply diet principles to determine dietary needs for metabolic diseases.	A	1,4,7
3	Plan and prepare menus for different disease conditions	A/C	1,4,6,7
4	Compare and analyse nutritive values with RDA using either manual or software.	An	1,3,4,6,7
Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests(Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	-	-	-	-
Understand	10	10	10	10
Apply	20	20	20	20
Analyse	15	15	15	15
Evaluate	10	10	10	10
Create	5	5	5	5
Total	60	60	60	60

Course Name	Clinical Biochemistry Practical's		
Course Code	26UPCND1CP04		
Type of Course	Core practical		
Class	I M.Sc.	Semester	II
Course Objectives	• To understand basic biochemical tests used in clinical nutrition. • To develop skills in performing laboratory estimations of blood and urine parameters. • To interpret biochemical results for nutritional assessment and health status.		

S.No	Exercises	Number of Hours
1	Estimation and interpretation of blood glucose levels	4
2	Estimation and interpretation of total protein	3
3	Estimation and interpretation of blood cholesterol.	3
4	Determination of serum creatinine and interpretation of results	4
5	Estimation and interpretation of serum iron levels	3
6	Estimation and interpretation of serum urea	4
7	Estimation and interpretation of urinary calcium	4
8	Estimation and interpretation of urinary urea	4
9	Estimation and interpretation of urinary creatinine	4
10	Estimation and interpretation of urinary pH	3
	Total Hours	36

References

Text Books

- Ghai – A Textbook of Practical Physiology, Jaypee Brothers Medical Publishers
- G.K.Pal - Textbook of Practical Physiology, Jaypee Brothers Medical Publishers

Reference Books

- Stirling, William – Outlines of Practical Physiology, Blakiston & Co.
- Manual of Practical Physiology- A.K.Jain, Mittal books.

Web Resources

- www.tnmgrmu.ac.in

Course Outcomes	On completion of the course, students should be able to CO1: Perform biochemical estimations using standard laboratory procedures with accuracy CO2: Interpret biochemical parameters in relation to nutritional and clinical conditions
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Course Outcomes (COs) – Programme Outcomes (POs) Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Perform biochemical estimations using standard laboratory procedures with accuracy	A	1,4,5,7
2	Interpret biochemical parameters in relation to nutritional and clinical conditions	An/E	1,3,4,7
Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	-	-	-	-
Understand	10	10	10	10
Apply	20	20	20	20
Analyse	15	15	15	15
Evaluate	10	10	10	10
Create	5	5	5	5
Total	60	60	60	60

SEMESTER-III

Course Name	Research Methods and Statistical applications		
Course Code	26UPCND1C06		
Type of Course	Core		
Class	II M.Sc.	Semester	III
Course Objectives	- To provide sound knowledge on the fundamental principles and techniques of methodology concerning research in nutrition and dietetics. - To familiarize the type of research tools and techniques applicable to a research problem. - To acquaint with the statistical methods for testing of hypothesis		

Unit	Content	Number of Hours
I	Research Methodology - Research- Meaning, Objectives, Significance - Forms of research- Basic, Applied, Action, Evaluation - Criteria of good research - Challenges in research Research Process - Meaning, Selection of a research problem - Steps involved in research process - Need for research in Clinical Nutrition and Dietetics - Ethics in research	12
II	Research Design - Meaning, Need, Features - Types of Research Design– Case Study, Causal, Longitudinal, Cross-Sectional, <i>In-vivo</i>, <i>In-vitro</i>, Experimental, Exploratory, Historical and Meta-Analysis.	12
III	Sampling Design and Scaling Techniques - Sampling- Definition - Criteria and Characteristics of a good sample design - Types of Sampling - Probability Sampling Techniques – Definition, Types, Advantages and Disadvantages - Non-Probability Sampling Techniques - Definition, Types, Advantages and Disadvantages - Measurement scale and Scaling techniques - Fundamental scales- Nominal, Ordinal, Interval, Ratio - Comparative scales- Paired Comparison, Rank order, Constant sum, Q-Sort - Non- Comparative scales- Continuous rating scale, Itemized rating scale- Likert scale, Semantic differential scale, Stapel scale	12
IV	Data Collection Tools and Data Processing Techniques - Research tools – Meaning and Purpose - Types of tools and their uses	12

	i. Primary tools- Questionnaires and Schedule, Interview, Observation ii. Secondary tools c) Processing of data- Editing, Coding and Tabulation d) Report writing	
V	Hypothesis and Statistical Testing a) Hypothesis- Meaning, Hypothesis Statement b) Descriptive Analysis- Graphical and Diagrammatic Presentations, Central Tendency – Mean, Median, Mode, Dispersion -Standard Deviation c) Hypothesis Testing- i) Parametric Tests or Standard Tests of Hypothesis– Definition, Merits and Demerits, Types and its Applications - Student’s T test (Independent, Paired, One tailed and two tailed), ANOVA, Z-test. ii) Non-Parametric or Distribution Free Tests – Definition, Merits and Demerits, Types and its Applications- Chi- square, Spearman’s Rank Co- relation, Kruskal Wallis or H test. d) Difference between parametric and non-parametric tests.	12
	Total Hours	60

References

Text Books

- Kothari.C.R -Research Methodology, Methods and Techniques, Fourth edition, 2019, New Age International Publisher.
- Gupta.S.C - Fundamentals of Applied Statistic, Sultan Chand and Sons, Fourth Edition, 2014, Sultan Chand & Sons.
- Gupta.S.P., Statistical Methods, 46th revised edition, 2021, Sultan Chand and Sons.
- Chawla,Deepakand Neena Sondhi Research Methodology, -Concepts and Cases, 2ndEdn,2018, Vikas Publishing House Pvt Ltd.Noida
- Copper, H.M Intergrating Research: A guide for literature reviews. 2nd Edition 2002, California: Sage.

Reference Book

- Van Maanen - Qualitative Methodology, 1983, Sage Publication
- Kerlinger - Foundation of Educational Research, Wadsworth Publishing Company
- Bryman A. and Cramer D - Quantitative Data Analysis for Social Scientist, Rev.Ed.
- Ranjitkumar- Research Methodology, 4th Ed. Edition, 2014, Sage Publishing.
- Danial, Wayne W and Chad L Cross Biostatistics – Basic Concepts and Methodology for the Health Sciences – International Student Version, 2014, 10th Ed.

Web Resources

- <https://explorable.com/research-methodology>
- <https://www.mbaknol.com/research-methodology/the-basic-types-of-research>

Course Outcomes	On completion of the course, students should be able to CO1: Elaborate research methodology and research process CO2: Draft research design for problem solving
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	CO3: Apply the appropriate sampling techniques for projects. CO4: Plan and design tools for data collection. CO5: Interpret results using statistical analysis.
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Course Outcomes (CO) –with PO Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Elaborate research methodology and research process	U	1,3,4,5,7
2	Draft research design for problem solving	A/C	1,2,3,4,5,6,7
3	Apply the appropriate sampling techniques for projects	A	1,3,4,5,7
4	Plan and design tools for data collection	A/C	1,2,3,4,5,6,7
5	Interpret results using statistical analysis	An/E	1,2,3,4,5,7
Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	5	5	10	10
Understand	15	15	15	20
Apply	10	10	15	15
Analyse	10	10	15	15
Evaluate	5	5	10	10
Create	5	5	10	5
	50	50	75	75

Course Name	Human Development and Nutrition		
Course Code	26UPCND1C07		
Type of Course	Core		
Class	II M.Sc.	Semester	III
Course Objectives	• To know the importance of nutrition during life span and dietary modifications for different age groups. • To learn the stages of growth and development of different age groups • To familiarize the theories of growth and development of all ages.		

Unit	Content	Number of Hours
I	Nutrition in Pregnancy - Physiology of Pregnancy - Stages of Gestation - Nutritional requirements and Dietary guidelines - High risk Pregnancies and Complications - Physical fitness	13
II	Nutrition during Lactation - Physiology of Lactation - Factors affecting Lactation and Lactation Management - Galactogogues - Nutritional requirements and Dietary Guidelines - Effect of Breast Feeding on Maternal Health Nutrition in Infancy - Growth and Development and Nutritional requirements - Volume and Composition of Breast Milk - Advantages of Breast Milk - Weaning Foods and Feeding Problems - Common Nutritional Problems - Preterm and Low Birth Weight Infants	14
III	Nutrition in Childhood - Growth and Development - Theories – Maturationist theory, Behaviorist theory, Eriksons psycho analytical theory, Piagets cognitive theory, Vygotsky's theory. - Nutritional requirements and Dietary guidelines for Preschool and School Children - Micronutrient Malnutrition among Preschool Children - Nutrition for Autism - Feeding Problems - Packed Lunch	14
IV	Adolescence - Growth and Development - Theories – Freud's psychosexual stage theory, Kohlberg's moral understanding stage theory, and Bronfenbrenner's ecological theory. - Physiological and Psychological changes	15

	d) Nutritional requirements and Dietary guidelines e) Nutritional issues and eating disorders Adulthood a) Theories of Adult Development: Levinson, Vaillant and Neugarten b) Physiological and Psychosocial changes c) Nutritional requirements and Dietary guidelines for Adult Man and Woman d) Physical Activity in Adulthood	
V	Elderly a) Theories of Aging – - Theory Building in Aging- Historical Development of Theories of Aging - Biological Theories of Aging - Biological Theories of Senescence, Stress Theories of Aging. - Psychological Theories of Aging- Theories of Cognition, Theories of Everyday Competence - Sociological Theories of Aging - Anthropological Theories, Life Course Theories, Social Theories of Aging. b) Nutritional requirements and Dietary guidelines c) Effects of Aging on organ functions and Health of Elderly	14
	Total Hours	60

References

Text Books

- Brown, J. E-Nutrition through the Life Cycle, 7th edition, 2019, Cengage Learning.
- Mahan L. K. & Stump S.E Krause's - Food Nutrition and Diet Therapy, 12th edition, 2008, Saunders.
- B.Srilakshmi - Nutrition Science, 7th edition-2021, New Age International.
- Bajaj.M, 1st edition-2023, Two lives- Twice as precious, Aditi lakshmi bajaj.

Reference Books

- Groff, J. L and Gropper, S. S- Advanced Nutrition and Human Metabolism, 5th edition-2009, Belmont CA: Wads worth/Thomson Learning.
- Goodhart, R. S. S. and Shils, M. E - Modern Nutrition in Health and Disease, Philadelphia: Lea and Febiger.
- Robinson Ch., M.B. Lawlea, W.L., Chenoweth, And A.E., Carwick: Normal And Therapeutic Nutrition, 17th Edn, Macmillan Publishing Company.
- Krause's., Kathleen Mahan., Marian T. Arlin: Food Nutrition & Diet Therapy, 8th Edition 1992, W.B. Saunders Company. 5. Jackson, M. S - Adolescent Nutritional Disorders, 1997, The New York Academy of Science.
- Jelliffe D.B- Assessment of Nutrition Status of the Community, 1966, WHO, Geneva.

Web Resources

- <https://www.universalclass.com/articles/health/nutrition/nutritional-needs-for-different-ages>.
- <https://www.nutrition.org.uk/nutritionscience/life.html>.
- <http://www.open.edu/openlearncreate/mod/oucontent/view.php>.

Course Outcomes	On completion of the course, students should be able to CO1: Understand nutritional needs and physiological changes during pregnancy and lactation. CO2: Explain infant growth, feeding practices, and common nutrition problems in infancy. CO3: Understand growth, development, and nutritional requirements during childhood and adolescence. CO4: Analyse nutritional needs and health concerns during adulthood. CO5: Understand nutritional requirements and the effects of aging on health in the elderly. CO6: Apply nutrition principles to plan diets across different stages of the life cycle.
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Course Outcomes (COs) – Programme Outcomes (POs) Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Understand nutritional needs and physiological changes during pregnancy and lactation.	U	1,4
2	Explain infant growth, feeding practices, and common nutrition problems in infancy.	U / A	1,4
3	Understand growth, development, and nutritional requirements during childhood and adolescence.	U	1,3,4
4	Analyse nutritional needs and health concerns during adulthood.	An	1,4,7
5	Understand nutritional requirements and the effects of aging on health in the elderly.	U / An	1,3,4
6	Apply nutrition principles to plan diets across different stages of the life cycle.	A	1,4,6,7
Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	10	10	20	20
Understand	10	10	20	20
Apply	15	15	15	15
Analyse	15	15	20	20
Evaluate	-	-	-	-
Create	-	-	-	-
Total	50	50	75	75

Course Name	Public Health Nutrition		
Course Code	26UPCND1C08		
Type of Course	Core		
Class	II M.Sc.	Semester	III
Course Objectives	• To understand the nutritional problems. • To gain knowledge on the nation's effort in combating community nutrition problems. • To educate the community on the importance of nutrition.		

Unit	Content	Number of Hours
I	Concept of Public Health Nutrition a) Relationship between health and nutrition, determinants and indicators of health and nutrition. b) Role of public nutritionist in the health care delivery system. Population Dynamics a) Demographic processes and Demographic cycle b) Demographic profile- population trends in India, density of population, Demographic transition, population structure, sex ratio, family size, literacy and education, morbidity rate a) and life expectancy.	10
II	Assessment of Nutritional Status a) Assessment of nutritional status at individual, household and institutional level: direct and indirect methods; b) Ecological, socio-cultural, economic and demographic correlations of malnutrition Nutritional surveillance a) National nutritional programmes and policies and b) Nutritional surveillance - Objectives, Triple A approach, Indicators and Uses.	10
III	Food Security Programmes- a) Dimensions of food security b) Public distribution system, Buffer stock c) National food security Act d) The organizations fighting hunger in India and around the world e) Famous Food security Revolutions f) Challenges to food security in India	10

IV	Strategies to combat public nutrition problems - Traditional medicine, vegetarianism, health foods – relevance in human health. - Prevalence of malnutrition in India - Common nutritional problems–Causes and preventive measures- PEM, VAD, IDA, IDD, VDD, Obesity and fluorosis. - Primary Health Care (PHC) and its role in preventing communicable diseases	10
V	Health Education and ICT Health Education - Methods, modes and barriers of communication - Planning, management and organization of health education programs - E-medicine, role of media in health education, E- health and M-health Information and Communication Technology (ICT) - Objectives, Strengths and limitations and applications of ICT in health care - E-Government and E-Governance in health care	8
	Total Hours	48

References

Text Books

- Sehgal S and Raghuvanshi Rita S. Textbook of Community Nutrition, Indian Council of Agricultural Research, published by Directorate of information and publication of Agriculture, Indian Council of Agriculture Research, Krishi Anusandhan Bhavan, Pusa, New Delhi, 2011.
- Suryatapadas- Textbook of Community Nutrition, 2016, Academic Publishers
- Prabha Bisht-Community Nutrition in India, 2017, Star Publications.
- B.Srilakshmi-Nutrition Science, 2006, New Age International.
- Swaminathan.M-Advanced Textbook on Food&Nutrition Vol1 & 2, Bappco.

Reference Books

- Park A., Textbook of Preventive and Social Medicine, Twenty Third edition, 2015, Bhanot.
- Gibney M J-Public Health Nutrition, 2nd Edn, John Wiley & Sons.
- Jelliffe D.B- Assessment of Nutrition Status of the Community, 1966, WHO, Geneva.

Web Resources

- <https://www.nutrition.gov>
- <http://www.ninindia.org/community.htm>

<https://www.nhp.gov.in/healthyliving/healthy-diet>

Course Outcomes	On completion of the course, students should be able to CO1: Assess the nutritional status of individuals. CO2: Relate health, nutrition and population dynamics of a community. CO3: Compile the nutritional interventions provided by the government. CO4: Describe the public nutritional problems and appraise strategies to combat malnutrition
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Course Outcomes (CO) –with PO Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Assess the nutritional status of individuals	A/An	1,3,4,7
2	Relate health, nutrition and population dynamics of a community	U/An	1,3,4,6,7
3	Compile the nutritional interventions provided by the government	U/A	1,2,3,4,5,7
4	Describe the public nutritional problems and appraise strategies to combat malnutrition	U/E	1,2,3,4,5,6,7
Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	5	5	10	10
Understand	15	15	15	20
Apply	10	10	15	15
Analyse	10	10	15	15
Evaluate	10	10	10	10
Create	-	-	10	5
	50	50	75	75

Course Name	Hospital Administration and Practices		
Course Code	26UPCND1E04		
Type of Course	Elective		
Class	II M.Sc.	Semester	III
Course Objectives	- To understand the hospital administration practices. - To comprehend patient data maintaining practices followed in hospitals. - To acquaint with biomedical waste management.		

Unit	Content	Number of Hours
I	Introduction to Hospital and Administration - Hospital- Definition, Classification, Functions, Organogram and functions of organisational staff - Introduction to Hospital - Parts of Hospital - Role of Hospital in Health care delivery - Hospital, relation to other health care services - Role of hospital administrator - Public relations- Principles of public relations, Responsibility and functions of PRO.	10
II	Quality Management in Hospital - Definition, Concept of Total Quality Management, importance of TQM, Principle of Total Quality management, basic elements of TQM - Critical Factors Influencing TQM, Total Quality Management Practices in Healthcare, Measuring the Quality in Healthcare Service - Relationship between Hospitals and Medical Staff	8
III	Biomedical Waste Management - Meaning – Categories of Biomedical wastes - Disposal of biomedical waste products - Incineration and its importance - Standards for Waste Autoclaving - Micro Waving and Deep Burial – Segregation – Packaging – Transportation – Storage.	10
IV	Health Records - Health record- Types, Functions, privacy, confidentiality and security, Advantages and Disadvantages of the paper record - Optically scanned records - The Electronic Health Record – Implementation of EHR -Advantages and disadvantages of the EHR – Bedside or point-of-care systems – Human factors and the EHR – Roadblocks and challenges to EHR implementation	10

V	Health Market and Economics a) Health market – categorization of consumption – Engel’s Law of Utility Analysis – Indifference analysis b) Health Economics – Nature & Scope of Economics – Demand analysis – Law of demand – Demand Curve – Supply analysis – Consumer behaviour.	10
	Hours	Total
		48

References

Text Books

- Sakharkar B M –Principles of Hospital Administration and Planning, 2010, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
- Kelkar S.A- Hospital Information Systems, 2010, Prentice Hall India Learning Private Limited.
- D.C. Joshi and Mamta Joshi - Hospital Administration, 2017, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
- Joydeep Das Gupta, 3rd Edition, 2023, Hospital Administration and Management: A Comprehensive Guide;, Jaypee Publishers

Reference Books

- Syed Amin Tabish - Hospital and Health Services Administration Principles and Practice, 2001, Oxford Publishers, New Delhi.
- Sharma Madhuri, 2nd edition, 2017, Hospital Waste Management and Its Monitoring, Jaypee Brothers Medical Publishers.
- Sharma - Holistic approach to Hospital Waste Management, 2006, AIIMS, New Delhi.
- Arun Kumar - Encyclopaedia of Hospital Administration and Development, 2000, Anmol Publications, New Delhi.
- James A William: Hospital Management, Mac Millam Education Ltd., New Delhi.
- Mr. Edwin Marshfield : Managerial Economics, Mc GrawHill

Web Resources

- <https://www.telehealth.net>
- <http://www.internetmedicine.com/telemedicine>

Course Outcomes	On completion of the course, students should be able to CO1: Understand the structure, functions, and administration of hospitals and healthcare systems. CO2: Explain quality management practices and their importance in healthcare services CO3: Understand biomedical waste management and apply safe disposal practices. CO4: Explain types and importance of health records, including electronic health records (EHR).
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	CO5: Understand basic concepts of health economics and healthcare market systems CO6: Apply management principles in hospital settings for effective healthcare delivery
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Course Outcomes (COs) – Programme Outcomes (POs) Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Understand the structure, functions, and administration of hospitals and healthcare systems.	U	1,4
2	Explain quality management practices and their importance in healthcare services.	U / An	1,4,5
3	Understand biomedical waste management and apply safe disposal practices.	U / A	1,3,5
4	Explain types and importance of health records, including electronic health records (EHR).	U	1,2,5
5	Understand basic concepts of health economics and healthcare market systems.	U / An	1,3,4
6	Apply management principles in hospital settings for effective healthcare delivery.	A	1,4,7
Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	5	5	10	15
Understand	15	15	15	20
Apply	10	10	10	15
Analyse	10	10	10	15
Evaluate	10	10	5	10
Create	-	-	-	-
Total	50	50	50	75

Course Name	Research Methods and Statistical applications Practical's		
Course Code	26UPCND1CP05		
Type of Course	Core practical's		
Class	II M.Sc.	Semester	III
Course Objectives	- To understand basic statistical concepts and their application in health and nutrition research. - To develop skills in data management, analysis, and interpretation using statistical tools. - To apply statistical techniques to solve research and clinical nutrition problems.		

S.No	Exercises	Number of Hours
1.	Introduction to Statistics a) Meaning and Definition of Statistics b) Misuse and Limitations of Statistics	3
2.	Data Management a) Data Entry in Software b) Coding of Data (numerical coding, variable naming, labels)	5
3.	Descriptive statistics a) Frequencies b) Cross Tabulation (Crosstabs)	4
4.	Large and Small Sample tests and interpretation a) Z-test for single proportions b) Z-test for Two proportions c) One Sample t-test d) Independent "t" test e) Paired Sample "t" test f) F -test (ANOVA)	9
5.	Chi square test and its interpretation a) General Features of Chi-Square b) Goodness of Fit Test c) Test of Independence of Attributes	5
6.	Correlation and Regression and its interpretation a) Linear Regression b) Correlation Coefficient c) Product-Moment Method (Pearson Correlation)	5
7.	Presentation of Data a) Bar Graphs (Simple, Multiple, Component) b) Pie Diagram c) Histogram d) Line Diagram	5
	Total	36

Course Outcomes	On completion of the course, students should be able to CO1: Understand basic statistical concepts, types of data, and limitations of statistics. CO2: Apply data management techniques including coding, entry, and organization using software CO3: Analyse and interpret descriptive statistics such as frequencies and cross tabulations CO4: Apply statistical tests (Z-test, t-test, ANOVA, Chi-square) to analyse research data. CO5: Interpret correlation and regression results in health and nutrition studies. CO6: Present data effectively using graphs and diagrams for better understanding and communication.
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Course Outcomes (COs) – Programme Outcomes (POs) Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Understand basic statistical concepts, types of data, and limitations of statistics.	U	1,3
2	Apply data management techniques including coding, entry, and organization using software.	A	1,4,7
3	Analyse and interpret descriptive statistics such as frequencies and cross tabulations.	An	1,3
4	Apply statistical tests (Z-test, t-test, ANOVA, Chi-square) to analyse research data.	A / An	1,4,7
5	Interpret correlation and regression results in health and nutrition studies.	An	1,3,6
6	Present data effectively using graphs and diagrams for better understanding and communication.	A	1,2,4
Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	-	-	-	-
Understand	5	5	5	5
Apply	15	10	10	10
Analyse	15	15	10	10
Evaluate	10	10	10	10
Create	15	20	25	25
Total	60	60	60	60

Course Name	Contemporary Perspectives in Home Science		
Course Code	26UPCND1E05		
Type of Course	Elective		
Class	II M.Sc.	Semester	III
Course Objectives	• To enable students gain knowledge on textiles and apparel designing. • To expertise in family resource management, housing and interior design. • To understand the concepts of child development and extension education.		

Unit	Content	Number of Hours
I	Textile and Apparel Designing Fibre-Types, Properties, Processing and manufacture of fibres Yarn-Definition, Classification, Testing and Identification of yarn and yarn twist Weaves-Types, Testing, Identification Fabric construction-Definition, Types, Construction techniques, Merits and demerits Pattern making- Drafting, draping, and flat pattern making techniques	10
II	Family Resource Management Concepts of home management and steps-Definition, Importance, Basis for home management –values, goals and standards, home management process- planning, controlling and evaluating Decision making-Definition, Characteristics, Steps and Types Work simplification- Definition, Symbols, techniques and Mendel's class of change Management of Natural Resources- Land, forest, water, air, water harvesting, municipal solid waste management, concept of sustainable development and SDGs. Human Resource Management (HRM) & Human Resource Development (HRD)-Functions, need and Challenges	10
III	Housing and Interior Design Design fundamentals-Elements of art, principles of design and principles of composition Colour-Dimensions of colour, colour schemes and psychological effects of colour Space Planning- Housing needs, space planning principles, and types of house plans.	10

	d) Product design-Design thinking process, diffusion and innovation, design communication e) Furniture & Furnishing- Historical Perspectives, Architectural Styles, Contemporary Trends, Wall finishes, Window and window treatments	
IV	Child Development a) Theories of human development and behavior b) Early childhood care and education- Activities for holistic development c) Role of family, peers, school, community, and culture on personality development. d) Children and persons with special needs, care and support, special education, prevention of disabilities, and rehabilitation. e) Children at risk-child labour, street children, children of destitute, orphans, child abuse and trafficking	10
V	Extension Education a) Extension Education & Philosophy-History, philosophy, principles, and objectives of extension education, specifically focusing on non-formal, adult, and continuing education. b) Programme Management-Need assessment, situation analysis, planning, organization, implementation, monitoring and evaluation c) Extension methods and materials-Interpersonal, small, and large group methods; audiovisual aids- need, importance, planning, classification, preparation and field testing, use and evaluation of audio-visual materials.	8
Total Hours		48

References

Text Books

- Deepali Rastogi and Sheetal Chopra, Textile Science, 2017, Orient Black swan Private Limited.
- Serene and Ahlawat Santos Shekhar (2013), Textbook of Home Science Extension Education.
- Tami James Moore and Sylvia M.Asay (2008), Family Resource Management, Sage Publications.
- Diane E. Papalia (2004), 9 th edition, Human Development, McGraw Hill India.
- Rani K. Sudha and Srivastava Sushila, Textbook of Human Development: A lifespan development approach, S. Chand; Co Ltd.
- Seetharaman,P, and Pannu. P, Interior Design and Decoration, 2009, Cbs Publishers.
- Chaudhari, S.N., Interior Design, Pointer Publishers.
- Sudhir Andrews -Hotel Housekeeping Training Manual, Tata Mc.Graw Hill

- Premlata Mullick (1995), Text book of Home Science, Kalyani Pub.

Reference Books

- Dahama.O.P and Bhatnagar .O.P - Education and Communication for Development
- Dr. (Lt.) Sandhya Rani Mohanty -Home Science Extension Education and Rural Development
- Dubey V.K. and Bishnoi Indira - Extension Education and communications

Course Outcomes	On completion of the course, students should be able to CO1: Understand the concepts of fibres, yarn, weaves and fabric construction techniques. CO2: Describe the process of home management. CO3: Understand types of housing and interior design concepts CO4: Understand early childhood education and care. CO5: Explain extension education methods and materials.
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Course Outcomes (COs) – Programme Outcomes (POs) Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Understand the concepts of fibres, yarn, weaves and fabric construction techniques.	U	1,4
2	Describe the process of home management	U	1,2,3,4,5,7
3	Understand types of housing and interior design concepts	U	1,3,4,6
4	Understand early childhood education and care	U	1,2,3,4,5,7
5	Explain extension education methods and materials	U	1,2,3,4,5,6,7

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	5	5	10	10
Understand	15	15	15	20
Apply	10	10	15	15
Analyse	10	10	15	15
Evaluate	10	10	10	10
Create	-	-	10	5
Total	50	50	75	75

Semester IV

Course Name	Functional Foods and Nutraceuticals		
Course Code	26UPCND1C09		
Type of Course	Core		
Class	II M.Sc.	Semester	IV
Course Objectives	- To understand the concepts and importance of nutraceuticals and functional foods - To learn the role of bioactive components in health promotion and disease prevention - To apply knowledge of nutraceuticals in clinical nutrition and food product development		

Unit	Content	Number of Hours
I	Introduction to functional foods and nutraceuticals - Nutraceuticals- definition history and classification. - Functional foods: Types- Cereal and cereal products; Milk and milk products; Meat, poultry and sea foods; nuts and oilseeds, Functional fruits and vegetables; Herbs and spices; - Beverages and Designer foods. - Nutraceuticals- The link between nutrition and medicine - Basis of claims for a compound as a nutraceutical	12
II	Properties, structure and Functional components of various Nutraceuticals - Pigments– Carotenoids, chlorophyll, anthocyanin, anthoxanthin, curcumin - Functional lipids - Flavor and odor compounds- Alkaloids, Terpenoids, Glycosides, Polyphenols Functional components and health effects of - Turmeric, fenugreek, black cumin, soya, olive oil, tea, common beans, capsicum annum, mustards, garlic, grapes, citrus fruits, Fish oils, Sea foods, Mushroom	15
III	Prebiotics, Probiotics, Synbiotics and Postbiotics - Prebiotics, probiotics, synbiotics and postbiotics- concept, functions, mechanism of action. - Clinical applications of prebiotics, probiotics and synbiotics in gastrointestinal system, respiratory system, cardiovascular system, urinary system, reproductive system and immune system. - Probiotic foods–ICMR guidelines for evaluation of probiotics in food	13

IV	Concept and the role of nutraceuticals/ functional foods in health and disease - Nutraceuticals for –Cardiovascular diseases, Cancer, Diabetes, Obesity, thyroid, Age related macular degeneration, Immune enhancement and Mood disorders - FOSHU Foods (Foods for Specified Health Use)– concepts, regulatory aspects - Food component – approved health claims, labeling considerations for functional ingredients, Permissible and impermissible functional claims - Role of biotechnology in the development of functional foods. - Adverse effects and toxicity of nutraceuticals	11
V	Recent advancements in Nutraceuticals and functional foods - Dietary supplements- GMPS and shelf life of dietary supplements. - Nutrigenomics- An introduction and its relation to nutraceuticals - Recent advancements and techniques in the formulation and processing of functional foods - Market demand for nutraceuticals and functional foods. - Challenges for Functional food delivery - Factors affecting consumer interest	09
	Total Hours	60

References

Text Books

- Rekha Sharma, 2023, Introduction to Functional Foods and Nutraceuticals, PharmaMed Press / BSP Books.
- Vattem, Dhiraj A. and Vatsala Maitin. 2016. Functional Foods, Nutraceuticals and Natural Products, Concepts and Applications. USA: DEStech Publications, Inc.
- Boye, Joyce I. 2015. Nutraceutical and Functional Food Processing Technology. New Jersey: Wiley Blackwell.
- Iwu, Maurice M. 2017. Food as Medicine: Functional Food Plants of Africa. US: CRC Press.
- Mary, K. Schmidl - Essentials of Functional Foods, 2000, Culinary and hospitality industry publication services.
- Robert E.C. Wildman - Handbook of Nutraceuticals and Functional Foods, 2001, Culinary and hospitality industry publication services, 2000.

Reference Books

- Nutraceuticals and Functional Foods in Human Health and Disease Prevention, Anand Swaroop (Editor), Debasis Bagchi (Editor), Harry G. Preuss (Editor), 2015, Apple Academic Press Inc.
- Wildman, 2016, Handbook of Nutraceuticals and Functional Foods, Second Edition, 2016, CRC Press.
- Chatwick, R - Functional Foods, 2003, Springer.
- Mazza, G. - Functional Foods- Biochemical and processing aspects, 1998, Culinary and hospitality industry publication services.
- Paresh, C. Dutta, Phytosterols as Functional Food Components and Nutraceuticals, 2004, Marcel DehkerInc, New York.

- Guo M. - Functional Foods – Principles and technology, 2009, Wood head publishing company, UK.

Web Resources

- <https://www.nutraceuticalsworld.com/>
- <https://www.nutraingredients.com/>

Course Outcomes	On completion of the course, students should be able to CO1: Understand the concepts, classification, and importance of nutraceuticals and functional foods. CO2: Explain properties and health benefits of bioactive compounds and functional components. CO3: Understand the role of prebiotics, probiotics, synbiotics, and postbiotics in health. CO4: Analyse the role of nutraceuticals in prevention and management of diseases. CO5: Understand regulatory aspects, safety, and labeling of functional foods. CO6: Apply knowledge in development and evaluation of functional foods and nutraceutical products.
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Course Outcomes (COs) – Programme Outcomes (POs) Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Understand the concepts, classification, and importance of nutraceuticals and functional foods.	U	1,3
2	Explain properties and health benefits of bioactive compounds and functional components.	U / An	1,3
3	Understand the role of prebiotics, probiotics, synbiotics, and postbiotics in health.	U	1,4
4	Analyse the role of nutraceuticals in prevention and management of diseases.	An	1,4,5
5	Understand regulatory aspects, safety, and labeling of functional foods.	U	1,5
6	Apply knowledge in development and evaluation of functional foods and nutraceutical products.	A	1,6,7
Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	5	5	10	10
Understand	15	15	15	20
Apply	10	10	15	15
Analyse	10	10	15	15
Evaluate	10	10	10	10
Create	-	-	10	5
Total	50	50	75	75

Course Name	Advanced Functional Foods Practical's		
Course Code	26UPCND1CP06		
Type of Course	Core practical		
Class	II M.Sc.	Semester	IV
Course Objectives	- To provide training in the planning and preparation of diets for different disease conditions using computers. - Expertise in various feeding formulas and techniques.		

S. No	Content	Number of Hours
1.	Introduction and documentation of several functional foods available in the market	1
2.	Formulation and valuation of Beta carotene rich functional foods	3
3.	Preparation and assessment of beta glucan rich functional foods	4
4.	Formulation and valuation of lycopene rich functional foods	4
5.	Preparation and assessment of probiotic rich functional foods	4
6.	Formulation and assessment of prebiotic rich functional foods	4
7.	Preparation and calculation of PUFAs rich functional foods	4
8.	Formulation and evaluation of vitamin A rich functional foods	4
9.	Preparation and estimation of Procyanidins and Proanthocyanidins rich functional foods	4
10.	Formulation and evaluation of calcium rich foods	4
Total Hours		36

Reference Books

- Nisha Maimun- Diet Planning for Diseases, 2020, Kalpaz Publications, New Delhi
- Luxita Sharma, Clinical Studies and Diet Plans for Common Diseases, 2020, Dreamtech Press, New Delhi
- Jeffery Horst, Methods of Analysis for Functional Foods and Nutraceuticals, 2002, CRS Press.
- AOAC International. Official methods of analysis of AOAC International
- Linden G. -Analytical Techniques for Foods and Agricultural Products.
- Ranganna. S.- Handbook of Analysis and Quality Control for Fruit and Vegetable Products

Course Outcomes	On completion of the course, students should be able to CO1: Identify and document functional foods and understand their bioactive components. CO2: Apply knowledge to formulate and prepare functional foods rich in bioactive compounds CO3: Analyse and evaluate the nutritional quality and health benefits of developed functional foods
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Course Outcomes (COs) – Programme Outcomes (POs) Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Identify and document functional foods and understand their bioactive components.	U	1,3
2	Apply knowledge to formulate and prepare functional foods rich in bioactive compounds	A	1,4,6
3	Analyse and evaluate the nutritional quality and health benefits of developed functional foods.	An / E	1,4,7
Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	-	-	-	-
Understand	10	10	10	10
Apply	20	20	20	20
Analyse	15	15	15	15
Evaluate	10	10	10	10
Create	5	5	5	5
Total	60	60	60	60

Supportive papers

Course Name	Diet Therapy in Life Style Diseases		
Course Code	26UPCND1S01		
Type of Course	Supportive paper		
Class	II M.Sc.	Semester	III
Course Objectives	• To enable the students to know the effect of the various life style diseases on nutritional status of individuals. • To enhance the knowledge on dietary requirements for different disease conditions. • To overview the types of diets provided to patients.		

Unit	Content	Number of Hours
I	Introduction to foods - Functions of food - Food groups - Planning balanced diets - Fad diets Introduction to diet therapy - Routine hospital diets- clear fluid, full fluid, soft diet, regular diet - Nutrition support service - Malnutrition in hospitalized patients - Pre and post- operative diets	8
II	Diet in Hypertension and Cardiovascular Diseases - Hypertension – - Prevalence - Aetiology - Symptoms - Dietary management - Cardiovascular Diseases – - Prevalence, Clinical effects - Risk factors, Role of fat in the development of atherosclerosis - Dietary management - Physical activity and heart diseases	8
III	Diet in Diabetes Mellitus - Prevalence, types, aetiology and symptoms - Diagnosis, treatment and complications - Dietary management	7
IV	Diet in Cancer - Risk factors and Symptoms - Nutritional problems of cancer therapy - Nutritional requirements and Dietary management - Role of food in the prevention of cancer - Physical activity and cancer	7
V	Diet in diseases of Kidney Functions	6

	b) Symptoms and Principles of dietary management –Acute renal failure, Chronic renal failure, Urinary calculi	
	Total Hours	36

References

Text Books

- Antia F.P. And Philip Abraham-Clinical Nutrition and Dietetics, 4th edition- 2002, Oxford Publishing Company.
- Swaminathan S- Advanced Textbook On Food & Nutrition, 2015, Bappco
- B. Srilakshmi- Dietetics, 2023, 9th Edition, New Age International Pvt. Ltd. New Delhi.
- RSSDI DIABETES UPDATE 2020, Banshi Saboo, Ch Vasanth Kumar, Sanjay Agarwal.
- Timmanpyati.S, 2nd edition-2022,Clinical nutrition in cancer,Practical guidelines and dietary Recommendations.
- T.Alp Ikizler, Willian E.Mitch, 7 th edition-2018, Handbook of nutrition and the kidney, Wolters Kluwer.

Reference Books

- Mahan L.K., Sylvia Escott-Stump - Krause's Food Nutrition and Diet Therapy 12th Edition, 2007,W.B. Saunders Company London.
- Passmore P. And M.A. East Wood - Human Nutrition and Dietetics, 2007, Churchill Living Stone.
- Raheena M. Begum - A Text Book of Foods Nutrition and Dietetics, 3rd edition 2009,Sterling Publishers Pvt. Ltd
- Robinson Ch., M.B. Lawlea, W.L., Chenoweth, and A.E., Carwick: Normal and Therapeutic Nutrition, 17th Edn, Macmillan Publishing Company.
- Shills and Young- Modern Nutrition in Health and Disease, 11th edition-2013, Lippincott Williams and Wilkins.
- Bennion M.: Clinical Nutrition, John Wiley & Sons.
- Whitney, E. N. and C. B. Cataldo, Understanding Normal and Clinical Nutrition, 1983, West Pub.
- Williams S. R. Essentials of Nutrition and Diet Therapy, 12th edn, 2018, Mosby College Pub. S. Louis.

Web Resources

- www.anme.com.mx/libros/PrinciplesofNutrition.pdf
- <https://2012books.lardbucket.org/pdfs/an-introduction-to-nutrition.pdf>
- krishikosh.egranth.ac.in
- <https://kdigo.org/guidelines/>
- <https://www.kidney.org/professionals/guidelines>
- <https://www.espen.org/guidelines-home/espen-guidelines7>
- https://www.nutritioncare.org/Guidelines_and_Clinical_Resources/Clinical_Guidelines/
- <https://diabetes.org/newsroom/press-releases/2022/american-diabetes-association-2023-standards-care-diabetes-guide-for-prevention-diagnosis-treatment-people-living-with-diabetes>
- <https://www.ahajournals.org/doi/10.1161/CIR.0000000000001063>

Course Outcomes	On completion of the course, students should be able to CO1: Understand basic concepts of food, balanced diet, and routine hospital diets CO2: Explain dietary management for major diseases such as hypertension, cardiovascular diseases, diabetes, and cancer CO3: Apply diet therapy principles in planning therapeutic diets for various clinical conditions including kidney diseases. CO4: Analyse the role of nutrition in prevention and management of diseases
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Course Outcomes (COs) – Programme Outcomes (POs) Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Understand basic concepts of food, balanced diet, and routine hospital diets.	U	1,4
2	Explain dietary management for major diseases such as hypertension, cardiovascular diseases, diabetes, and cancer.	U / A	1,4
3	Apply diet therapy principles in planning therapeutic diets for various clinical conditions including kidney diseases.	A	1,4,7
4	Analyse the role of nutrition in prevention and management of diseases.	An	1,3,4
*Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	5	5	10	10
Understand	15	15	15	20
Apply	10	10	15	15
Analyse	10	10	15	15
Evaluate	10	10	10	10
Create	-	-	10	5
Total	50	50	75	75

Course Name	Basic Concepts in Clinical Dietetics		
Course Code	26UPCND1S02		
Type of Course	Supportive paper		
Class	II M.Sc.	Semester	III
Course Objectives	• To enable the students to learn about the concepts in nutrition science. • To recognize the significance of dieticians in hospitals. • To sensitise on food allergies.		

Unit	Content	Number of Hours
I	The Dietician - Classification - Code of ethics - Responsibility - The dietician in India - Indian dietetic association - Technology in diet counselling	7
II	Nutritional anaemia - Prevalence and causes - Types – Iron Deficiency, Megaloblastic, differentiating - Prevention	7
III	Diet in infections and fever - Host defence mechanism - Causes, Types - General dietary considerations - Typhoid, Influenza, Malaria, Tuberculosis and AIDS	8
IV	Diet in obesity and Underweight Obesity - Aetiology and theories - Assessment, types, treatment - Complications, Weight management guidelines, eating disorders Underweight Aetiology, Nutritional and food requirements	8
V	Food Sensitivity - Types of reactions, food involved in sensitivity - Symptoms - Diagnosis - Treatment	6
	Total Hours	36

References

Text Books

- Antia F.P. And Philip Abraham, 4th edition- 2002, -Clinical Nutrition and Dietetics, Oxford Publishing Company.
- Swaminathan S, 2015,- Advanced Textbook On Food & Nutrition, Bappco
- B. Srilakshmi- Dietetics, 2023, 9th Edition, New Age International Pvt. Ltd. New Delhi.

Reference Books

- Mahan L.K., Sylvia Escott-Stump - Krause's Food Nutrition and Diet Therapy 12th Edition, 2007, W.B. Saunders Company London.
- Passmore P. And M.A. East Wood - Human Nutrition and Dietetics, 2007, Churchill Living Stone.
- Raheena M. Begum - A Text Book of Foods Nutrition and Dietetics , 3 edition 2009, Sterling Publishers Pvt. Ltd
- Robinson Ch., M.B. Lawlea, W.L., Chenoweth, and A.E., Carwick: Normal and Therapeutic Nutrition, 17 th Edn, Macmillan Publishing Company.
- Shills and Young- Modern Nutrition in Health and Disease, 11th edition-2013, Lippincott Williams and Wilkins.
- Bennion M.: Clinical Nutrition, John Wiley & Sons.
- Whitney, E. N. and C. B. Cataldo, Understanding Normal and Clinical Nutrition, 1983, West Pub.
- Williams S. R. Essentials of Nutrition and Diet Therapy, 12th edn, 2018, Mosby College Pub. S. Louis.

Web Resources

- www.anme.com.mx/libros/PrinciplesofNutrition.pdf
- <https://2012books.lardbucket.org/pdfs/an-introduction-to-nutrition.pdf>
- krishikosh.egranth.ac.in

Course Outcomes	On completion of the course, students should be able to CO1: Understand the role, responsibilities, and ethics of a dietician in healthcare settings. CO2: Explain causes, types, and dietary management of nutritional anaemia and infections. CO3: Apply diet therapy principles in managing obesity, underweight, and related conditions. CO4: Analyse food sensitivities and plan appropriate dietary interventions
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Course Outcomes (COs) – Programme Outcomes (POs) Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Understand the role, responsibilities, and ethics of a dietician in healthcare settings.	U	1,4,5
2	Explain causes, types, and dietary management of nutritional anaemia and infections.	U / A	1,4
3	Apply diet therapy principles in managing obesity, underweight, and related conditions.	A	1,4,7
4	Analyse food sensitivities and plan appropriate dietary interventions.	An	1,3,4
*Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	5	5	10	10
Understand	15	15	15	20
Apply	10	10	15	15
Analyse	10	10	15	15
Evaluate	10	10	10	10
Create	-	-	10	5
Total	50	50	75	75

Course Name	Life Cycle Nutrition		
Course Code	26UPCND1S03		
Type of Course	Supportive paper		
Class	II M.Sc.	Semester	III
Course Objectives	• To familiarize the concept of balanced diet. • To discern the importance of nutrition during life span and dietary modifications for different age groups. • Develop aptitude to learn the nutritional problems of different age groups.		

Unit	Content	Number of Hours
I	Introduction to foods - Functions of food - Food groups - Food in relation to health - Explanation of terms - Planning balanced diets - Food guide - Vegan diets	6
II	Nutritional and food requirements of expectant mother and lactating mother - Expectant mother- preconception nutrition, nutritional requirements, food requirements, general problems - Lactating women – nutritional requirements, food requirements	7
III	Nutritional and food requirements for infants and preschool children - Growth and development during infancy - Nutritional requirements for infants - Food requirements for infants - Low birth weight, preterm baby - Weaning - Nutritional requirements for pre-schoolers - Food requirements, nutrition related problems of pre-schooler	8
IV	Nutritional and food requirements for school children and adolescents - School children – nutritional requirements, food requirements, packed lunch, school lunch programmes - Adolescents – nutritional requirements, food requirements, nutritional problems	7
V	Nutritional and food requirements of adults and during old age - Adult – nutritional requirements, food requirements - Old age – nutritional requirements, food requirements, nutritional related problems of old age, degenerative.	8
	Total Hours	36

References

Text Books

- Brown, J. E-Nutrition through the Life Cycle, 7th Edition-2017, Cengage Learning.
- Mahan L. K. & Stump S.E Krause's - Food Nutrition and diet Therapy, 12th edition-2007, Saunders.
- B.Srilakshmi - Nutrition Science, 7th edition-2021, New Age International.
- Indian Council of Medical Research Nutrient Requirements and Recommended Dietary Allowances for India, A Report of the Expert Group of the Indian Council of Medical Research, New Delhi; ICMR. July 2023 Revised.
- Bajaj.M, Diet metrics, hand book of food exchanges, 1st edition- 2019, Notion press.

Reference Books

- Groff, J. L and Gropper, S. S-7th edition-2017, Advanced Nutrition and Human Metabolism, Belmont CA: Wads worth/Thomson Learning.
- Goodhart, R. S. S. and Shils, M. E - Modern Nutrition in Health and Disease, Philadelphia: Lea and Febiger.
- Jackson, M. S - Adolescent Nutritional Disorders, 1997, The New York Academy of Science.
- Jelliffe D.B- Assessment of Nutrition Status of the Community, 1966, WHO, Geneva.

Web Resources

- <https://www.universalclass.com/articles/health/nutrition/nutritional-needs-for-different-ages>.
- <https://www.nutrition.org.uk/nutritionscience/life.html>
- <http://www.open.edu/openlearncreate/mod/oucontent/view.php>

Course Outcomes	On completion of the course, students should be able to CO1: Define the nutritional needs of each age group CO2: Infer and apply concepts of balanced diet CO3: Interpret nutritional problems in different age groups
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Course Outcomes (CO) –with PO Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Define the nutritional needs of each age group	R/U	1,3,4
2	Infer and apply concepts of balanced diet	An/A	1,2,3,4,6,7
3	Interpret nutritional problems in different age groups	An/E	1,2,3,4,5,7
<i>*Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)</i>			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	5	5	10	10
Understand	15	15	15	20
Apply	10	10	15	15
Analyse	10	10	15	15
Evaluate	10	10	10	10
Create	-	-	10	5
Total	50	50	75	75

Course Name	Nutrition Science		
Course Code	26UPCND1S04		
Type of Course	Supportive paper		
Class	II M.Sc.	Semester	III
Course Objectives	• To enable the students to learn about the concepts in nutrition science. • To recognize the significance of diet in nutritional problems. • To understand the role of food and nutrients in infections and fever.		

Unit	Content	Number of Hours
I	Introduction to Nutrition Science - History - Nutrition research in India - Nutrients- Classification - Functions of macro and micro nutrients - Food sources of macro and micro nutrients	6
II	Protein Energy Malnutrition - Etiology and clinical features - Nutritional requirement - Treatment and Prevention Nutritional anaemia - Prevalence and causes - Types – Iron Deficiency, Megaloblastic, differentiating - Prevention	7
III	Vitamin A Deficiency Disorders - Etiology and clinical features - Nutritional requirement - Evaluation of Vitamin A status - Treatment and Prevention	7
IV	Obesity and Underweight Obesity - Aetiology and theories - Assessment, types, treatment - Complications, Weight management guidelines, eating disorders Underweight Aetiology, Nutritional and food requirements	8
V	Infections and fever - Host defence mechanism - Causes, Types - General dietary considerations-Typhoid, Influenza, Malaria, Tuberculosis and AIDS - Nutritional requirements	8
	Total Hours	36

References**Text Books:**

- Antia F.P and Philip Abraham-Clinical Nutrition and Dietetics, 2001, Oxford Publishing Company.
- Swaminathan S- Advanced Textbook on Food & Nutrition, 2015, Bappco
- B. Srilakshmi- Nutrition Science, 2021, 6th Edition, New Age International Pvt. Ltd. New Delhi.
- B. Srilakshmi- Dietetics, 2023, 9th Edition, New Age International Pvt. Ltd. New Delhi.
- Bajaj.M, Diet metrics, Hand book of food exchanges, 1st edition- 2019, Notion press.
- Raheena M. Begum - A Text Book of Foods Nutrition and Dietetics, 3 edition 2009, Sterling Publishers pvt. Ltd

Reference Books:

- Mahan L.K., Sylvia Escott-Stump - Krause's Food Nutrition and Diet Therapy 12th Edition, 2008, W.B. Saunders Company London.
- Passmore P. And M.A. East Wood - Human Nutrition and Dietetics, Churchill Living Stone, 8th edition- 1986
- Robinson Ch., M.B. Lawlea, W.L., Chenoweth, and A.E., Carwick: Normal and Therapeutic Nutrition, 17th Edn, Macmillan Publishing Company.
- Shills and Young- Modern Nutrition in Health and Disease, 2012, Lippincott Williams and Wilkins.
- Whitney, E. N. and C. B. Cataldo, Understanding Normal and Clinical Nutrition, 3rd edition- 1991, West Pub.
- Williams S. R. Essentials of Nutrition and Diet Therapy, 12th edn, 2018, Mosby College Pub. S. Louis.

Web Resources:

- www.anme.com.mx/libros/PrinciplesofNutrition.pdf
- <https://2012books.lardbucket.org/pdfs/an-introduction-to-nutrition.pdf>
- krishikosh.egranth.ac.in

Course Outcomes	On completion of the course, students should be able to CO1: Understand the concepts in nutrition science CO2: Identify and describe causes, symptoms and complications of nutritional problems CO3: Relate the role of food and nutrients in obesity and underweight CO4: Apply diet principles for recovery from infectious diseases
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Course Outcomes (CO) –with PO Mapping

CO No.	Expected Course Outcome	Learning Domains	PO No.
1	Understand the concepts in nutrition science	U	1,4,7
2	Identify and describe causes, symptoms and complications of nutritional problems	U/An	1,2,3,4,5,7
3	Relate the role of food and nutrients in obesity and underweight	U/A	1,3,4,6,7
4	Apply diet principles for recovery from infectious diseases	A	1,2,3,4,5,7
*Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)			Terminal Examination (Marks)
	I	II	III	
Remember	5	5	10	10
Understand	15	15	15	20
Apply	10	10	15	15
Analyse	10	10	15	15
Evaluate	10	10	10	10
Create	-	-	10	5
Total	50	50	75	75