Kurukshetra University, Kurukshetra

(Established by the State Legislature Act-XII of 1956)
("A++" Grade, NAAC Accredited)

Syllabus
for
Post Graduate Programme

M.Sc. Home Science (Food, Nutrition and Dietetics)

as per NEP 2020
Curriculum and Credit Framework for Postgraduate Programme

CBCS-LOCF
With effect from the session 2025-26

DEPARTMENT OF HOME SCIENCE

FACULTY OF LIFE SCIENCES

KURUKSHETRA UNIVERSITY, KURUKSHETRA -136119
HARYANA, INDIA

Session: 2025-26			
Part A - Introduction			
Name of Programme	M. Sc. Home Science (Food Nutrition & Dietetics)		
Semester	**3**		
Name of the Course	**Clinical Nutrition & Dietetics-II**		
Course Code	M24-FND-301		
Course Type	CC-9		
Level of the course	500-599		
Pre-requisite for the course (if any)	-		
Course Learning Outcomes (CLO) After completing this course, the learner will be able to:	CLO 1: Understand the role of nutrition in Renal disorders. CLO 2: Know about the chrono nutrition and nutritional management in space. CLO 3: Gain knowledge about the causative factors, metabolic changes, prevention and nutritional management of Non communicable Diseases. CLO 4: Understand the Oncology Nutrition and role of artificial Intelligence in clinical nutrition.		
Credits	Theory	Practical	Total
	4	0	4
Teaching Hours per week	4	0	4
Internal Assessment Marks	30	0	30
End Term Exam Marks	70	0	70
Max. Marks	100	0	100
Examination Time	3 hours		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes (CLOs) into consideration. The compulsory question (Question No. 1) will consist at least 4 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question. All questions will carry equal marks.

Unit	Topics	Contact Hours
I	**Etiology, manifestations and dietary management of Renal Disorders**: • Glomerulonephritis • Nephrotic syndrome • Acute renal failure • Chronic renal failure • Renal stones- Major types of stones	15
II	**Chrono- Nutrition:** • Introduction, principles and health benefits of Chrono nutrition. • Biological clock and Circadian rhythm • **Chrono-Nutrition in Disease Prevention and Management-** • Type 2 diabetes, obesity, and sleep disorders etc. **Nutritional management in space**: • Space Nutrition & its goals • Physiological Changes in Space Affecting Nutrition • Space Food Systems • Nutritional Challenges in Space • Future of Space Nutrition	15

III	**Etiology, metabolic and clinical aberrations, complications, prevention and nutritional management of:** • Weight imbalances (over and under nutrition) • Diabetes mellitus: Type 1, Type 2 • Cardiovascular disorders: Hypertension, Atherosclerosis, Coronary heart disease	15
IV	**Oncology Nutrition:** • Process and Causes of Cancer Development • Body's Defense System and types of Cancer • Nutritional Problems and effects of Cancer Therapy on Nutrition • Nutritional Management of cancer Related Symptoms **Artificial Intelligence and clinical nutrition:** • Introduction and its role in Clinical Nutrition • Limitations and challenges of AI in nutrition • AI Tools Used in Nutrition Research • Nutritio App, iNutrimon • IBM Watson Health: AI platform for dietary recommendations	15
	Total Contact Hours	60

Suggested Evaluation Methods			
Internal Assessment: 30		**End Term Examination: 70**	
➢ **Theory**	**30**	➢ **Theory:**	**70**
• Class Participation:	5	Written Examination	
• Seminar/presentation/assignment/quiz/class test etc.:	10		
• Mid-Term Exam:	15		

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1 Sue Rodwell Williams, (1993): Nutrition, Diet Therapy, (7th Ed.): W.B. Saunders Company London

2. Robinson Ch.,M.B. Lawlea, W.L, Chenoweth, and A.E., Carwick: Normal And Therapeutic Nutrition, Macmillan Publishling Company.

3. Mahan L.K., Sylvia Escott-Stump (2000): Krause's Food Nutrition and Diet Therapy 10th Edition, W.B Saunders Company London

4. B. Shrilakshmi, (2007): Dietetics, published by K.K Gupta for New Age International Pvt. Ltd. New Delhi

5. Gopalan C., Ram Sastri B.V. and BalaSubramaniam S.C., (2006) Nutritive Value of Indian Foods, Hydrabad, National Institute of Nutrition, Indian Council of Medical Research

6. Passmore P, and M.A. East Wood: Human Nutrition and Dietetics, Churchill Living Stone

7. Antia F.P.and Philip Abraham (2001) Clinical Nutrition and Dietetics, Oxford Publishing Company

8. WohlShils and Goodheart: Modern Nutrition in Health and Disease, McLaren and Ubrman, Philadelphia

9. Stanfield S. P. and Hui Y.H: Nutrition and Diet Therapy14th Edition Jones and Barlett Publishers Sudbury, Massachusetts

10. Schlenker D. E. and Roth L.S: William's Essentials of Nutrition and Diet Therapy 10th Edition Elesvier MOSBY

Session: 2025-26			
Part A – Introduction			
Name of Programme	M.Sc. Home Science (Food, Nutrition and Dietetics)		
Semester	**3**		
Name of the Course	**Public Health Nutrition-II**		
Course Code	M24-FND-302		
Course Type	CC-10		
Level of the course	500-599		
Pre-requisite for the course (if any)	-		
Course Learning Outcomes (CLO) After completing this course, the learner will be able to:	CLO1: Understanding concepts and factors influencing food and nutritional security at various levels. CLO 2: Gain knowledge of key components, strategies, goals and strategies of national nutritional policy along their relevance with public health and to evaluate the appropriateness of different assessment methods for various community settings. CLO 3:Comprehend and analyze various nutritional programmes aimed at improving nutritional status, including nutrient deficiency control, supplementary, feeding and food security programs. CLO 4: Learn to design and implement effective nutrition education programs, including planning, execution, evaluation and follow up.		
Credits	Theory	Practical	Total
	4	0	4
Teaching Hours per week	4	0	4
Internal Assessment Marks	30	0	30
End Term Exam Marks	70	0	70
Max. Marks	100	0	100
Examination Time	3 hours		

Part B-Contents of the Course

Instructions for Paper- Setter: The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes (CLOs) into consideration. The compulsory question (Question No. 1) will consist at least 4 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question. All questions will carry equal marks.

Unit	Topics	Contact Hours
I	• Concept, definitions and factors affecting Food and Nutrition Security at National, Household and Individual level. • Role of national and international agencies in Public Health Nutrition.	15
II	• National nutrition Policy. • Poshan Abhiyan • Assessment of Nutritional status of the Community o Anthropometric measurements o Biochemical o Clinical o Dietary surveys	15

III	• Nutritional Programmes for improvement of Nutritional status: o Nutrient Deficiency control programmes. o Supplementary Feeding programmes. o Food Security Programmes o Self-Employment and Wage Employment Schemes	15
IV	• Nutrition Education: o Methods o Planning and execution o Evaluation and follow up	15
	Total Contact Hours	60

Suggested Evaluation Methods

Internal Assessment: 30		**End Term Examination: 70**	
➢ **Theory**	**30**	➢ **Theory:**	**70**
• Class Participation:	5	Written Examination	
• Seminar/presentation/assignment/quiz/class test etc.:	10		
• Mid-Term Exam:	15		

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. B. Shrilakshmi, (2007): Dietetics, published by K.K Gupta for New Age International Pvt. Ltd. New Delhi
2. Passmore P, and M.A. East Wood: Human Nutrition and Dietetics, Churchill Living Stone
3. Antia F.P.and Philip Abraham (2001) Clinical Nutrition and Dietetics, Oxford Publishing Company
4. WohlShils and Goodheart: Modern Nutrition in Health and Disease, McLaren and Ubrman, Philadelphia
5. Stanfield S. P. and Hui Y.H: Nutrition and Diet Therapy14th Edition Jones and Barlett Publishers Sudbury, Massachusetts

Session: 2025-26			
Part A– Introduction			
Name of Programme	M.Sc. Home Science (Food, Nutrition and Dietetics)		
Semester	**3**		
Name of the Course	**Sports Specific Nutrition**		
Course Code	M24-FND-303		
Course Type	DEC-1		
Level of the course	500-599		
Pre-requisite for the course (if any)	-		
Course Learning Outcomes (CLO) After completing this course, the learner will be able to:	CLO: 1. Explain the differences in nutritional needs between normal active persons and athletes/exercising individuals. CLO: 2. Understand the role of carbohydrates, protein, and fat in exercise metabolism and optimize their intake for various sports and training types. CLO: 3 No about hydration strategies and the safe use of common supplements in sports nutrition, considering anti-doping laws and WADA regulations. CLO: 4. Gain knowledge regarding nutrition plans tailored to specific sports and consider the unique needs of various athlete populations.		
Credits	Theory	Practical	Total
	4	0	4
Teaching Hours per week	4	0	4
Internal Assessment Marks	30	0	30
End Term Exam Marks	70	0	70
Max. Marks	100	0	100
Examination Time	3 hours		

Part B-Contents of the Course

Instructions for Paper- Setter: The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes (CLOs) into consideration. The compulsory question (Question No. 1) will consist at least 4 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question. All questions will carry equal marks.

Unit	Topics	Contact Hours
I	• **Introduction to sports nutrition:** Definition, scope, and principles of sports nutrition. Nutritional considerations for sports and exercising person as compare to normal active person. Types of sports activities and energy substrates for activities of different intensity and duration. Energy systems in athletic performance (ATP-PC, glycolytic, oxidative pathways) • **Carbohydrates intake and performance**: Intensity of training impacting carbohydrates intake and utilization. Types, timing, and quantity of carbohydrates intake in resistance training, endurance training and recreational sports. Carbohydrate loading and its types for various sports. • **Protein and amino acid requirements:** Factors affecting Protein turnover, Protein requirement and metabolism during endurance	15

	exercise, resistance exercise and recovery. Specific role of amino acids for performance. Protein supplements. • **Role of fat in exercise metabolism:** Factors affecting fat oxidation, effects of fasting and fat ingestion, dietary strategies and implications for endurance and resistance training.	
II	• **Dehydration :** Causes; Symptoms and its effects on cardiovascular system and muscle metabolism; Tolerable levels of dehydration; Synergistic effect of dehydration and hyperthermia; Effects of dehydration on endurance and performance. • **Hydration strategies:** Beverage composition and formulation (isotonic, hypotonic and hypertonic); only fluid versus fuelling with other macronutrients and electrolytes for exercise benefits; Beverage volume and Beverage timing (Pre-exercise and Post-exercise rehydration). • **Nutrient periodisation and Meal timing:** Importance of periodisation and meal timing related to the type of training and exercise intensity. Effects of energy intake and co-ingestion other nutrients like carbohydrate and protein composition before, during and after training. Type of carbohydrates and proteins beneficial for maximum refueling post exercise sessions.	15
III	• **Energy balance concept for athletic performance:** Macronutrient contributions, caloricity and optimization for training and sports. Principals, factors and methods for determining energy expenditure commonly used among athletes. Managing energy balance in athletes and sports person. • **Supplementation and Regulations-** Assessing body composition (DXA, skin folds, Safe strategies for weight loss/gain**,** Evidence-based use of common supplements (creatine, caffeine, beta-alanine)**,**Ergogenic aids and performance impacts**,**Anti-doping laws and WADA regulations	15
IV	• **Sports specific nutrition:** nutrition plan for endurance sports (running, cycling), power/strength sports(weightlifting, sprinting), team sports(football, basketball), weight class and aesthetic sports (wrestling, gymnastics), racquet and multi energy spots system • **Nutrition considerations for**: Female athletes (including RED-S),Adolescent athletes, Master (aging) athletes, Vegetarian/vegan athletes ,Athletes with medical issues (e.g., diabetes, GI disorders)	15
	Total Contact Hours	60

Suggested Evaluation Methods			
Internal Assessment: 30		**End Term Examination: 70**	
➢ **Theory**	**30**	➢ **Theory:**	**70**
• Class Participation:	5	Written Examination	
• Seminar/presentation/assignment/quiz/class test etc.:	10		
• Mid-Term Exam:	15		

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Ira Walinaky, (1998) Nutrition in Exercise and sport
2. Charles B. Corbin, Ruth Lindsey and grey walk (2000) Concepts of fitness and wellness.
3. Robert A. Robergers and Scott O. Roberts (2000) exercise physiology

Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Home Science (Food, Nutrition and Dietetics)		
Semester	**3**		
Name of the Course	Food Microbiology		
Course Code	M24-FND-304		
Course Type	DEC-1		
Level of the course	500-599		
Pre-requisite for the course (if any)	-		
Course Learning Outcomes (CLO) After completing this course, the learner will be able to:	CLO 1: Know about food microbiology, microbial growth and factors affecting it. CLO 2: Get an idea about nutritional parameters, sources of microbial contamination, spoilage and food preservation. CLO 3: Gain insight into fermented foods and food borne diseases. CLO 4: have an account of microorganisms as food and food testing and quality control.		
Credits	Theory	Practical	Total
	4	0	4
Teaching Hours per week	4	0	4
Internal Assessment Marks	30	0	30
End Term Exam Marks	70	0	70
Max. Marks	100	0	100
Examination Time	3 hours		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes (CLOs) into consideration. The compulsory question (Question No. 1) will consist of at least 4 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question. All questions will carry equal marks.

Unit	Topics	Contact Hours
I	• Introduction to Food Microbiology. • Microbial growth and methods of measurement of growth. • **Factors affecting growth of microorganisms in food**: Intrinsic (nutrient content, pH and buffering capacity, redox potential, antimicrobial constituents, water activity), extrinsic (relative humidity, temperature, gaseous atmosphere).	15
II	• Nutritional requirements, nutritional types, culture media and its types for microorganism. • **Sources of contamination and microbial spoilage of**: Milk and milk products, eggs and poultry, fish and other sea foods, Cereal and cereal products, meat and meat products, Vegetables and fruits, canned foods. • **Food Preservation**: General principles of food preservation, various classical physical, chemical, and biological methods of preservation.	15

	New developments in food preservation techniques.	
III	• **Fermented foods**: Production of fermented milk and milk products, plant-based products, pickles, fish products, and meat products, Bread, Vinegar, Yoghurt, Bear, Wine, probiotics and prebiotics. • **Food borne diseases**: Food borne infections including bacterial, viral and fungal infections. Study of infections due to food borne parasites. Symptoms and methods of prevention and control of food borne diseases caused by following: • **Bacterial agents**:Salmonella, Staphylococcus, Clostridium, E. coli. • **Fungal agents**: Aspergillus, Fusarium, penicillium. • **Viruses**:Polio, Hepatitis. • **Protozoa**: Giardia, Entamoeba.	15
IV	• **Microorganisms as food**: single cell proteins, Mushrooms. • **Microbiological criteria for food testing and Quality control**: Indicator organisms, Microbiological standards, Principle of GMP and The HACCP system and food safety used in controlling microbiological hazards.	15
	Total Contact Hours	60

Suggested Evaluation Methods			
Internal Assessment: 30		**End Term Examination: 70**	
➢ **Theory**	**30**	➢ **Theory:**	**70**
• Class Participation:	5	Written Examination	
• Seminar/presentation/assignment/quiz/class test etc.:	10		
• Mid-Term Exam:	15		

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. General Microbiology – Powar
2. Good Microbiology – Frazier and Westhoff
3. Microbiology – Prescott, Harley, Klein
4. Food Microbiology – Adams
5. An Introduction of Microbiology - P. Tauro
6. General Microbiology – Stanier
7. Food Microbiology – James M. H Jay
8. Food Hygiene, microbiology & HACCP – 3rd edition – S.J. Forsythe &P.R. Hayes

Session: 2025-26			
Part A - Introduction			
Name of Programme	M.Sc. Home Science (Food, Nutrition and Dietetics)		
Semester	**3**		
Name of the Course	Human Physiology		
Course Code	M24-FND-305		
Course Type	DEC-1		
Level of the course	500-599		
Pre-requisite for the course (if any)	-		
Course Learning Outcomes (CLO) After completing this course, the learner will be able to:	CLO1: Know about digestive system and cardiovascular system and immune system. CLO2: Have insight into respiratory system, reproductive system and Musculo-skeletal system and related disorder. CLO3: Have an account of excretory system and sensory system related disorder. CLO4: Get an idea about endocrine system and nervous system related disorder.		
Credits	Theory	Practical	Total
	4	0	4
Teaching Hours per week	4	0	4
Internal Assessment Marks	30	0	30
End Term Exam Marks	70	0	70
Max. Marks	100	0	100
Examination Time	3 hours		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes (CLOs) into consideration. The compulsory question (Question No. 1) will consist at least 4 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question. All questions will carry equal marks.

Unit	Topics	Contact Hours
I	• **Digestive System**- Different parts of digestive system, Secretory and digestive functions of the salivary glands, stomach, pancreas, liver and intestines, mechanism of absorption of carbohydrates, proteins and fats. • **Cardiovascular System**- Structure and function of the heart, ECG, cardiac cycle, cardiac output, heart sounds, regulation of heart rate, blood pressure: Factors affecting it and hypertension. • **Blood formation, composition, blood clotting**- formation and functions • of plasma proteins, erythropoiesis, blood groups, histocompatibility and blood indices. • **Immune system**- cell mediated and humoral immunity, Innate and ada immunity, Activation of WBCs and production of antibodies and r inflammation and defence.	15
II	• **Respiratory System**- Structure of respiratory organs, uptake and delivery of respiratory gases and regulation of breathing, Laryngitis, pharyngitis bronchitis, asthma in brief • **Reproductive System**- Structure and function of testis and ovaries,	15

	menstrual cycle, puberty, menopause, breast and cervical cancer, menstrual disorders, infertility, ultra sound imaging in brief. • **Musculo-skeletal system-** Structure and function of bone, cartilage and connective tissue. Disorders of the skeletal system, types of muscles, structure and function.	
III	• **Excretory System**- Structure and function of nephron, mechanism of urine formation and the role of the kidneys in water and electrolyte balance, diuretics, renal stone, albuminurea, haematourea, oedema, uremia, incontinence, in brief. • **Sensory System**- General senses (types, structure and functions). Special senses (structure and functions: olfaction, vision, gestation, equilibrium and hearing).	15
IV	• **Endocrine System**- structure, functions and the different syndromes resulting from hypo or hyperactivity of the following glands: Thyroid, parathyroid, adrenal cortex, adrenal medulla, endocrine pancreas, pituitary. • **Nervous System**- Main divisions, structure and function of various parts of brain: brain stem, cerebral cortex, cerebellum and diencephalon, blood brain barrier, structure and function of spinal cord, cerebrospinal fluid, cranial and spinal nerves, introduction to autonomic nervous system, neuralgia, sciatica, coma, poliomyelitis, EEC, CT, MRI in brief.	15
	Total Contact Hours	60

Suggested Evaluation Methods

Internal Assessment: 30		**End Term Examination: 70**	
➢ **Theory**	**30**	➢ **Theory:**	**70**
• Class Participation:	5	Written Examination	
• Seminar/presentation/assignment/quiz/class test etc.:	10		
• Mid-Term Exam:	15		

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Stand, F.L. Modern Physiology the Macmillan Company Latest Ed.
2. Guyton, A.C. Textbook of Medical Physiology W.S. Saunders
3. Davidson, B. and Smith E., Textbook of Physiology and Biochemistry, 1972 (8th Ed.).
4. Human Physiology – A.J. Vander
5. Principles of Anatomy and Physiology – Anagnastakes.
6. Textbook of Physiology – Patton
7. Bloom W. & Favcott. D.W.A. – Textbook of Histology, W.B. Saunders and Company
8. Martini: Fundamentals of Anatomy and Physiology (6th & 7th Ed)

Session: 2025-26			
Part A– Introduction			
Name of Programme	M.Sc. Home Science (Food Nutrition and Dietetics)		
Semester	**3**		
Name of the Course	**Nutrition through Life Span**		
Course Code	M24-FND-306		
Course Type	DEC-1		
Level of the course	500-599		
Pre-requisite for the course (if any)	-		
Course Learning Outcomes (CLO) After completing this course, the learner will be able to:	CLO1: Apply knowledge of the science of nutrition to human health across the lifespan. CLO2: Relate foods and nutrients to the biological requirements of humans at different stages of the life cycle. CLO3: Explain, compare and contrast the nutritional requirements of humans during different stages of the life cycle. CLO4: Learn to address nutritional problems during different life cycles		
Credits	Theory	Practical	Total
	4	0	4
Teaching Hours per week	4	0	4
Internal Assessment Marks	30	0	30
End Term Exam Marks	70	0	70
Max. Marks	100	0	100
Examination Time	3 hours		

Part B-Contents of the Course

Instructions for Paper- Setter: The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes (CLOs) into consideration. The compulsory question (Question No. 1) will consist at least 4 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question. All questions will carry equal marks.

Unit	Topics	Contact Hours
I	• **Nutrition during infancy** – Growth and development during infancy, RDA, Nutritional requirements and factors affecting it, nutritional problems. Advantages of breast feeding, artificial feeding, preterm baby – nutritional requirements, weaning- types of weaning foods and supplementary foods, problems in weaning. • **Nutrition during preschool age** – . Growth and development during preschool, RDA, Nutritional requirements and factors affecting it , nutritional problems.	15
II	• **Nutrition for school going children** – Growth and development, RDA, Nutritional requirements and factors affecting it, nutritional problems, policies for school lunch programmes. • **Nutrition during adolescence** – Growth and development, RDA,	15

	Nutritional requirements and factors affecting it, nutritional problems and nutritional disorders.	
III	• **Nutrition in adulthood** – RDA, Nutritional requirements and factors affecting it, nutritional problems and nutritional disorders. • **Nutrition in old age** – physical, physiological changes, Nutritional requirements and factors affecting it , nutritional problems and nutritional disorders.	15
IV	• **Nutrition in pregnancy** – physiological changes during pregnancy, developmental stages of the embryo, complications in pregnancy, – RDA, Nutritional requirements and factors affecting it, • **Nutrition in lactation** –physiology of lactation, composition of breast milk and factors affecting it, RDA, Nutritional requirements and factors affecting it.	15
	Total Contact Hours	60

Suggested Evaluation Methods

Internal Assessment: 30		**End Term Examination: 70**	
➢ **Theory**	**30**	➢ **Theory:**	**70**
• Class Participation:	5	Written Examination	
• Seminar/presentation/assignment/quiz/class test etc.:	10		
• Mid-Term Exam:	15		

Part C-Learning Resources

1. B. Shrilakshmi, (2007): Dietetics, published by K.K Gupta for New Age International Pvt. Ltd. New Delhi
2. Passmore P, and M.A. East Wood: Human Nutrition and Dietetics, Churchill Living Stone
3. Antia F.P.and Philip Abraham (2001) Clinical Nutrition and Dietetics, Oxford Publishing Company
4. WohlShils and Goodheart: Modern Nutrition in Health and Disease, McLaren and Ubrman, Philadelphia
5. Stanfield S. P. and Hui Y.H: Nutrition and Diet Therapy14th Edition Jones and Barlett Publishers Sudbury, Massachusetts

Session: 2025-26			
Part A– Introduction			
Name of Programme	M.Sc. Home Science (Food Nutrition and Dietetics)		
Semester	**3**		
Name of the Course	**Maternal and Child Nutrition**		
Course Code	M24-FND-307		
Course Type	DEC-2		
Level of the course	500-599		
Pre-requisite for the course (if any)	-		
Course Learning Outcomes (CLO) After completing this course, the learner will be able to:	CLO 1: Understand the role and importance of Maternal nutrition. CLO 2: Knowledge about the Physiology of lactation and nutritional benefits of Breast feeding. CLO 3: Gain knowledge about the growth & development and nutritional requirements during infancy CLO 4: Understand the role of nutrition in preventing and managing childhood diseases.		
Credits	Theory	Practical	Total
	4	0	4
Teaching Hours per week	4	0	4
Internal Assessment Marks	30	0	30
End Term Exam Marks	70	0	70
Max. Marks	100	0	100
Examination Time	3 hours		

Part B-Contents of the Course

Instructions for Paper- Setter: The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes (CLOs) into consideration. The compulsory question (Question No. 1) will consist at least 4 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question. All questions will carry equal marks.

Unit	Topics	Contact Hours
I	• **Maternal Nutrition** o Maternal nutrition o Physiological and psychological changes during pregnancy o Nutritional needs during pregnancy o Factors affecting the outcome of pregnancy o Pregnancy in special conditions o Intrauterine Growth Retardation (IUGR) o Congenital malformations o Foetal Alcoholic Syndrome o Gestational Diabetes Mellitus o Pregnancy Induced Hypertension	15
II	• **Lactation** o Development of mammary tissues and role of hormones o Physiology of lactation and milk production o Nutritional needs of lactating mothers o Composition of human milk o Effect of nutritional status of lactating mother on quantity and	15

	quality of breast milk o 6. Nutritional Benefits of Breastfeeding o For the infant: immunity, growth, cognitive development o For the mother: uterine involution, weight loss, reduced cancer risk o Breast feeding: factors affecting breast feeding,	
III	• **Infancy** o Growth and development during infancy o Immunization Schedule o Nutrition requirements during infancy o Food requirements and modification of foods for infants Pre-term, LBW infants: implications for feeding and management o Weaning and dietary guidelines in infant feeding and complimentary feeding	15
IV	• **Childhood** o Growth and development of children o Growth monitoring using growth charts o Nutritional requirements of pre-school and school going children o Child malnutrition o Undernutrition: stunting, wasting, underweight o Overnutrition: childhood obesity o Nutritional challenges and nutrition for children with special need (cerebral palsy, autism and Down syndrome) o Maternal and child nutrition policies and programmes in India	15
	Total Contact Hours	60

Suggested Evaluation Methods

Internal Assessment: 30		**End Term Examination: 70**	
➢ **Theory**	**30**	➢ **Theory:**	**70**
• Class Participation:	5	Written Examination	
• Seminar/presentation/assignment/quiz/class test etc.:	10		
• Mid-Term Exam:	15		

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1.Passmore P, and M.A. East Wood: Human Nutrition and Dietetics, Churchill Living Stone

2. Antia F.P.and Philip Abraham (2001) Clinical Nutrition and Dietetics, Oxford Publishing Company

3.WohlShils and Goodheart: Modern Nutrition in Health and Disease, McLaren and Ubrman, Philadelphia

4. Stanfield S. P. and Hui Y.H: Nutrition and Diet Therapy14th Edition Jones and Barlett Publishers Sudbury, Massachusetts

5. Schlenker D. E. and Roth L.S: William's Essentials of Nutrition and Diet Therapy 10th Edition Elesvier MOSBY

6. Passmore P, and M.A. East Wood: Human Nutrition and Dietetics, Churchill Living Stone

7. Antia F.P.and Philip Abraham (2001) Clinical Nutrition and Dietetics, Oxford Publishing Company

8. WohlShils and Goodheart: Modern Nutrition in Health and Disease, McLaren and Ubrman, Philadelphia

9. Stanfield S. P. and Hui Y.H: Nutrition and Diet Therapy14th Edition Jones and Barlett Publishers Sudbury, Massachusetts

10. Schlenker D. E. and Roth L.S: William's Essentials of Nutrition and Diet Therapy 10th Edition Elesvier MOSBY

Session: 2025-26			
Part A– Introduction			
Name of Programme	M.Sc. Home Science (Food Nutrition and Dietetics)		
Semester	**3**		
Name of the Course	**Pediatric Nutrition and Geriatric Nutrition**		
Course Code	M24-FND-308		
Course Type	DEC-2		
Level of the course	500-599		
Pre-requisite for the course (if any)	-		
Course Learning Outcomes (CLO) After completing this course, the learner will be able to:	CLO 1: Understand the role and importance of Peadiatric nutrition. CLO 2: Knowledge about the child Malnutrition and nutritional management of Childhood diseases. CLO 3: Gain knowledge about the Geriatric nutrition and age-related changes. CLO 4: Understand the role of nutrition in preventing and managing age related disorder and diseases		
Credits	Theory	Practical	Total
	4	0	4
Teaching Hours per week	4	0	4
Internal Assessment Marks	30	0	30
End Term Exam Marks	70	0	70
Max. Marks	100	0	100
Examination Time	3 hours		

Part B-Contents of the Course

Instructions for Paper- Setter: The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes (CLOs) into consideration. The compulsory question (Question No. 1) will consist at least 4 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question. All questions will carry equal marks.

Unit	Topics	Contact Hours
I	**Introduction to Pediatric Nutrition** • Composition of Human Milk, prelacteal feeds, duration of breastfeeding, advantages of breast feeding, types of Infant formulas. • Complementary or weaning feeding, issues and concerns. • Growth, development and body composition from infancy, preschool, childhood, puberty and adolescence. • WHO Growth Standards and classification (Z-scores) • Preterm/ VLBW infants – Complications	15
II	**Child Malnutrition**: • Undernutrition in childhood – PEM, FTT, SAM, Fe deficiency, Vitamin A deficiency – causes, consequences and nutritional management • Over-nutrition - causes, consequences and nutritional management. • Nutritional Management of Inborn Errors of Metabolism – PKU, Maple syrup urine disease, Homocystinemia, Tyrosinemia, Galactosemia. • Role of diet and nutritional challenges in developmental disabilities- autism spectrum disorders, cerebral palsy, Down syndrome etc. • Pediatric diabetes (type 1) – Impact on growth and development • Food Allergies (milk allergy, lactose intolerance, celiac disease and gluten free diets)	15

III	**Geriatric Nutrition** **Definition, importance, Goals, Challenges and key Principles of Geriatric Nutrition** • **Changes associated with Ageing process** o Cellular aspects of ageing o Physiological changes: body composition, gastrointestinal, cardiac, respiratory, renal, muscular, skeletal, neural(including brain and spinal cord), endocrine and metabolic, changes and impact on health and nutritional status. • **Age-Related Physiological Changes Affecting Nutrition** o Decreased appetite and taste changes o Dentition problems (e.g., missing teeth, ill-fitting dentures) o Digestive issues (e.g., decreased gastric acid, constipation) o Slower metabolism and reduced physical activity	15
IV	**Age-Related Disorders and Nutrition** • Nutritional and health status of elderly: Factors influencing food consumption and nutritional status of elderly, Undernutrition in the Elderly – risk factors. • Common diseases in elderly: Etiopathogenesis, manifestations and interventions – Gastrointestinal disturbances, cardiac, renal, respiratory diseases, mental changes including depression, dementia, Parkinson's, Alzheimer's, bone and muscle related abnormalities, Sarcopenia, frailty and Polypharmacy. • **Special Diets in Geriatrics** o Texture-modified diets for dysphagia o Low-sodium, low-fat, diabetic diets o High-protein diets for muscle maintenance o Nutrient-dense snacks and fortified foods	15
	Total Contact Hours	60

Suggested Evaluation Methods

Internal Assessment: 30		**End Term Examination: 70**	
➢ **Theory**	**30**	➢ **Theory:**	**70**
• Class Participation:	5	Written Examination	
• Seminar/presentation/assignment/quiz/class test etc.:	10		
• Mid-Term Exam:	15		

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1.Passmore P, and M.A. East Wood: Human Nutrition and Dietetics, Churchill Living Stone

2. Antia F.P.and Philip Abraham (2001) Clinical Nutrition and Dietetics, Oxford Publishing Company

3.WohlShils and Goodheart: Modern Nutrition in Health and Disease, McLaren and Ubrman, Philadelphia

4. Stanfield S. P. and Hui Y.H: Nutrition and Diet Therapy14th Edition Jones and Barlett Publishers Sudbury, Massachusetts

5. Schlenker D. E. and Roth L.S: William's Essentials of Nutrition and Diet Therapy 10th Edition Elesvier MOSBY

6. Passmore P, and M.A. East Wood: Human Nutrition and Dietetics, Churchill Living Stone

7. Antia F.P.and Philip Abraham (2001) Clinical Nutrition and Dietetics, Oxford Publishing Company

8. WohlShils and Goodheart: Modern Nutrition in Health and Disease, McLaren and Ubrman, Philadelphia

9. Stanfield S. P. and Hui Y.H: Nutrition and Diet Therapy14th Edition Jones and Barlett Publishers Sudbury, Massachusetts

10. Schlenker D. E. and Roth L.S: William's Essentials of Nutrition and Diet Therapy 10th Edition Elesvier MOSBY

Session: 2025-26			
Part A– Introduction			
Name of Programme	M.Sc. Home Science (Food Nutrition and Dietetics)		
Semester	**3**		
Name of the Course	**Nutrition in Critical Care**		
Course Code	**M24-FND-309**		
Course Type	DEC-2		
Level of the course	500-599		
Pre-requisite for the course (if any)	-		
Course Learning Outcomes (CLO) After completing this course, the learner will be able to:	CLO 1: Understand the Critical illnesses and its metabolism. CLO 2: Knowledge about the importance and care in Enteral Nutrition. CLO 3: Gain knowledge about the Parenteral nutrition in critical Care. CLO 4: Understand the Assessment of nutritional status in critically ill patients		
Credits	Theory	Practical	Total
	4	0	4
Teaching Hours per week	4	0	4
Internal Assessment Marks	30	0	30
End Term Exam Marks	70	0	70
Max. Marks	100	0	100
Examination Time	3 hours		

Part B-Contents of the Course

Instructions for Paper- Setter: The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes (CLOs) into consideration. The compulsory question (Question No. 1) will consist at least 4 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question. All questions will carry equal marks.

Unit	Topics	Contact Hours
I	• **Introduction to Critical Illness and Metabolism** o Stress response and metabolic changes (ebb, flow and anabolism phases) o Hypermetabolic, hypercatabolic state and inflammatory response o Role of nutrition in modulating the immune response o Immunonutrition (glutamine, arginine, omega-3 fatty acids) o Role of Immune Enhancers in Clinical Nutrition	15
II	• **Enteral Nutrition** o Various sites for Enteral nutrition o Routes: nasogastric, nasojejunal, PEG, PEJ o Types of formulas: standard, peptide-based, disease-specific o Feeding techniques: continuous, cyclic, bolus o Monitoring tolerance: gastric residual volumes, bowel function o Complications: aspiration, diarrhea, tube dislodgement	15
III	• **Total Parental Nutrition:**	15

	○ The importance of TPN ○ Total vs partial parenteral nutrition ○ Central vs peripheral PN ○ Components: dextrose, amino acids, lipids, electrolytes, vitamins ○ Long term effects of its use and complications including refeeding syndrome and infection.	
IV	• **Assessment of Nutritional Status in Critically Ill Patients** ○ Nutrition Risk Screening (NRS-2002, NUTRIC score) ○ Subjective Global Assessment (SGA) ○ Anthropometric, biochemical, and clinical assessment ○ Challenges of assessment in ICU (fluid shifts, inflammation) ○ Diet related ethical issues in the critical illnesses	15
	Total Contact Hours	60

Suggested Evaluation Methods

Internal Assessment: 30		**End Term Examination: 70**	
➢ **Theory**	**30**	➢ **Theory:**	**70**
• Class Participation:	5	Written Examination	
• Seminar/presentation/assignment/quiz/class test etc.:	10		
• Mid-Term Exam:	15		

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Passmore P, and M.A. East Wood: Human Nutrition and Dietetics, Churchill Living Stone
2. Antia F.P.and Philip Abraham (2001) Clinical Nutrition and Dietetics, Oxford Publishing Company
3. WohlShils and Goodheart: Modern Nutrition in Health and Disease, McLaren and Ubrman, Philadelphia
4. Stanfield S. P. and Hui Y.H: Nutrition and Diet Therapy14th Edition Jones and Barlett Publishers Sudbury, Massachusetts
5. Schlenker D. E. and Roth L.S: William's Essentials of Nutrition and Diet Therapy 10th Edition Elesvier MOSBY

Session: 2025-26			
Part A–Introduction			
Name of Programme	M.Sc. Home Science (Food Nutrition and Dietetics)		
Semester	**3**		
Name of the Course	Nutritional Management		
Course Code	M24-FND-310		
Course Type	DEC-2		
Level of the course	500-599		
Pre-requisite for the course (if any)	-		
Course Learning Outcomes (CLO) After completing this course, the learner will be able to:	CLO 1: Understand the principles of nutritional science in health and disease. CLO 2: Assess nutritional needs in individuals and populations. CLO 3:Plan and implement dietary interventions for prevention and management of various health conditions. CLO 4: Integrate current research and guidelines into nutritional practice.:		
Credits	Theory	Practical	Total
	4	0	4
Teaching Hours per week	4	0	4
Internal Assessment Marks	30	0	30
End Term Exam Marks	70	0	70
Max. Marks	100	0	100
Examination Time	3 hours		

Part B-Contents of the Course

Instructions for Paper- Setter: The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes (CLOs) into consideration. The compulsory question (Question No. 1) will consist at least 4 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question. All questions will carry equal marks.

Unit	Topics	Contact Hours
I	• Definition, Meaning, scope and interdisciplinary approach of nutritional management. • Brain structure, neurotransmitters, and their nutrient co-factors • Gut-brain axis: micro biota–neurotransmitter link • Role of macronutrients in brain function-Carbohydrates and glucose metabolism in the brain • Protein quality, amino acids (tryptophan, tyrosine, glutamine) in neurotransmitter synthesis • Essential fatty acids (Omega-3, Omega-6) and neuronal membrane integrity. • Micronutrients for brain function - B vitamins (B1, B6, B12, folate) neurotransmitter formation • Minerals (iron, zinc, magnesium, selenium) in cognitive function • Antioxidants (vitamin C, vitamin E, carotenoids, polyphenols) and oxidative stress control.	15
II	• Blood–brain barrier and nutrient transport	

	• Dietary approach for - Depression & Anxiety Disorders- Role of serotonin precursors and micronutrients -Anti-inflammatory dietary patterns. • Schizophrenia & Bipolar Disorder -Glycemic control, omega-3 fatty acids, antioxidant therapy • Weight management in behavioral eating disorder antipsychotic patients • Neurodevelopment Disorders (ADHD, Autism- Elimination diets, micronutrient optimization, gut micro biota modulation • Neurodegenerative Disorders (Alzheimer's, Parkinson's- Antioxidants, anti-inflammatory foods, ketogenic interventions • Epilepsy- Ketogenic and modified Atkins diets • Micronutrient supplementation for antiepileptic drug side effect.	15
III	• Nutritional Needs in calamites and emergencies: o Assessing nutritional needs based on population demographics and crisis impact. o Importance of micronutrients in emergency diets. • Nutrition Interventions: o Emergency feeding strategies: general food distributions and targeted supplementary feeding. o Therapeutic foods for treating acute malnutrition. • Challenges and Solutions: o Cultural considerations in food distribution. o Monitoring and evaluating nutrition interventions in emergencies.	15
IV	• Microgravity effects- changes in metabolism, bone density, and muscle mass. • Macronutrient and micronutrient requirements in space • Classification of space food, Food selection, preparation, procession of food for space flight and serving food • Meal planning –strategies for long-duration missions. • Managing food intake- techniques for ensuring adequate nutrition in microgravity. • Mitigating nutrient deficiencies in space-strategies to prevent deficiencies.	15
	Total Contact Hours	60

Suggested Evaluation Methods

Internal Assessment: 30		**End Term Examination: 70**	
➢ **Theory**	**30**	➢ **Theory:**	**70**
• Class Participation:	5	Written Examination	
• Seminar/presentation/assignment/quiz/class test etc.:	10		
• Mid-Term Exam:	15		

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Passmore P, and M.A. East Wood: Human Nutrition and Dietetics, Churchill Living Stone
2. Antia F.P.and Philip Abraham (2001) Clinical Nutrition and Dietetics, Oxford Publishing Company
3. WohlShils and Goodheart: Modern Nutrition in Health and Disease, McLaren and Ubrman, Philadelphia
4. Stanfield S. P. and Hui Y.H: Nutrition and Diet Therapy14th Edition Jones and Barlett Publishers Sudbury, Massachusetts
5. Schlenker D. E. and Roth L.S: William's Essentials of Nutrition and Diet Therapy 10th Edition Elesvier MOSBY

Session: 2025-26			
Part A – Introduction			
Name of the Programme	M.Sc. Home Science (Food Nutrition & Dietetics)		
Semester	**3**		
Name of the Course	**Clinical Nutrition & Dietetics II**		
Course Code	M24-FND-311		
Course Type	PC-5		
Level of the course	500-599		
Pre-requisite for the course (if any)	-		
Course Learning Outcomes (CLO) After completing this course, the learner will be able to:	CLO 1: Plan, calculate and prepare therapeutic diets for various disorders. CLO 2: Know about commercial nutritional supplements available in market. CLO 3:.Develop skills in preparing teaching aids for the diagnosis of different diseases. CLO 4: Develop skill of doing market survey of commercial nutritional supplements.		
Credits	Theory	Practical	Total
	0	4	4
Teaching Hours per week	0	8	8
Internal Assessment Marks	0	30	30
End Term Exam Marks	0	70	70
Max. Marks	0	100	100
Examination Time	0	4 hours (or as decided by PGBOS)	

Part B- Contents of the Course

	Practicals	**Contact Hours**
	Syllabus/ List of Practical **1. Clinical Nutrition & Dietetics** 1.1 Planning, Calculation, Preparation, serving and evaluation of therapeutic diets for diseases covered in theory. 1.2 Preparation of diet counselling aids for common disorders. 1.3 Market survey of the following products: • Food Supplements • Commercial nutritional Supplements • Disease specific foods 1.4 Formulation of therapeutic diets emphasizing fat and energy modification, sodium & potassium restriction and hypocaloric diets for Obesity.	120

Suggested Evaluation Methods

Internal Assessment: 30		**End Term Examination: 70**	
➢ **Practicum**	**30**	➢ **Practicum**	**70**
• Class Participation:	5	Lab record, Viva-Voce, write-up and execution of the practical	
• Seminar/Demonstration/Viva-voce/Lab records etc.:	10		
• Mid-Term Exam:	15		

Part C-Learning Resources

Recommended Books/e-resources/LMS:

1. Gopalan C., Ram Sastri B.V. and BalaSubramaniam S.C., (2006) Nutritive Value of Indian Foods, Hydrabad, National Institute of Nutrition, Indian Council of Medical Research
2. Longvah T., Ananthan R., Bhaskarachary K. and Venkaiah K. (2017): Indian Food Composition Tables, National Institute of Nutrition, Indian Council of Medical Research, Hydrabad, Telangana (India)
3. Nutrient Requirements for Indians, Recommended Dietary Allowances And Estimated Average Requirements-2020, ICMR-NIN

Session: 2025-26			
Part A – Introduction			
Name of the Programme	M.Sc. Home Science (Food Nutrition & Dietetics)		
Semester	**3**		
Name of the Course	**Public Health Nutrition- II**		
Course Code	M24-FND-312		
Course Type	PC-6		
Level of the course	500-599		
Pre-requisite for the course (if any)	-		
Course Learning Outcomes (CLO) After completing this course, the learner will be able to:	CLO 1: Understand the concept & purpose of Nutritional status assessment in community sitting. CLO 2: Be familiar with standard methods & Techniques for assessing nutritional status CLO 3: Gain knowledge on the basis of education communication strategies for improvement of Nutritional status. CLO 4: Student will be able to communicate Nutritional information effectively audiences.		
Credits	Theory	Practical	Total
	0	4	4
Teaching Hours per week	0	8	8
Internal Assessment Marks	0	30	30
End Term Exam Marks	0	70	70
Max. Marks	0	100	100
Examination Time	0	4 hours (or as decided by PGBOS)	

Part B- Contents of the Course

	Practicals	**Contact Hours**
	Syllabus/ List of Practical ➢ Assessment of nutritional status of community by using anthropometric, dietary measurement. (Report to be submitted in the practical exam) ➢ Preparation of visual aids for addressing public health nutrition in the community: • charts/ posters • Pamphlets/ brochures • Nutritional games/ nutritional stories Nutrition ➢ Preparation and effective use of aids for improving Nutritional status.	120

Suggested Evaluation Methods

Internal Assessment: 30		**End Term Examination: 70**	
➢ **Practicum**	**30**	➢ **Practicum**	**70**
• Class Participation:	5	Lab record, Viva-Voce, write-up and execution of the practical	
• Seminar/Demonstration/Viva-voce/Lab records etc.:	10		
• Mid-Term Exam:	15		

Part C-Learning Resources

Session: 2025-26			
Part A - Introduction			
Name of Programme	M. Sc. Home Science (Food Nutrition & Dietetics)		
Semester	**3**		
Name of the Course	**Nutrition for Holistic Health**		
Course Code	M24- OEC-322		
Course Type	OEC		
Level of the course	500-599		
Pre-requisite for the course (if any)	-		
Course Learning Outcomes (CLO) After completing this course, the learner will be able to:	CLO 1: Importance of macro nutrients in maintaining good health CLO 2: Familiarize with the micro nutrients of food group system CLO 3: Impart knowledge on food groups and meal Planning. CLO4. Gain knowledge about balanced diet and therapeutic diet.		
Credits	Theory	Practical	Total
	2	0	2
Teaching Hours per week	2	0	2
Internal Assessment Marks	15	0	15
End Term Exam Marks	35	0	35
Max. Marks	50	0	50
Examination Time	3 hours		

Part B- Contents of the Course

Instructions for Paper- Setter: The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes (CLOs) into consideration. The compulsory question (Question No. 1) will consist at least 4 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question. All questions will carry equal marks.

Unit	Topics	Contact Hours
I	**Food:** Functions of food and classification. • **Essential food constituents**: o Carbohydrates o Proteins o Fats **Fiber**: Role of fiber in human nutrition.	8
II	**Dietary sources, functions, daily allowances, deficiency and excess of following:** o **Vitamin**: A, D, E, K, B1, B2, B3, B12, C o **Minerals**: Calcium, iron, iodine, sodium, potassium. • **Functions of water in the body.**	8
III	• Food groups • Food Pyramid • Meal Planning: Meaning and introduction • Principles of meal planning, factors affecting it.	7
IV	• My food plate • Balanced diet, its concept and points to be considered while planning a balanced diet.	7

	• Therapeutic diet and its diets and principals	
		Total Contact Hours 30

Suggested Evaluation Methods			
Internal Assessment: 15		**End Term Examination: 35**	
➢ **Theory**	**15**	➢ **Theory:**	**35**
• Class Participation:	4	Written Examination	
• Seminar/presentation/assignment/quiz/class test etc.:	4		
• Mid-Term Exam:	7		

Part C-Learning Resources

Recommended Books/e-resources/LMS:

4. B. Shrilakshmi, (2007): Dietetics, published by K.K Gupta for New Age International Pvt. Ltd. New Delhi
6. Passmore P, and M.A. East Wood: Human Nutrition and Dietetics, Churchill Living Stone
7. Antia F.P.and Philip Abraham (2001) Clinical Nutrition and Dietetics, Oxford Publishing Company
8. WohlShils and Goodheart: Modern Nutrition in Health and Disease, McLaren and Ubrman, Philadelphia
9. Stanfield S. P. and Hui Y.H: Nutrition and Diet Therapy14th Edition Jones and Barlett Publishers Sudbury, Massachusetts