M.Sc. (2 years course) in Clinical Nutrition & Dietetics

Out Line of the Syllabus (Semester System)

1st Semester	**F.M-300**	Theoretical-200	Practical-100
Course No.: 111-116		Course No. : 111-114	Course No.: 115-116
2nd Semester	**F.M-300**	Theoretical-200	Practical-100
Course No.: 121-126		Course No.: 121-124	Course No.: 125-126
3rd Semester	**F.M-300**	Theoretical-200	Practical-100
Course No.: 231-236		Course No.: 231-234	Course No.: 235-236
4th Semester	**F.M-300**	Theoretical-200	Practical-100
Course No.: 241-246		Course No.: 241-244	Course No.: 245-246

Theoretical Marks = 800

Practical Marks = 400

Total Marks = 1200

1200 Marks = 120 Credits

1 Credit = 10 hrs. (10 Marks)

Explanation of Course Number

1st digit indicates 1st year or 2nd year of M.Sc. Programme

2nd digit indicates Semester Number

3rd digit indicates Paper Number

Example: 236

2 → 2nd Year Course

3 → 3rd Semester

6 → 6th Paper

Each Semester will cover 300 marks (Theoretical 200 and Practical 100 marks), 30 credits

1 Credit = 10 hrs (10 marks)

Sem. No.	Course No.	Title of the course	Theory in hrs.	Practical in hrs.	Credit	Marks allotted		Total marks
						E.E. Weight	I.E. Weight	
1st	111	Nutritional Physiology including Metabolism in Diseases	50	-	5	40	10	50
	112	Nutritional Biochemistry	50	-	5	40	10	50
	113	Research Methodology	50	-	5	40	10	50
	114	Methods of Investigation including Nanotechnology	50	-	5	40	10	50
	115	Nutritional Physiology and Biochemistry	-	50	5	40	10	50
	116	Biometric assessment of Nutritional status	-	50	5	40	10	50
Total			**200**	**100**	**30**	**240**	**60**	**300**

Sem. No.	Course No.	Title of the course	Theory in hrs.	Practical in hrs.	Credit	Marks allotted		Total marks
						E.E. Weight	I.E. Weight	
2nd	121	Statistics and Computer application	50	-	5	40	10	50
	122	Functional foods and Nutraceutical including GM food	50	-	5	40	10	50
	123	Nutritional education, Counseling and Entrepreneurial development	50	-	5	40	10	50
	124	Nutritional policy & Programme for public health including emergencies and disaster management	50	-	5	40	10	50
	125	Statistics and Computer application	-	50	5	40	10	50
	126	Public health and nutritional status assessment (Assignment programme) and Review work	-	50	5	40	10	50
Total			**200**	**100**	**30**	**240**	**60**	**300**

Each Semester will cover 300 marks (Theoretical 200 and Practical 100 marks), 30 credits

1 Credit = 10 hrs (10 marks)

Sem. No.	Course No.	Title of the course	Theory in hrs.	Practical in hrs.	Credit	Marks allotted		Total marks
						E.E. Weight	I.E. Weight	
3rd	231	Nutritional Genomics, Proteomics and Metabolomics	50	-	5	40	10	50
	232	Drug-Nutrient interaction and Food service management	50	-	5	40	10	50
	233	Dietary management of diseases – Part I	50	-	5	40	10	50
	234	Dietary management of diseases – Part II	50	-	5	40	10	50
	235	Nutritional Proteomics, Genomics and Metabolomics	-	50	5	40	10	50
	236	Therapeutic diet chart preparation for diseases-Part-I & Part II	-	50	5	40	10	50
Total			**200**	**100**	**30**	**240**	**60**	**300**

Sem. No.	Course No.	Title of the course	Theory in hrs.	Practical in hrs.	Credit	Marks allotted		Total marks
						E.E. Weight	I.E. Weight	
4th	241	Food microbiology and Food preservation	50	-	5	40	10	50
	242	Pediatric and Geriatric nutrition with nutrition in critical care	50	-	5	40	10	50
	243	Dietary management of diseases – Part III	50	-	5	40	10	50
	244	Dietary management of diseases – Part IV	50	-	5	40	10	50
	245	Therapeutic diet chart preparation for diseases-Part-III & Part IV	-	50	5	40	10	50
	246	Thesis work and hospital training (2 months)	-	50	5	40	10	50
Total			**200**	**100**	**30**	**240**	**60**	**300**

NUTRITIONAL PHYSIOLOGY INCLUDING METABOLISM IN DISEASES
(Course No. – 111)

Objectives of this course are:

1. Focus the relationship between physiological process for normal growth and development.
2. Highlight the regulatory biomolecules for cellular metabolism by signaling transduction.
3. Reflects the role of nutrients for the maintenance of physiological systems & physical activity.

Course No.	Subject	Theory in hrs.	Credit	Mark		Total
				E.E.W	I.E.W	
111	**Nutritional Physiology including Metabolism in Diseases**	**50**	**5**	**40**	**10**	**50**

1 Lecture – 1 hour
10 Marks – 1 credit

Block No.	Topic in Details	No. of Lectures	% Weightage
1.	Growth and Development		
	1.1 General concept of Intra uterine growth & Infertile growth, Growth regulation	3	6
	1.2 Pubertal growth – Growth regulator	2	4
	1.3 Development of different phases of life cycle	2	4
	1.4 Growth chart & Growth monitoring, Growth markers	2	4
2.	Endocrine & Metabolism		
	2.1 Hormone receptor – Signal transduction, Nongenomic and genomic cAMP path, Tyrosine kinase, DAG, MAP kinase, IP_3	5	10
	2.2 Glycemic indices, Role of hormones	2	4
	2.3 Lipid Metabolism – Role of hormones	2	4
	2.4 Protein Metabolism – Role of hormones	2	4
3.	Nutrients & Cardiovascular activities including Pathophysiology		
	3.1 Biogenesis of cardiovascular activities like TG, TC, HDL, LDL & VLDL	2	4
	3.2 Atherosclerosis, Role of nutrients for its protection	2	4
	3.3 Role of PUFA & MUFA on cardiovascular disease	2	4

NUTRITIONAL BIOCHEMISTRY
(Course No. – 112)

This course will enable the students to:

1. Enrich the knowledge of biochemistry acquired at the undergraduate level.
2. Clear the mechanisms of metabolic pathway running in human body.
3. Focus the nutritional disorders and imbalances of macro and micro nutrients.

Course No.	Subject	Theory in hrs.	Credit	Mark		Total
				E.E.W	I.E.W	
112	Nutritional Biochemistry	50	5	40	10	50

1 Lecture – 1 hour
10 Marks – 1 credit

Block No.	Topic in Details	No. of Lectures	% Weightage
1.	Membrane structure, Transport of metabolites across membrane	2	4
2.	Acid-base balance and its regulation	1	2
3.	Carbohydrate metabolism		
	3.1 Pathway of glycolysis & its regulation, Energetics & Role of hormone	1	2
	3.2 Pathway of TCA cycle & its regulation, Energetics & Role of hormone	1	2
	3.3 Glycogen metabolism & its regulation, Energetics & Role of hormones	1	2
	3.4 HMP Shunt pathway & its regulation	1	2
	3.5 Protein sparing action of carbohydrate	1	2
	3.6 Inborn error of carbohydrate metabolism (galactosemia)	1	2
	3.7 Glycoprotein & Proteoglycan	1	2
4.	Protein Metabolism		
	4.1 Deamination, Transamination & Transmethylation	1	2
	4.2 Urea cycle	1	2
	4.3 Protein structure	1	2
	4.4 Inborn error of amino acid metabolism	1	2
5.	Lipid Metabolism		
	5.1 Fatty acid synthesis	1	2
	5.2 Lipoprotein synthesis	1	2
	5.3 β–oxidation & ω–oxidation	1	2
	5.4 Forward cholesterol transportation (LDL & VLDL), Reverse cholesterol transportation (HDL)	2	4
	5.5 Disorders of lipid metabolism, Dyslipidemia & Lipid storage disease	1	2
	5.6 Ketosis & Ketone body metabolism	1	2

8. Nelson, D.L. and Cox, M.M. (2000): 3rd Ed. Lehninger's Principles of Biochemistry, Macmillan Worth Publishers.

9. Devlin, T.M. (1997): 4th Ed. Text book of Biochemistry with Clinical Correlations, Wiley Liss Inc

10. Stryer, L. (1998): 4th Ed. Biochemistry, WH Freeman and Co.

11. Conn, E.E., Stumpf, P.K., Bruening, G. and Doi, R.H. (2001): 5th Ed. Outlines of Biochemistry, John Wiley and Sons.

12. Voet, D. Voet, J.G. and Pratt, C.W. (1999). Fundamentals of Biochemistry.

13. Tietz, N.W. (1976) Fundamentals of Clinical Chemistry. WB Saunders Co.

14. King, E.J. and Wootton, I.D.P. (1956). 3rd ed. Micro-Analysis in Medical Biochemistry. J and A Churchill Ltd.

15. Plummer, D.T. (1987). 3rd ed. An Introduction to Practical Biochemistry. McGraw-Hill Book Co.

5.	Qualitative research in food and nutrition- 5.1 Type of quality of research 5.2 Tools 5.3 Techniques and methodology 5.4 Rapid assessment procedure 5.5 Project reorientation and evaluation	 1 1 1 1 2	 2 2 2 2 4
6.	Quantitative research method- 6.1 Theory and design in quantitative research 6.2 Definition and quantitative research 6.3 Methods and techniques of data collection 6.4 Group discussion 6.5 Interviews: key information, in depth interview	 2 2 2 1 1	 4 4 4 2 2
7.	7.1 Critical analysis of research 7.2 Writing a research proposal 7.3 Analysis of data and research report	1 1 2	2 2 4
8.	8.1 Ethics in research.	2	4
Total		**50**	**100%**

LIST OF REFERENCE TEXT BOOKS

1. Methodology and Techniques of Social Research. Bandarkar P.L., Wilkinson T.S. Himalaya Publishing House, 2000.

2. Theory and Practice in Social Research. Hans Raj Surjit Publications. New Delhi.

3. Methodology of Research in Social Sciences. Krishnassamy O.R. Himalaya Publishing House.

4. Research Methods in extension Education. Sumati M and Sabarathanam V.E. New Delhi.

5. Basis of Qualitative Research. Strann A and Corbin J Grohnded Theory Procedures and Techniques.

6. Gupta, S. (2001) "Research Methodology and Statistical Techniques", Deep and Deep, New Delhi,

7. Hooda, R.P. (2003) "Statistics for Business and Economics", 3rd ed.,Macmillan India Ltd., Delhi.

8. Dey, B.R. (2005) "Textbook of Managerial Statistics", Macmillan India Ltd., Delhi,

9. Fleming, M.C. & Nellis, Joseph G. (1997) "The Essence of Statistics for Business", Prentice-Hall of India, New Delhi,

4.	Electrophoresis- 4.1 Paper Electrophoresis 4.2 Gel Electrophoresis 4.3 Immuno Electrophoresis	 1 1 1	 2 2 2
5.	Bioassay – 5.1 Evaluation of active ingredient from different plant	1	2
6.	Use of Isotope- 6.1 Radioactive elements and study of Isotope. 6.2 Structure elucidation-UV, IR, NMR, GC-MS and their applications	 1 3	 2 6
7.	Immunological methods- 7.1 RIA 7.2 ELISA 7.3 CLIA 7.4 Immunohistological technique and Immune fluorescence technique	 1 1 1 2	 2 2 2 4
8.	Quantitative assay- 8.1 DNA 8.2 RNA and Protein 8.3 Nucleic acid study- PCR 8.4 RT-PCR 8.5 DNA probes 8.6 Hybridization techniques and ISEL study	 1 1 1 1 1 1	 2 2 2 2 2 2
9.	General concept of Nanotechnology	1	2
10.	Examining of biological process relating to metabolism by Nanotechnology due to limitation of sampling tissue	2	4
11.	Nutrition metabolism at atomic levels	1	2
12.	Nanotechnology: a tool for the food science	2	4
13.	Nanodevices for real time optical intercellular sensing	1	2
14.	Nanoscience for gene and protein expression	2	4
15.	Nanotecnology and sports supplement	2	4
16.	Nano dietotherapeutics	2	4
17.	Targeted delivery of Nutrients for optimization, role of Nanoscience	2	4
Total		**50**	**100%**

NUTRITIONAL PHYSIOLOGY AND BIOCHEMISTRY
(Course No. – 115)

Objectives of this course are:

1. Concept about the physical activity and nutritional status.
2. Knowledge gain about the nutritional status in relation with quantity of physiological biomolecules.
3. Idea about relationship between micronutrient and nutritional status.

Course No.	Subject	Practical in hrs.	Credit	Mark		Total
				E.E.W	I.E.W	
115	Nutritional Physiology and Biochemistry	50	5	40	10	50

1 Practical – 1 hour
10 Marks – 1 credit

Block No.	Topic in Details	No. of Practical class (hr.)	% Weightage
1.	Determination of -		
	1.1 Body mass index	2	4
	1.2 Arm circumference	2	4
	1.3 Head circumference	2	4
	1.4 Waist hip ratio	2	4
	1.5 BMR, anthropometric analysis of under nutrition and obesity	2	4
2.	Estimation of -		
	2.1 Plasma protein	2	4
	2.2 Plasma lactate	2	4
	2.3 Serum iron	2	4
	2.4 Serum calcium assessment	2	4
	2.5 Serum triglyceride	2	4
	2.6 Cholesterol	2	4
	2.7 Lipoprotein assessment	2	4
3.	Dialysis of Protein	4	8
4.	Estimation of -		
	4.1 Vitamin-A	3	6
	4.2 Vitamin C	3	6
	4.3 Vitamin- D	3	6
	4.4 Vitamin-E	3	6
	4.5 Vitamin-B_{12} & B_6 from food extract and from serum using spectroflurometer and spectrophotometer	6	12
5.	Plasma glucose assessment by enzymatic method	2	4
6.	Electrophoresis of protein	2	4
	Total	**50**	**100%**

BIOMETRIC ASSESSMENT OF NUTRITIONAL STATUS
(Course No. – 116)

Objectives of this course are:

1. Learn about the relationship between body physical parameters and nutritional status.
2. Concept about growth curve in relation with nutritional status.

Course No.	Subject	Practical in hrs.	Credit	Mark		Total
				E.E.W	I.E.W	
116	Biometric Assessment of Nutritional status	50	5	40	10	50

1 Practical – 1 hour
10 Marks – 1 credit

Block No.	Topic in Details	No. of Practical class (hr.)	% Weightage
1.	Weight for age, height for age, weight for height in preadolescence group in different communities and its comparison with reference value	10	20
2.	BMI, Mid upper circumference, head circumference, chest circumference of different age groups and comments on result	9	18
3.	Body fat assessment in different zone, skin fold thickness in different age group	7	14
4.	Resting energy expenditure from height, weight and others parameters	6	12
5.	Use of Laboratory data and its application on its nutritional status assessment.	6	12
6.	BMR computation using primary and secondary data	6	12
7.	Nutritional status assessment of pre school going children using growth curve	6	12
Total		**50**	**100%**

STATISTICS AND COMPUTER APPLICATION
(Course No. 121)

Objectives of this course are:

1. Learn to apply statistical methods for data analysis for both large and small samples
2. Knowledge generation about the interpretation of the results obtained from statistical analysis of data
3. Be able to summarize of the data and its tabular presentation or graphical (line diagram, bar diagram, pie diagram) using computer
4. Develop the competence about the use of statistical software package

Course No.	Subject	Theory in hrs.	Credit	Mark		Total
				E.E.W	I.E.W	
121	Statistics and Computer Application	50	5	40	10	50

1 Lecture – 1 hour
10 Marks – 1 credit

Block No.	Topic in Details	No. of Lectures	% Weightage
1.	1.1 Conceptual understanding of statistical measures	1	2
	1.2 Classification and tabulation	1	2
	1.3 Measurement of central tendency	2	4
	1.4 Measurement of variation	2	4
2.	2.1 Frequency distribution	1	2
	2.2 Histogram	1	2
	2.3 Frequency polygon	1	2
	2.4 Binomial distribution	1	2
	2.5 Normal distribution-use of probability table	1	2
3.	3.1 Parametric and nonparametric tests	1	2
	3.2 Testing of hypothesis- Type I and Type II errors	2	4
	3.3 Chi-square test	2	4
	3.4 Goodness of fit	1	2
	3.5 Application of student 't' test for samples	2	4
	3.6 Difference in proportion for mean and difference in means	2	4
4.	4.1Correlation	2	4
	4.2 Coefficient of correction and rank correlation	2	4
	4.3 Regression and prediction	1	2
	4.4 Analysis of variance-one way and two way classification	2	4

FUNCTIONAL FOODS AND NUTRACEUTICALS INCLUDING GM FOOD
(Course No. 122)

Objectives of this course are:

1. Gain knowledge about the effects of functional foods and nutraceuticals on health
2. Understand the application of various aspects of food science and product development in industry, which meet nutritional needs of consumers
3. Understand theoritical concepts about sensory evaluation of food.

Course No.	Subject	Theory in hrs.	Credit	Mark		Total
				E.E.W	I.E.W	
122	Functional foods and Nutraceutical including GM food	50	5	40	10	50

1 Lecture – 1 hour
10 Marks – 1 credit

Block No.	Topic in Details	No. of Lectures	% Weightage
1.	1.1 Probiotics and Symbiotics concept, nutrient Vs. non nutrients	2	4
	1.2 Important features of probiotic microorganisms	2	4
	1.3 Health effects of probiotics including mechanism of action	3	6
	1.4 Probiotics in fermented milk product and non milk products	2	4
	1.5 Quality assurance of probiotics and safety	2	4
2.	2.1 Prebiotics – Concept, chemistry sources, metabolism and bio availability	3	6
	2.2 Physiological effects of prebiotics, effects on human health and application in risk reduction of diseases	3	6
	2.3 Perspective for food applications for – Dietary fiber, resistant starch, gums, oligosaccharides	4	8
3.	3.1 Nutraceuticals with potential health benefit – definition, chemistry sources, metabolism and bio availability	3	6
	3.2 Physiological effects of Nutraceuticals, effects on human health and application in risk reduction of diseases	4	8
	3.3 Perspective for food applications for – Polyphenols like flavonoids, chatchins, tannins	3	6
	3.4 Phytoestrogens, phytosterols, pigments like lycopene, carcumin.	4	8

NUTRITIONAL EDUCATION, COUNSELING AND ENTREPRENEURIAL DEVELOPMENT
(Course No. 123)

Objectives of this course are:

1. Knowledge about the application of counseling methods on patients with different diseases
2. To understand the principles and methods of counseling
3. To promote entrepreneurship skills among students and to understand the importance with relevances of entrepreneurship
4. To understand the procedure for settlement of small enterprises / self employment schemes.

Course No.	Subject	Theory in hrs.	Credit	Mark		Total
				E.E.W	I.E.W	
123	**Nutritional education, Counseling and Entrepreneurial Development**	**50**	**5**	**40**	**10**	**50**

1 Lecture – 1 hour
10 Marks – 1 credit

Block No.	Topic in Details	No. of Lectures	% Weightage
1.	1.1 Importance and relevance of Information, Education and communication (IEC).	3	6
	1.2 Concept, type, process and media of communication.	4	8
	1.3 Interpersonal group and Mass communication.	4	8
	1.4 Family education. Patient education and Patient health.	3	6
2.	2.1 Introduction of counseling, existing trends in counseling services in India.	3	6
	2.2 Processes involved in counseling, supportive and behavioral Techniques in counseling,	3	6
	2.3 Cognitive and psychoanalytical techniques in counselling.	4	8
	2.4 Practical issues involved counseling, family counselling covering family planning counseling, abortion counselling, counseling for children and adolescents, geriatric counselling with specific diseases like HIV/AIDS, Cancer and Diabetes	8	16

NUTRITIONAL GENOMICS, PROTEOMICS AND METABOLOMICS
(Course No. 231)

Objectives of this course are:

1. Be familiar with various molecular biological techniques
2. Understand the effect of nutraceutical on gene expression, protein expression and enzyme kinetics
3. Learn the advantages for the application of these modern techniques in nutritional sciences over traditional techniques
4. Knowledge empowerment in clinical nutrition considering modification of gene expression by dietary ingredients

Course No.	Subject	Theory in hrs.	Credit	Mark		Total
				E.E.W	I.E.W	
231	Nutritional Genomics, Proteomics and Metabolomics	50	5	40	10	50

1 Lecture – 1 hour
10 Marks – 1 credit

Block No.	Topic in Details	No. of Lectures	% Weightage
1.	Fundamentals of DND- structure and function	1	2
2.	Fundamental of genetic engineering	2	4
3.	Fundamental of PCR, RTPCR and Q-PCR for gene expression	4	8
4.	Fundamental of bio-informatics- status of human genome project, protein information resources, genomic information resources, DNA sequence analysis	3	6
5.	5.1 Nutrient and Gene expression with special reference to vitamin and other macronutrient, 5.2 Role of nutrient and dilatory component in regulation of genome structure expression and stability.	3 2	6 4
6.	Role of individual nutrient requirement on genetic variation,	2	4
7.	7.1 Idea about nutriogenomics. Nutrition is only one player in the epigenetic repertoire, 7.2 Epigenetic effect of nutritional supplement to pregnant mother to regulate the undesirable gene expression of fetus like cancer, obesity and diabetes,	2 2	4 4

LIST OF REFERENCE TEXT BOOKS

1. Human Molecular Genetics. Tom trachan and Andrew P.Raed.Pub: Bios Scientific Publishers.
2. Essential Medical Genetics. Connor J.N, Ferguson-Smith M.A. Blackwell Scientific Publications, Oxford.
3. Human Cytogenetics: A Practical Approach. Rooney DE, Czepulkowski BH. IRL Press. Oxford.
4. Genomics and Proteomics in Nutrition. Berdanier, Nima Moustid-Moussa, Edited by Carolyn D. Berdanier Publisher: Marcel Dekker Inc.
5. Bioinformatics: Genes, Proteins and computer
6. Metabolomics: Methods and Protocols. By Wolfram Weckwerth (Editor), Pub: Human Press.
7. Metabolomics in Toxicity Assessment. By Donald G. Robertson (Editor), John Lindon (Editor), Jeremy K. Nicholson (Editor). Elaine Holmes (Editor), Pub: CRC group, Taylor and Francis.
8. The Handbook of Metabolomics. Editor: Lindon, John C, Nicholson, Jermy K., Editor: Holmes, Elaine, Pub: Elsvier Sc.

LIST OF REFERENCE TEXT BOOKS

1. Nutrient and gene interaction in Health and Disease. By Moustaid-moussa N, Berdanier C.D., CRC Press.
2. Genetics: The nutrition Connection. By De Burk, R.M. American Dietatic Association.
3. Food Medication Interaction. By Pronsky Z.M. Birchrunville.
4. Drug-induced Mutrient Depletion Handbook. By Pelton R., Lexi-company.
5. The science and practice of Pharmacology. By Tischio J.P., Mark Publishing Company.

LIST OF REFERENCE TEXT BOOKS

1. Mahan, L.K. and Escott-Stump, S. (2000): Krause's Food Nutrition and Diet Therapy, 10th Edition, W.B. Saunders Ltd.
2. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. (1999): Modern Nutrition in Health and Disease, 9th Edition, Williams and Wilkins.
3. Escott-Stump, S. (1998): Nutrition and Diagnosis Related Care, 4th Edition, Williams and Wilkins.
4. Garrow, J.S., James, W.P.T. and Ralph, A. (2000): Human Nutrition and Dietetics, 10th Edition, Churchill Livingstone.
5. Williams, S.R. (1993): Nutrition and Diet Therapy, 7th Edition, Times Mirror/Mosby College Publishing.
6. Davis, J. and Sherer, K. (1994): Applied Nutrition and Diet Therapy for Nurses, 2nd Edition, W.B. Saunders Co.
7. Walker, W.A. and Watkins, J.B. (Ed) (1985): Nutrition in Pediatrics, Boston, Little, Brown & Co.
8. Guyton, A.C. and Hall, J.E. (1999): Textbook of Medical Physiology, 9th Edition, W.B. Saunders Co.
9. Ritchie, A.C. (1990): Boyd's Textbook of Pathology, 9th Edition, Lea and Febiger, Philadelphia.
10. Fauci, S.A. et al (1998): Harrison's Principles of Internal Medicine, 14th Edition, McGraw Hill.
11. World Cancer Research Fund (1997). Food, Nutrition and the Prevention of Cancer- A Global perspective, Washington E.D. WCRF.

	1.8 Ulcer Epidemiology, Pathophysiology, Cause & dietary management	4	8
	1.9 Irritable Bowel Syndrome Epidemiology, Pathophysiology, Cause & dietary Management	4	8
	1.10 Colitis Epidemiology, Pathophysiology, Cause & dietary management	4	8
2.	Rheumatic diseases		
	2.1 Artharitis Epidemiology,Pathophysiology, Cause & dietary management	4	8
	2.2 Osteoarthritis Epidemiology, Pathophysiology, Cause & dietary management	3	6
	2.3 Lupas arthritomatosis Epidemiology, Pathophysiology, Cause & dietary management	3	6
Total		**50**	**100%**

LIST OF REFERENCE TEXT BOOKS

1. Williams, S.R. (1993): Nutrition and Diet Therapy, 7th Edition, Times Mirror/Mosby College Publishing.
2. Davis, J. and Sherer, K. (1994): Applied Nutrition and Diet Therapy for Nurses, 2nd Edition, W.B. Saunders Co.
3. Walker, W.A. and Watkins, J.B. (Ed) (1985): Nutrition in Pediatrics, Boston, Little, Brown & Co.
4. Guyton, A.C. and Hall, J.E. (1999): Textbook of Medical Physiology, 9th Edition, W.B. Saunders Co.
5. Ritchie, A.C. (1990): Boyd's Textbook of Pathology, 9th Edition, Lea and Febiger, Philadelphia.
6. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. (1999): Modern Nutrition in Health and Disease, 9th Edition, Williams and Wilkins.
7. Escott-Stump, S. (1998): Nutrition and Diagnosis Related Care, 4th Edition, Williams and Wilkins.

THERAPEUTIC DIET CHART PREPARATION FOR DISEASES PART I & PART II
(Course No. 236)

Objectives of this course are:

1. Learn the nutritional and dietary management of different diseases considering the severity and laboratory data
2. Critical care of individual disease along with focusing on drug-nutrient interaction

Course No.	Subject	Practical in hrs.	Credit	Mark		Total
				E.E.W	I.E.W	
236	Therapeutic Diet Chart Preparation For Disease Part I & Part II	50	5	40	10	50

1 Practical – 1 hour
10 Marks – 1 credit

Block No.	Topic in Details	No. of Practical class (hr.)	% Weightage
1.	Non communicable disease-		
	1.1 Therapeutic diet chart preparation for Diabetes, case specific	2	4
	1.2 Therapeutic diet chart preparation for Hypertension, case specific	2	4
	1.3 Therapeutic diet chart preparation for Hyperlipidemia case specific	2	4
	1.4 Therapeutic diet chart preparation for Atherosclerosis, case specific	2	4
	1.5 Therapeutic diet chart preparation for Nutritional anemia, case specific	2	4
	1.6 Therapeutic diet chart preparation for Cancer, case specific	2	4
	1.7 Therapeutic diet chart preparation for Constipation, case specific	2	4
	1.8 Therapeutic diet chart preparation for Food allergy, case specific	2	4
2.	Gastro Intestinal Diseases		
	2.1 Therapeutic diet chart preparation for Cholera, case specific	3	6
	2.2 Therapeutic diet chart preparation for Diarrhoea, case specific	3	6

FOOD MICROBIOLOGY AND FOOD PRESERVATION
(Course No. 241)

Objectives of this course are

1. To study about the microorganisms present in different food products
2. To study about the common organisms associated with food borne illness
3. Obtain knowledge about principle and methods of preservation

Course No.	Subject	Theory in hrs.	Credit	Mark		Total
				E.E.W	I.E.W	
241	Food Microbiology And Food Preservation	50	5	40	10	50

1 Lecture – 1 hour
10 Marks – 1 credit

Block No.	Topic in Details	No. of Lectures	% Weightage
1.	Fundamentals of Microbiology		
	1.1 Introduction, Development of microbiology and food sanitation	1	2
	1.2 Bacteria-morphology, reproduction, physiology, growth curve and biochemical changes in bacteria.	2	4
	1.3 Yeast-morphology, methods of multiplication, process of hybridization, physiology, classification and importance of yeast.	2	4
	1.4 Moulds-morphology, physiology and nutritional multiplication, significance of moulds and common household moulds.	2	4
	1.5 Viruses-discovery, morphology, reproduction, bacteriophages, human viral disease, identification and control and viruses in relation to food science.	2	4
2.	Denaturation of bacteria Sterilization: physical agents-light, desication, electricity and heat and Chemical agents,	1	2
3.	Microbiology of natural products		
	3.1 Water-sources, bacteriology of water supplies,	1	2
	3.2 Bacteriological examination and purification of water	1	2
4.	Microbiology of milk and milk products		
	4.1 Kinds of microorganisms in milk, sources of contamination, pathogens in milk, control of	2	4

17.	Food hygiene and quality control Food laws and quality control measures	2	4
18.	Food additives 18.1 Definition, their need, importance and safety evaluation, quality control and its importance. 18.2 Regulation of food additives.	2 1	4 2
19.	Toxicants in food	1	2
Total		**50**	**100%**

LIST OF REFERENCE TEXT BOOKS

1. Marian C Spears; Food Service Organisation; III Edition, Prentice Hall Inc., USA. 1995
2. Lendal. H. Kotschever, Richard Donnely, "Quantity Food Purchasing, Mac Millan Publishing Company, New York, IV Edition, 1993.
3. West and Woods, Introduction to Food Service, Macmillan Publishing Company, New York, 7 th edition, 1994.
4. Dubey and Maheswari, A Text Book of Food Microbiology. S Chand Company, Kolkata.
5. Mohini Sethi and Surjeet, M Malhan, "Catering Management an Integrated approach" , Wiley Eastern Limited, Mumbai, II edition.

4.	4.1 Nutrition in childhood; Growth and development; nutrient needs 4.2 Assessment of nutritional status of children 4.3 Providing an adequate diet – Factors affecting food intake. 4.4 Feeding the preschool child, the school – aged child	1 1 1	2 2 2
5.	Nutritional concerns – 5.5 Childhood obesity; Underweight and Undernutrition-shottern and longterm consequences in brief, Failure to thrive; 5.6 Growth faltering and detection Mineral and vitamin deficiencies 5.7 Dental caries 5.8 Allergies 5.9 Attention-deficit hyperactivity disorder	1 1 1 1 1	2 2 2 2 2
6.	Nurological disease in children i.e. epilepsy (ketogenic diets)	2	4
7.	Pulmonary disease in children, cystic fibrosis	2	4
8.	Geriatric Nutrition The ageing process-physiological, metabolic, body consumption changes and impact on health and nutritional status	2	4
9.	Socio-psychological aspects of ageing-special problems of elderly women	2	4
10.	Nutritional and health status of elderly. Factors influencing food and nutrient intake, health status including lifestyle pattern, medication, phychosocil aspect etc.	2	4
11.	Chronic degenerative disease and nutritional problems of the elderly-their etiopathogenesis, management, prevention and control	2	4
12.	Policies and programmes of the government and NGO sector pertaining of the elderly	2	4
13.	Critical care Nutritional screening and nutritional status assessment of the critically ill	2	4
14.	Nutritional support system and other life – saving measures for the critically ill	2	4
15.	Enteral and parenteral nutrition support. Role of immune enhancer, conditionally essential nutrients, immune suppressants, and special diets in critical care	3	6
16.	Complications of nutritional support system including refeeding syndrome and rehabilitation diets	2	4

13. Bagchi, K. & Puri, S. (Ed) (1999): Diet and Aging – Exploring Some Facets. Soc. For Gerontological Research, New Delhi and Help Age India, New Delhi.
14. Chaudhary, A. (Ed) (2001): Active Aging in the New Millennium, Pub. Anugraha, Delhi.
15. Shills, M.E., Olson, J.A., Shike, M. and Ross, A.C. (Ed) (1999): 9th Edition, Williams and Wilkins.
16. Sharma, O.P. (Ed.) (1999): Geriatric Care in India – Geriatrics and Gerontology: A Textbook, M/s. ANB Publishers.
17. Aiken, L.R. (1978): The Psychology of Later Life, Philadelphia WB Saunders Company.
18. Bergmann, Klaus (1972): Aged: Their Understanding and Care, London Wolfe Pub.
19. Binstock, R.H. and E. Shanes (eds) (1986): Handbook of Aging and Social Sciences V.N. Reinhold Co, New York,.
20. Bose, A.B. and K.D. Gangrade (1988): Aging in India: Problems and Potentialities, Abhinav Pub. , New Delhi
21. Desai, K.G. (1985): Problems of the Retired People in Greater Bombay, TISS, Series No. 27.
22. Ghosh, B. (1988): Contemporary Social Problems in India, Bombay, Himalaya Pub.
23. Pinkston, P.H. and N.K. Linsk (1984): Care of the Elderly: A family approach, New York, Pergamon Press.
24. Watson, R. R. (ed) (2000) Handbook of Nutrition in the Aged. 3rd edition. CRC Press. Boca Raton
25. Nutrition Screening Initiative (1991 and 1992). Nutrition Screening Manual for Professionals Caring for Older Americans. Washington, D.C. Green Margolis, Mitchell, Burns and Associates
26. Chernoff, R. (ed) (1991). Geriatric Nutrition: The Health Professionals' Handbook, Gaithersburg, MD: Aspen
27. The Nutrition Screening Initiative (1994). Incorporating Nutrition Screening and Interventions into Medical Practice: A Monograph for Physicians.
28. Watson, R.R. (ed) (1985) CRC Handbook of Vitamins in the Aged ERC Press, Boca Raton, Florida
29. Bock, G.R.; and Whelen, J. (eds) The Childhood Environment and Adult Disease. Chichester, U.K. Wiley
30. Berg, R.L. and Casells, J.S. (1990) The Second Fifty Years: Promoting Health and Preventing Disability. Washington E.C. National Academy Press.

	2.3 Respiratory failure Epidemiology, Pathophysiology, Cause & dietary management and critical care	6	12
	2.4 Tuberculosis Epidemiology, Pathophysiology, Cause & dietary management and critical care	5	10
Total		**50**	**100%**

LIST OF REFERENCE TEXT BOOKS

Reference Books are same as stated in the theoretical section of Course No. 233 & 234.

	Epidemiology, Pathophysiology, Cause & dietary management and critical care 1.9 Maple syrup urine disease- Epidemiology, Pathophysiology, Cause & dietary management and critical care	3	6
2.	Neural diseases 2.1 Parkinson disease Epidemiology, Pathophysiology, Cause & dietary management and critical care 2.2 Alzeimer's disease Epidemiology, Pathophysiology, Cause & dietary management and critical care 2.3 Angeleman disease Epidemiology, Pathophysiology, Cause & dietary management and critical care 2.4 Corea athotosis disease Epidemiology, Pathophysiology, Cause & dietary management and critical care 2.5 Lafora disease Epidemiology, Pathophysiology, Cause & dietary management and critical care 2.6 Huntington Corea disease Epidemiology, Pathophysiology, Cause & dietary management and critical care	3 3 3 3 3 3	6 6 6 6 6 6
Total		**50**	**100%**

LIST OF REFERENCE TEXT BOOKS

Reference Books are same as stated in the theoretical section of Course No. 233 & 234.

2.	Respiratory disease- 2.1 Therapeutic diet chart preparation for Asthama, case specific 2.2 Therapeutic diet chart preparation for Chronic obstructive pulmonary disease, case specific 2.3 Therapeutic diet chart preparation for Respiratory failure, case specific 2.4 Therapeutic diet chart preparation for Tuberculosis, case specific	 3 3 2 3	 6 6 4 6
3.	3.1 Therapeutic diet chart preparation for Inborn error of metabolism, case specific 3.2 Therapeutic diet chart preparation for HIV, case specific 3.3 Therapeutic diet chart preparation for Sepsis, case specific 3.4 Therapeutic diet chart preparation for Trauma, case specific 3.5 Therapeutic diet chart preparation for Burns, case specific 3.6 Therapeutic diet chart preparation for Phenyl ketonuria, case specific 3.7 Therapeutic diet chart preparation for Galactosemia, case specific 3.8 Therapeutic diet chart preparation for Glycogen storage disease, case specific 3.9 Therapeutic diet chart preparation for Maple syrup urine disease, case specific	3 3 2 2 3 3 3 3 3	6 6 4 4 6 6 6 6 6
Total		**50**	**100%**

LIST OF REFERENCE TEXT BOOKS

Reference Books are same as stated in the theoretical section of Course No. 233 & 234.