

SNDT Women's University
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Syllabus
Post Graduate Diploma in Dietetics



SNDT Women's University
1, Nathibai Thackersey Road,
Mumbai 400 020

Revised – 2015

Objectives:**This programme will enable:**

1. Students to develop as professionals with expertise in medical nutrition management/dietetics for services in hospitals and clinics
2. To develop capabilities to provided preventive and promotive care across the life cycle

Eligibility:

Students with minimum 50% marks or B grade who have BSc Foods and Nutrition, Food Science and Nutrition, Clinical Nutrition and Dietetics, Biochemistry, Life sciences, Applied Nutrition, Food Technology, Nutrition and Dietetics, Public Health and Nutrition, Physiology.

Semester I

Code No	Courses	Total credits	Th Cr	Pr Cr	Int Cr/ Marks	Ext Cr/ Marks	Total Marks	U/C
101001	Nutritional Biochemistry	4	4	-	2/50	2/50	100	U
101002	Physiology	4	4	-	2/50	2/50	100	U
101003	Medical Nutrition Therapy I-Th	4	4	-	2/50	2/50	100	U
101004	Medical Nutrition Therapy I-Pr	4	-	4	2/50	2/50	100	U
101005	Clinical Nutrition	4	4	-	2/50	2/50	100	C
101006	Hospital Organization, Personnel Management and Food Service Administration	4	4	-	2/50	2/50	100	U
	Total	24	20	4	12/300	12/300	600	

Semester II

Code No	Courses	Total credits	Th Cr	Pr Cr	Int Cr/ Marks	Ext Cr/ Marks	Total Marks	U/C
201001	Medical Nutrition Therapy II-Th	4	4	-	2/50	2/50	100	U
201002	Medical Nutrition Therapy II- Pr	4	-	4	2/50	2/50	100	U
201013 Or 201023	Catering Management Pr Applied Food Science and Product Modification	4	-	4	2/50	2/50	100	U
201004	Dietetic Techniques and Patient Counseling	4	1	3	2/50	2/50	100	U
201005	Pediatric Nutrition	4	2	2	2/50	2/50	100	U
201016 or 201026 or 201036	Geriatric Nutrition Public Nutrition Nutrition for Sports and Exercise	4	3	1	2/50	2/50	100	C
	Total	24	10	14	12/300	12/300	600	

Clinical Placement**Duration 4 months: May/June to September**

NUTRITIONAL BIOCHEMISTRY

4 Credits Theory

Objectives:

This course will enable the students to:

1. Augment the knowledge of biochemistry acquired at the undergraduate level
2. Understand the mechanisms adopted by the human body for regulation of metabolic pathways
3. Develop an insight into interrelationships between various metabolic pathways
4. Understand integration of cellular level metabolic events to nutritional disorders and imbalances.
5. Apply the knowledge for medical nutrition management in various disease conditions

Contents:

Module No	Topics and Details	Number of credits
1	<p>a. Membrane structure, composition and Transport of metabolites across membranes</p> <p>b. Acid base balance and its regulation</p> <p>c. Enzymes</p> <ul style="list-style-type: none">- Kinetics of monosubstrate and bisubstrate catalysed reactions (including inhibition)- Enzyme specificity, regulation of enzyme activity and synthesis- Enzymes in clinical diagnosis <p>d. Detoxification in the body-metabolism of xenobiotics (Phase I and Phase II enzymes)</p> <p>e. Cell Signaling : Overview of extracellular cell signaling, G protein couple receptors and their effectors, enzyme linked receptors and their effectors, second messengers, map kinase pathways</p> <p>f. Free radicals, ROS and oxidative damage</p> <p>g. Hormones – Mode of action and regulation of metabolism.</p>	2
2	<p>Review of :</p> <p>a. Carbohydrate Metabolism : Intestinal transport of</p>	1

	<p>carbohydrates, Transport of glucose across various cells, Cellular metabolism of carbohydrates Glycogen metabolism. Regulation of carbohydrate metabolism at substrate level, enzyme level, hormonal level and organ level, Disorders of carbohydrate metabolism. Definition, classification, structure and properties of glycoproteins and proteoglycans</p> <p>b. Metabolism of Lipids : Metabolism is to be discussed with reference to: Intestinal transport of lipids, Cellular uptake and metabolism of lipids (beta-oxidation, de novo synthesis of fatty acids, synthesis and breakdown of unsaturated fatty acids, cholesterol, phospholipids and triacylglycerol) Lipoprotein metabolism, VLDL and LDL ('Forward' Cholesterol transport) VLDL and LDL (Endogenous TAG transport), HDL ('Reverse' Cholesterol transport), Regulation of lipid metabolism at substrate level, enzyme level, hormonal level and organ level, Disorders of lipid metabolism, Dyslipidemias, Lipid storage diseases</p> <p>c. Protein Metabolism: Metabolism of amino acids- biosynthesis and catabolism - energy, glucose and ketone bodies, protein amino acids, non-protein amino acids (including urea cycle, transamination, one-carbon metabolism), Creatine and creatinine, Plasma proteins – Nature, properties and functions, Biologically active peptides, polypeptides and transport proteins, Inborn errors of amino acid metabolism</p> <p>d. Intermediary Metabolism: Review of regulation of intermediary metabolism- equilibrium and non-equilibrium reactions, committed steps, allosteric modifications, covalent modulation, hormonal induction and repression, cross-over theorem, starve-feed cycle, caloric homeostasis and futile cycles, Tricarboxylic acid cycle</p> <p>e. Biological Oxidation : Electron transport chain and oxidative phosphorylation</p>	
3	<p>Biochemical aspects of purine and pyrimidines</p> <p>a. Metabolism of purines</p> <p>b. Metabolism of pyrimidines</p> <p>c. Role of purine and pyrimidine nucleotides in metabolism.</p> <p>Biochemistry of Nucleic Acids</p>	1

	<ul style="list-style-type: none"> a. Metabolism of DNA b. Metabolism of RNAs c. DNA replication, mutation, repair and recombination concepts d. Disorders of nucleic acid metabolism <p>Protein Biosynthesis</p> <ul style="list-style-type: none"> a. Gene expression and its regulation, transcription, translation, post-translational modification b. Inhibitors of protein biosynthesis c. Gene expression in mitochondria d. Systems Biology including Metabolomics and Proteomics 	
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References:

1. Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2000): 25th Ed. Harpers Biochemistry. Macmillan Worth Publishers.
2. Nelson, D.L. and Cox, M.M. (2000): 3rd Ed. Lehninger's Principles of Biochemistry, Macmillan Worth Publishers.
3. Devlin, T.M. (1997): 4th Ed. Text book of Biochemistry with Clinical Correlations, Wiley Liss Inc
4. Stryer, L. (1998): 4th Ed. Biochemistry, WH Freeman and Co.
5. Conn, E.E., Stumpf, P.K., Bruening, G. and Doi, R.H. (2001): 5th Ed. Outlines of Biochemistry, John Wiley and Sons.
6. Voet, D. Voet, J.G. and Pratt, C.W. (1999). Fundamentals of Biochemistry.
7. Tietz, N.W. (1976) Fundamentals of Clinical Chemistry. WB Saunders Co.
8. King, E.J. and Wootton, I.D.P. (1956). 3rd ed. Micro-Analysis in Medical Biochemistry. J and A Churchill Ltd.
9. Plummer, D.T. (1987). 3rd ed. An Introduction to Practical Biochemistry. McGraw-Hill Book Co.

PHYSIOLOGY

4 credits Theory

Objectives:

This course will enable students to:

1. Advance their understanding of some of the relevant issues and topics of human physiology.
2. Understand the integrated functions of all systems and the grounding of nutritional science in Physiology.
3. Understand alterations of structure and function in various organs and systems in disease conditions.

Module No	Topics and Details	Number of credits
1	<p>Unit 1. Cell Structure Levels of cellular organization Types of cell organelles, tissues, organs and systems Regulation of cell Multiplication</p> <p>Unit 2. Tissues Structure, physiological properties and function of Epithelial tissue Structure, physiological properties and function of Muscle tissue Structure, physiological properties and function of Nervous tissue Structure, physiological properties and function of Skeletal tissue (bone and cartilage)</p> <p>Unit 3. Body Fluids Blood, Lymph, CSF, Ocular, Interstitial, Pleural, Pericardial and Synovial fluids Blood formation, composition, coagulation, factors affecting coagulation, hemostasis. Blood groups and histocompatibility, blood indices, Anemia.</p> <p>Unit 4. Biological Aspects of Immunity Innate, acquired and active immunity Cell mediated immunity Humoral immunity and complement system Tumor and transplantation. Auto immune disease Immune deficiency disorders Innate, acquired and active immunity, Cell mediated and humoral mediated immunity. Auto immune disease and Immune deficiency disorders.</p>	1
2	<p>Unit 1. Endocrine System Different endocrine glands and their major functions, synergistic and</p>	1

	<p>antagonistic hormones, chemical classification of hormones</p> <p>Hormone-Receptors, mode of action, second messenger system, negative feed back control.</p> <p>Unit 2. Gastrointestinal system and Hepato biliary system</p> <p>Structure, physiology and functions of different organs and role of hormones and enzymes</p> <p>Unit 3. Excretory System</p> <p>Components of Excretory System, Kidney: Structural and functional relation</p> <p>Urine formation</p> <p>Regulation of water balance, excreting dilute or concentrated urine</p> <p>Regulation of acid base balance</p>	
3	<p>Unit 1. Heart and Circulation</p> <p>Basic Structure, special junctional tissues, cardiac muscle properties</p> <p>Cardiac cycle, cardiac output, factors affecting cardiac output</p> <p>Normal ECG, heart failure</p> <p>Systematic, pulmonary, coronary and portal circulation</p> <p>Blood pressure, control and factors affecting blood pressure.</p> <p>Unit 2. Respiratory System</p> <p>Structural components of Respiratory System</p> <p>External and Internal respiration</p> <p>Mechanical control of respiration</p> <p>Chemical control of respiration</p> <p>Neural control of respiration</p>	1
4	<p>Unit 1: Brain and Nervous system central and autonomic nervous system, organization, Structure and properties of nerve, transmission of impulse , resting and action potential, Reflex action , reflex arc.</p> <p>Unit 2: Musculoskeletal system</p> <p>Unit 3: Reproductive System</p> <p>Unit 1. Female Reproductive System – Structure and function of Ovary, Uterus</p> <p>Unit 2. Hormonal control of menstrual cycle</p> <p>Unit 3. Male reproductive system – Structure and Function of Testis, hormonal control of spermatogenesis.</p>	

References:

1. West, J.B.: Best and Taylor's Physiological Basis of Medical Practice, 11th Edition.
2. Chatterjee, C.C. (2002): Human Physiology: Medical Allied Agency, Calcutta.
3. Guyton and Hall (2003): Test Book of Medical Physiology, 9th Edition, Prism Books Pvt. Ltd., W.B. Sanders Company, USA.
4. Tortora (2003) Principles of Anatomy and Physiology.. John Wiley and sons.

5. Keel and Neil: Samson and Wright's Applied Physiology (12th edition), Oxford University Press. London.
6. Ross and Wilson: Anatomy and physiology in Health and Illness, 8th Edition, Church Hill Livingstone, N.Y.

MEDICAL NUTRITION THERAPY – I

4 credits Theory

Objectives:

The course will enable the students to:

- Understand the etiology, physiologic and metabolic anomalies of acute and chronic diseases and patient needs.
- Know the effect of the various diseases on nutritional status and nutritional and dietary requirements.
- Be able to recommend and provide appropriate nutritional care for prevention/ and treatment of the various diseases.

Module No	Topics and Details	Number of credits
1	<p>Unit 1. Nutritional screening and assessment of nutritional status of hospitalized and outdoor patients.</p> <p>Identification of high risk patients. Assessment of patient needs based on interpretation of patient data – clinical, biochemical, biophysical, personal etc.</p> <p>Unit 2. Newer trends in delivery of nutritional care and dietary counselling.</p> <p>Nutritional support – Recent advances in techniques and feeding substrates.</p> <p>Unit 3. Exchange list as a tool for planning diets</p> <p>Unit 4. Anaemias</p> <ul style="list-style-type: none"> • Types • Causes • Symptoms • MNT for all types <p>Pathophysiology of Fevers: Dietary Management of TB, Typhoid, Malaria.</p>	1
2	<p>Unit 1. Nutritional care for weight imbalance</p> <p>1. Obesity</p> <p>Types of obesity</p> <p>Health Risks</p> <p>Causes – neural, hormonal, psychological</p> <p>Physiology of obesity</p> <p>Dietary treatment – Past - Present rationale</p> <p>Psychology of weight reduction</p> <ul style="list-style-type: none"> - Psychotherapy - Behaviour modification <p>Pharmacological treatment</p> <p>Surgical treatment</p> <p>Physical activity and exercise in the obese</p>	1

	<p>Unit 2. Underweight Causes Health risks Dietary Treatment Psychotherapy Eating disorders – Anorexia Nervosa and Bulimia</p>	
3	<p>Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of the following:</p> <p>Unit 1. G.I. Tract Disorders</p> <ul style="list-style-type: none"> • Diagnostic tests for G.I. disease • Pathophysiology and diet therapy of all G.I. disorders and their nutritional care • Disorders of oesophagus • Disorders of stomach • Disorders of small intestine • Disorders of large intestine • Malabsorption syndrome • Parasitic infections <p>Unit 2. Liver and Biliary System</p> <ul style="list-style-type: none"> • Physiology and function of liver gall bladder and pancreas • Pathophysiology and its implications • Disorders and diet therapy 	1
4	<p>Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of the following:</p> <p>Unit 1. Respiratory Disorders</p> <ul style="list-style-type: none"> • Dietary management in following disorders – bronchitis • Respiratory distress syndrome • Cystic fibrosis • Chronic obstructive pulmonary disorder (COPD) • Asthama • Aspiration • Pneumonia • Lung cancer <p>Unit 2. Allergy</p> <ul style="list-style-type: none"> • Definition • Symptoms • Mechanism of food allergy • Biochemical and immunotesting • Prognosis • Medications (briefly) • History and food record • Elimination diets 	1

	Unit 3. Disorders of Adrenal Cortex, Thyroid and Parathyroid Functions of the gland, hormones, imbalance of hormones, symptoms and dietary care	
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References:

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.

Journals and Other Reference Series

1. Nutrition Update Series
2. World Review of Nutrition and Dietetics
3. Journal of the American Dietetic Association
4. American Journal of Clinical Nutrition
5. European Journal of Clinical Nutrition
6. Nutrition Reviews

MEDICAL NUTRITION THERAPY I

4 credits Practicals

Objectives:

This course will enable students to:

1. Prescribe diets and counsel patients to provide appropriate therapeutic nutritional care and counselling
2. Develop standards of dietetic practice

For each of the topics, the practicals should focus on:

Commonly used tests for diagnosis of various diseases – system – wise

- Interpretation of patient data and diagnostic tests and drawing up of patient diet prescription, using a case study approach.
- Follow up – acceptability of diet prescription, compliance, discharge diet plan for each of the diseases discussed in the theory.
- Planning and preparation of diets for patients with common multiple disorders and complications and discharge diet plans.

Module No	Topics and Details	Number of credits
1	Standardization of portion sizes for different food preparations. Assessment of Nutritional status	1
2	Review of Hospitals diets Preparation of normal routine diets generally served in a hospital <ol style="list-style-type: none">I Modifications in Consistency and Fibre<ol style="list-style-type: none">a. Different types of liquid dietsb. Different types of semisolid / soft diets – General mechanical and pureedc. Bland Dietsd. Low Fibre Dietse. Low Residue dietsf. High fibre diets	1
3	Energy Modifications <ol style="list-style-type: none">A. Assessment of weight status and estimating energy requirementsB. Energy Modifications<ol style="list-style-type: none">Low Calorie PreparationsUse of artificial sweeteners in deserts and beverages and adjuacts.Low Calorie DietsAdult weight reduction	1

	<p>High calorie diets High calories protein diets for underweight fevers, anaemias and convalescing patients</p>	
	<p>Bland diets High calories, high protein, fibre and residue restricted diets for peptic ulcer and ulcerative colitis etc. Hiatus hernia, Gastritis, Irritable bowel, Achalasia etc.</p> <p>High calorie, High Protein, moderate and fat restricted diet in Liver disease and disease of pancreas and gallbladder Low protein diets in hepatic encephalopathy</p> <p>Elimination diets for Allergy</p>	

CLINICAL NUTRITION

4 Credits Theory

Objectives:

The course will enable the students to:

- Understand the etiology, physiologic and metabolic anomalies of acute and chronic diseases and patient needs.
- To assess nutritional status of patients.
- Be familiar with recent advances in the medical nutritional management of various diseases.

Module No	Topic and Details	No of Credits
1	<p>A. Cellular adaptations to stress.</p> <p>a. Types of stress</p> <p>b. Changes in hormonal secretion, CNS and immune system. Cellular changes</p> <p>c. Effects on cells and tissues</p> <p>B. Diet, nutrient and drug interactions.</p> <p>a. Effect of drugs on ingestion, digestion, absorption and metabolism of food and nutrients.</p> <p>C. Nutrition and Immune response</p> <p>a: Role of individual nutrients in immune response and function</p> <p>b: Effect of undernutrition and overnutrition on immune function</p> <p>c: Immunoenhancers, immunosuppressants, conditionally essential nutrients. d. Effect of food, nutrients and nutritional status on drug dosage and efficacy.</p> <p>D. Ageing</p> <p>Physiological changes with ageing</p> <p>Bone health</p> <p>Osteoporosis</p> <p>Rheumatoid arthritis</p>	1

2	<p>A. Nutrition and the gastro intestinal tract a.Malabsorption and its patho-physiology, Carbohydrate intolerance. b.Parasitic infections c.Acute and chronic infections d.Diarrhea e.Recent advances in gastroenterology and nutrition f.Diet and gut microflora</p> <p>B. Nutrition and oral health a.Structure, development and maturation b.Dental caries c.Recent advances in role of nutrition in dental health</p>	1
3	<p>A. Nutrition and cardiovascular diseases a.Role of lipids, carbohydrates, protein, and other nutrients b. Bile acid metabolism c.Prostaglandins</p> <p>B. Diabetes mellitus and complications-Recent advances</p> <p>C. Nutrition and Renal Disease Nephrotic syndrome Nephritis ESRD Renal Transplant Nephrolithiasis Recent advances</p>	1
4	<p>Nutrition and Cancer Carcinogenesis and Mutagenesis- Carcinogens in Food Epidemiology Investigations of Diet-Cancer relationship Development of cancer Types of cancer and effect on metabolism and nutritional status Nutrients and their relationship with cancer Recent developments in nutrition and cancer.</p> <p>Nutrition and HIV/AIDS</p>	1

References:

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

Journals and Other Reference Series

1. Nutrition Update Series
2. World Review of Nutrition and Dietetics
3. Journal of the American Dietetic Association
4. American Journal of Clinical Nutrition
5. European Journal of Clinical Nutrition
6. Nutrition Reviews
7. Clinical Nutrition
8. Asia Pacific Journal of Clinical Nutrition
9. Nutrition in Clinical Practice
10. Current Opinion in Clinical Nutrition and Metabolic Care
11. International Journal of Clinical Nutrition and Dietetics
12. Guidelines /Position statements of ASPEN, ESPEN, ADA, IDF
13. Canadian Journal of Clinical Nutrition
14. Annals of Nutrition and Metabolism

HOSPITAL ORGANIZATION, PERSONNEL MANAGEMENT AND FOOD SERVICE ADMINISTRATION

4 credits Theory

Objectives :

- To enable students to be familiar with medical food services and hospitals as organizations.
- To enable students to understand the management processes in terms of planning, organizing, leading, evaluating and controlling.
- To enable students to be familiar with legislation relating to food service and labour laws.

Contents

Module No	Topics and Details	Number of credits
1	<p>Introduction to medical food service – goals and objectives.</p> <p>Organization – Definitions, types of organization and food Service Systems – an overview, organization chart, Preparation of chart – activity analysis, decision analysis, relation analysis</p> <p>Management principles – planning, organizing, directing, controlling, management by objectives. Roles and Responsibilities of health care team and dietitians</p> <p>Tools of Management</p> <p>Professional ethics</p> <p>Computer Applications in Food Service</p>	1
2	<p>Recruitment, selection, training of personnel employees, supervision, performance appraisal, motivation and rewards incentives for effective performance, placement and promotion</p> <p>Decision-making – Types and approaches to decision making, problem solving tools.</p> <p>Time Management</p> <p>Labour laws, policies and food related laws, welfare schemes for employees in India.</p>	1
3	<p>Review of types of catering and food service systems.</p> <p>Menu planning</p> <p style="padding-left: 40px;">----- Menu consideration</p> <p style="padding-left: 40px;">----- Meal pattern and menu format</p> <p style="padding-left: 40px;">----- Steps in menu planning</p> <p style="padding-left: 40px;">----- Modified diet Menu planning</p> <p>----- Cycle Menus</p> <p>Food production and service equipment in Hospitals, space allocation, equipment selection. Safety care and use, energy management related to equipment planning.</p>	2

	<p>Purchasing and Storeroom management Purchasing systems, specifications, food requisition and inventory systems, quality assurance and evaluation laws relating to food purchasing</p> <p>Financial Management</p> <ul style="list-style-type: none"> Cost-Identifying Elements of cost Food cost control – cost analysis of dishes Portions and menus Labour cost control Energy cost control Budget systems and accounting Budget preparation <p>Relationship of costs, profits and sales in commercial and non-commercial establishments.</p> <p>Sanitation and Hygiene in food storage, preparation and service</p>	
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References

1. Shepard, Donald & Hodgkin, Dominic & Anthony, Yvonne : Analysis of hospital costs: a manual for managers. Geneva : World Health Organization, 2000
2. Food Supply Chain Management: Issues For The Hospitality And Retail Sectors/edited by Jane F Eastham , Liz Sharples and Stephen D Ball. Oxford : Butterworth-Heinemann, 2001.
3. Hospitality Operations and Management/edited by Krishan K Kamra, Robert C Mill, S Kaushil. New Delhi: A H Wheeler, 2000.
4. Lockwood, Andrew : Quality management in hospitality : best practice in action London : Cassell, c1996.
5. Jones, Ursula & Newton, Shirley & Dixon, Pauline : Hospitality and catering : a closer look. London : Cassell Publ, 1997.
6. Thorner, Marvin Edwrds & Manning, Peter Burnam : Quality control in food service. Westport : AVI Publ, c1976.
7. Food Service Systems : Analysis, Design And Implementation/ edited by G E Livingston, Charlotte M Chang. New York : Academic Press, c1979.
8. Ross, Lynne Nannen : Work simplification in food service : Individualized instruction. Ames : The Iowa Press, 1972.
9. Andrews, Sudhir : Food and beverage service : Training manual. New Delhi : Tata McGraw-Hill, c1980.
10. Powers, Thomas F & Powers, Jo Marie : Food service operations : planning and control. New York: John Wiley, c1984.(Wiley Service Management Series, edited by Thomas F Powers)

11. Lillicrap, D R : Food and beverage service. London : Edward Arnold, c1985.
12. Kumar, H L : Personnel management in hotel and catering industry. New Delhi : Metropolitan, 1986.
13. Yoga, M : Personnel management. New Delhi : National Productivity Council, 1983.(Management guide, National Productivity Council, 13)
14. Agarwal, Anand : Personnel management : an overview. Bombay : Jaico Publ, 1984.
15. Armstrong, Michael : A Handbook of personnel management practice.
London : Kogan Page, c1996.
16. Mamoria, C B & Gankar, S V : Personnel management. 21st rev ed. Mumbai : Himalaya Publ, c2001.
17. Rao, P Subba : Personnel and human resource management. Mumbai : Himalaya, 2002.

MEDICAL NUTRITION THERAPY – II

4 Credits Theory

Objectives:

The course will enable the students to:

- Understand the etiology, physiologic and metabolic anomalies of acute and chronic diseases and patient needs.
- Know the effect of the various diseases on nutritional status and nutritional and dietary requirements.
- Be able to recommend and provide appropriate nutritional care for prevention/ and treatment of the various diseases.

Contents:

Module No	Topic and Details	No of Credits
1	Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of: Diseases of Circulatory System <ul style="list-style-type: none">• Atherosclerosis: Pathophysiology, risk factors including dietary factors (in brief)• Genetic hyperlipidemias• Prevention of coronary heart diseases• Medical nutritional therapy• Coronary bypass surgery• Congestive Cardiac Failure and Cachexia• Progressive dietary management for cardiac transplantation and cardiac surgery. Hypertension <ul style="list-style-type: none">• Definition – Classification• Prevention• Nutritional factors	
2	Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of: Diabetes Mellitus & Hypoglycemia Diabetes Mellitus classification aetiology pathophysiology diagnosis Management of DM 1. Monitoring	

	<ul style="list-style-type: none"> a) Home glucose monitoring b) Glycosylated c) Urine testing <ol style="list-style-type: none"> 2. Blood glucose lowering agents <ul style="list-style-type: none"> a) Insulin b) Oral hypoglycemic agents 3. Exercise 4. Nutritional Management/Therapy <ol style="list-style-type: none"> a. Nutrient contents of diabetic diets b. Diet planning for NIDDM – IDDM (Type 1 and type 2) c. Special foods – sweeteners/sugar sub d. Alcohol 5. Special conditions <ol style="list-style-type: none"> a. Pregnancy b. Elderly c. Surgery d. Illness 6. Acute complications <ol style="list-style-type: none"> a. Hypoglycemia b. Ketoacidosis c. Somogyi effect d. Dawn phenomenon 7. Long term complication <ol style="list-style-type: none"> a. Macrovascular b. Microvascular c. Patient education 8. Hypoglycemia <ol style="list-style-type: none"> a. Pathophysiology b. Diagnosis c. Types d. Treatment <p>Recent Advances</p>	
3	<p>Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of:</p> <p>Renal Disorders</p> <ol style="list-style-type: none"> 1. Physiology and function of the kidney (in brief) 2. Diseases of the kidney – causes, symptoms and dietary treatment for the following <ul style="list-style-type: none"> • Nephritic syndrome (Acute glomerular nephritis/Chronic glomerular nephritis) • Nephrotic syndrome • Acute renal failure • Chronic renal failure/CKD • ESRD, Dialysis, Renal transplant <p>Renal calculi</p> <p>Neurological disorders</p> <ul style="list-style-type: none"> • Diet therapy for the following Parkinson's 	

	Alzheimer's Multiple sclerosis Epilepsy (in brief) Migraine Feeding problems in patients suffering from neurological disorders and its effect on their nutritional status.	
4	Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in the medical nutritional management of: Stress and Trauma <ul style="list-style-type: none"> • Burns • Surgery & SIRS/MODS Cancer Immuno-deficiency Disorders HIV / AIDS Genetic disorders (In brief) Musculo-skeletal Disorders <ul style="list-style-type: none"> • Sarcopenia • Gout • Rheumatoid Arthritis • Osteo Arthritis 	

References:

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.
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11. World Cancer Research Fund (1997). Food, Nutrition and the Prevention of Cancer- A Global perspective, Washington E.D. WCRF.

Journals and Other Reference Series

1. Nutrition Update Series

2. World Review of Nutrition and Dietetics
3. Journal of the American Dietetic Association
4. American Journal of Clinical Nutrition
5. European Journal of Clinical Nutrition
6. Nutrition Reviews

MEDICAL NUTRITION THERAPY II PRACTICALS

Module No	Topic and Details	No of Credits
1	<p>Diseases of Circulatory System Formulation of preparations with modified fat and sodium Formulations of content. Low cholesterol and low sodium diets for cardio vascular diseases – acute, chronic and Convalescent conditions. Diet in Hypertension. Progressive dietary management for cardiac transplantation and cardiac surgery.</p>	1
2	<p>Diseases of Carbohydrate Metabolism I.Diabetes Mellitus A. Formation of food preparations for diabetics- snacks, desserts and beverages B. Without Insulin C. With Insulin – Adult D. Diabetes in Pregnancy E. Diabetes and Illness II Hypoglycemic conditions</p> <p>Diets for specific metabolic disorders : Gout</p>	1
3	<p>Protein Modifications and mineral Modifications in Renal Disease. Glomerulonephritis – Acute and Chronic Nephrotic Syndrome Nephrolithiasis Renal Failure – Acute and Chronic Dialysis Renal Transplant</p>	1
4	<p>High Risk Management (hospital based) Nutrition Assessment Review of Existing Practices in Hospitals Oral Supplements indigenous / home-base and commercial for stressed patients e.g. burns, cancer, surgery, debilitated patients, management of patients with feeding problems tube feed – all forms Elemental diets, Parenteral and Enteral Nutrition Diet in Neoplasia Dietary Management for patients with multiple ailments.</p>	1

CATERING MANAGEMENT PRACTICALS

4 Credits

Objectives:

This course will enable students to:

1. Plan and prepare various recipes/products on large scale.
2. Estimate cost and sales price of food products
3. Plan menus for quantity food service within specified cost limits

Module No	Topic and Details	No of Credits
1	<p>Rice Preparations : Plain and fried rice, jeera rice, pulao, masala rice, tomato rice, vegetable biryani, prawn pulao, moghlai biryani, mutton biryani, chicken biryani, yakhani pulao, lime rice, coconut rice, curd rice, khichdi, dal dhokli</p> <p>Wheat Preparations Chapati, paratha plain, paratha stuffed, types of puries, bhatura, nan, Lacha paratha</p>	
2	<p>Pulse Preparations : Punjabi Dal, sambar, dal fry, simple dal, sprouted pulses, alu-chole, masala rajmah, tur dal with greens.</p> <p>Egg Preparations : Egg curry, Baked egg, Scrambled egg, Poached egg, Boiled egg – soft omlet, soufflé, egg custard, caramel custard.</p> <p>Meat Preparations : Kofta curry, rogan josh, mutton chilli fry, mutton palak, vindaloo murgh masala, brain masala, Tandoori chicken, chicken curry, prawn curry, fish curry</p>	
3	<p>Vegetable Preparations : Alu matar, alu palak, alu dal, fried vegetable, palak paneer, vegetable kofta, vegetable kurma, vegetable au gratin.</p> <p>Salads : Tossed, Russian, mouled, decorative dressing-mayonnaise, kuchumbers, raitas-boondi, salad dressings – mayonnaise, Italian French etc</p> <p>Soups – clear cream, chowder, mixed veg., tomato cream, carrot, and accompaniments, cream, mulligatawny, minestrone, madras, consumers’ – chicken, meat, coin soup, spinach soup, gazpacho chowder, sauces – white sauce, cheese sauce, mayonnaise sauce, curry sauce, Breads – Banana, high fibre bread and cookies, bread sticks, buns.</p>	
	<p>Snacks : Variety of sandwiches, veg. puff, fried snacks, fermented and</p>	

	<p>steamed snacks, vegetable pies, vegetable hamburgers, veg. & meat loaf, chicken casserole doughnuts</p> <p>Sweets (Adapted for therapeutic purposes) Sheera, Ladoo, Shrikhand, Puranpoli, Kheer, Rasagulla, Kulfi, Fruit salad, Custard, Puddings, Jellies, Icecreams, Trifle, Bread Pudding, Coffee mousse, Gateau, Tarts</p>	
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DIETETIC TECHNIQUES AND PATIENT COUNSELLING

Objectives:

This course will prepare the students to:

- Understand the principles and procedures of nutrition counseling and the role of the counsellor.
- Develop an understanding how: (a) lifestyles influence health and well-being; (b) acute and chronic disease affects the emotional and psychological state and the behaviour of the individuals.
- Be familiar with various techniques used in counseling.
- Be able to use various types and techniques of counseling to motivate patients to achieve well-being.

Contents:

Module No	Topics and Details	No of Credits
Theory		
1	<p>Counselling – Definition, Expectations, goals, scope and limits.</p> <p>Counsellor – Characteristics of an effective counselor</p> <p>The Client – Characteristics, expectations</p> <p>The Counselling Process:</p> <p>Techniques for obtaining relevant information</p> <ol style="list-style-type: none"> 1. Clinical Information 2. Medical History and General Profile 3. Dietary Diagnosis <ul style="list-style-type: none"> • Assessing food and nutrient intakes • Lifestyles, physical activity, stress 4. Nutritional Status 5. Correlating relevant information and identifying areas of need <ul style="list-style-type: none"> Stage I: Problem exploration and clarification Stage II: Developing new perspectives and setting goals Stage III: Implementation follow up and evaluation <p>Counselling Theories and Approaches: Key Concepts and Techniques</p> <p>Counselling techniques, strategies and communication skills</p> <p>Rapport building and opening techniques</p> <p>Questioning, listening, reflecting, acceptance, silence, leading reassurance, non-verbal behaviour, terminating skills.</p> <p>Group Counselling</p>	1
Practicals		
2	Developing resources and aids for education and counseling	1

3	<p>Working with:</p> <p>1. Hospitalised patients (adults, pediatric, elderly, handicapped), adjusting and adopting to individual needs</p> <p>Outpatients (adults, pediatric, elderly, handicapped), patients education, techniques and modes</p> <p>Follow up Monitoring and Evaluation of outcome: Home visits.</p>	2
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2. Holli, B.B. and Calabrese, R.J. (1998): Communication and Education Skills for Dietetics Professionals. Lippin Cott Williams & Wilkins, New York.
3. Curry, R.K. and Jaffe, A. (1998): Nutrition Counselling and Communication Skills, W.B. Saunders Co. London.
4. Hosking, G. and Powell, R. (1985): Chronic Childhood Disorders; Wright, Bristol.
5. O'Deughterty, M.M. (1983): Counselling the chronically ill child; The Lewis Publishing Co. Vermont, 1983.
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PEDIATRIC NUTRITION

2 Credits (Th) + 2 credits (Pr)

Theory Contents

Module No	Topics and Details	No of credits
1	<p>Growth, Development and Nutritional Needs: Infancy through Adolescence</p> <p>Growth, Development and Body composition, Milestones during infancy, preschool, childhood, puberty and adolescence</p> <p>Nutritional Requirements at different stages: infancy, childhood, adolescence</p> <p>Infant and Young Child Feeding Practices; Breast feeding, Composition of human milk, recommendations for breastfeeding, Pre-lacteal feeds and risks, exclusive breastfeeding, duration of breastfeeding, Advantages of Breast feeding</p> <p>Contraindications and types of infant formulas.</p> <p>Complementary feeding- issues and concerns, recommendations</p> <p>Nutrition during childhood to adolescence: nutritional requirements, factors affecting food intake formation of food habits, . Feeding children and adolescents, packed lunch</p> <p>Preterm/ VLBW infants – Complications, Role of parenteral and enteral nutrition (trophic feeds – gut priming)</p> <p>Undernutrition in childhood – PEM, FTT, SAM, Fe deficiency, vit A deficiency – causes, consequences, management (in brief) Catch up growth</p>	1
2	<p>Nutritional considerations for special conditions –</p> <p>Overnutrition - causes, consequences, management</p> <p>Nutritional Management of Inborn Errors of Metabolism - PKU, Maple syrup urine disease, Homocystinemia, Tyrosinemia, Galactosemia, Glycogen storage disorder</p> <p>Diarrhea and constipation - causes, consequences, management</p> <p>Epilepsy and dietary approaches – ketogenic diet, Atkins and recent advances</p> <p>Role of diet and nutritional challenges in developmental disabilities- autism spectrum disorders, cerebral palsy, Attention-deficit hyperactivity disorder</p> <p>Type 1 DM – Impact on growth and management</p> <p>Nephrotic syndrome and CKD in children - Impact on growth and management</p> <p>Food Allergies</p>	1

Practicals

Contents

Module No	Topics and Details	No of credits
Pediatric Nutrition		
1	<p>Pediatric Nutritional Assessment:- Anthropometric measurements, biochemical parameters, clinical and dietary assessment methods. Measuring, recording and plotting growth on growth charts. Use of growth reference/ standards (Field work)</p> <p>Normal nutrition for infants – Guidelines on breastfeeding and complementary feeding. Market survey of infant formulae and complementary foods. Planning complementary feeds as per the guidelines. Preparation of ARF.</p> <p>Nutrition in childhood and adolescence: Planning for preschool child, the school-aged child and adolescents</p>	1
2	<p>Guidelines for management for PEM, SAM, Fe deficiency and vitamin A deficiency</p> <p>Nutritional requirements for Inborn Errors of Metabolism - PKU, Maple syrup urine disease, Homocystinemia, Tyrosinemia, Galactosemia, Glycogen storage disorder</p> <p>Nutritional Management of diarrhea</p> <p>Diets for Epilepsy - Ketogenic diet, Atkins diet</p> <p>Feeding challenges for developmental disabilities, feeding devices</p> <p>Nutritional requirements and managements of - type 1 DM, Nephrotic syndrome and CKD</p>	1

Practicals are to be done through the following:

1. Case studies of children with different ailments and planning of diets
2. Visit to Pediatric ward /Pediatric hospital and Centre dealing with inborn errors of metabolism
3. Visit to Centres/Schools dealing with Children with Special needs e.g Spastic Society of India,

GERIATRIC NUTRITION

3 credits Theory + 1 credit Practical

Objectives:

This course will enable the students to:

1. Understand the multifaceted aspects of aging
2. Understand the specific needs of elderly and the effects of various diseases on nutritional status and nutritional requirements at these stages of the life cycle
3. Be competent to recommend / provide appropriate nutritional care based on pathophysiology, prevention/ and treatment of the various diet-related disorders/ diseases

Module No	Topic and Details	No of Credits
1	<p>The Ageing Society- Global and Indian scenario Epidemiology Life Expectancy vs Life Span Usual vs Successful Ageing Changes associated with Ageing process Cellular aspects of ageing 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 Functional manifestations of ageing: constipation, impaired fluid and electrolyte balance, altered thermoregulation, sleep disturbances</p>	1
2	<p>Common molecular theories of ageing and nutritional interventions Factors influencing ageing – endogenous and exogenous Benefits of calorie restriction and exercise Nutritional requirements – factors influencing and dietary plans for senior citizens Promoting successful ageing-traditional and modern methods</p>	1
3	<p>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 Role of Nutrition in prevention of age related diseases Nutrient drug interactions</p>	1

PRACTICAL

Module No	Topic and Details	No of Credits
4	Assessment of nutritional status – mini nutrition index, assessment of frailty Policies and programmes of the government and NGO sector pertaining to the elderly Promoting fitness and well being- use of various modern and traditional approaches	1

Practicals are to be done through the following:

1. Visit to old age homes
2. Assessment of physical fitness, food intake and nutritional status
3. Planning and preparation of diets for the elderly in health and sickness.
4. Developing protocol for promoting fitness and health vis-à-vis health status/disease.

References:

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3. Escott-Stump, S. (1998): Nutrition and Diagnosis Related Care, 4th Edition, Williams and Wilkins.
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12. Kumar, V. (1996): Aging – Indian Perspective and Global Scenario. Proceedings of International Symposium of Gerontology and Seventh Conference of the Association of Gerontology (India).
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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.
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19. Binstock, R.H. and E. Shanes (eds) (1986): Handbook of Aging and Social Sciences V.N. Reinhold Co, New York,.
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21. Desai, K.G. (1985): Problems of the Retired People in Greater Bombay, TISS, Series No. 27.
24. Ghosh, B. (1988): Contemporary Social Problems in India, Bombay, Himalaya Pub.
25. Pinkston, P.H. and N.K. Linsk (1984): Care of the Elderly: A family approach, New York, Pergamon Press.
26. Watson, R. R. (ed) (2000) Handbook of Nutrition in the Aged. 3rd edition. CRC Press. Boca Raton
27. Nutrition Screening Initiative (1991 and 1992). Nutrition Screening Manual for Professionals Caring for Older Americans. Washington, D.C. Green Margolis, Mitchell, Burns and Associates
28. Chernoff, R. (ed) (1991). Geriatric Nutrition: The Health Professionals' Handbook, Gaithersburg, MD: Aspen
29. The Nutrition Screening Initiative (1994). Incorporating Nutrition Screening and Interventions into Medical Practice: A Monograph for Physicians.
30. Watson, R.R. (ed) (1985) CRC Handbook of Vitamins in the Aged ERC Press, Boca Raton, Florida
31. Bock, G.R.; and Whelen, J. (eds) The Childhood Environment and Adult Disease. Chichester, U.K. Wiley
32. Berg, R.L. and Casells, J.S. (1990) The Second Fifty Years: Promoting Health and Preventing Disability. Washington E.C. National Academy Press.

Journals:

1. American Journal of Clinical Nutrition,
2. Gerontology,
3. Journal of the American Geriatric Society,
4. Age Ageing,
5. Journal of Applied Gerontology,
6. Age,
7. Journal of Gerontology

PUBLIC NUTRITION AND HEALTH

4 Credits (Th)

Objectives:

This course will enable the students to:

1. Develop a holistic knowledge base and understanding of the nature of important nutritional problems and their prevention and control for the disadvantaged and upper socio-economic strata in society
2. Understand the causes /determinants and consequences of nutritional problems in society
3. Be familiar with various approaches to nutrition and health interventions, programmes and policies.

Contents:

Module No	Topics and Details	No of Credits
1	<p>Concept of public nutrition</p> <ol style="list-style-type: none">a. Relationship between health and nutritionb. Role of public nutritionists in the health care delivery <p>Sectors and Public Policies relevant to nutrition and health.</p> <p>Primary Health Care of the Community</p> <ol style="list-style-type: none">a. National Health Care Delivery Systemb. Determinants of Health Statusc. Indicators of Health <p>Population Dynamics</p> <ol style="list-style-type: none">e. Demographic transitionf. Population structureg. Fertility behaviorh. Population policyi. Fertilityj. Interrelationship between Nutrition and Quality of Life <p>Food and Nutrition Security</p> <ol style="list-style-type: none">a. Food production<ul style="list-style-type: none">❖ Access❖ Distribution❖ Availability❖ Losses❖ Consumptionb. Food Securityc. Socio-cultural aspects and Dietary Patterns: Their implications for Nutrition and Health	1

2	<p>Nutritional Status</p> <p>a. Determinants of nutritional status of individual and populations</p> <p>b. Nutrition and Non-nutritional indicators</p> <ul style="list-style-type: none"> ❖ Socio-cultural ❖ Biologic ❖ Environmental ❖ Economic <p>c: Assessment of nutritional status of individuals of different ages- MUAC, Wt for age, Ht for age, Wt for ht, Ponderal index, BMI</p> <p>Applications and limitations in different field situations- choice of an indicator</p> <p>Major Nutritional Problems – etiology, prevalence, clinical manifestations, preventive and therapeutic measures for:</p> <ul style="list-style-type: none"> a. Macro and micro nutrient deficiencies b. Other nutritional problems like lathyrism, dropsy, aflatoxicosis, alcoholism and fluorosis. c. Overweight, obesity and chronic degenerative diseases 	1
3	<p>Approaches and Strategies for improving nutritional status and health:</p> <p>a. National Food , Nutrition and Health Policies - Plan of action and programmes</p> <p>b. Programmatic options- their advantages and demerits. Feasibility Political support Available resources (human, financial, infrastructural)</p> <p>c. Case studies of selected strategies and programmes: their rationale and context, how to select interventions from a range of possible options:</p> <p>d.. Health-based interventions, Food-based interventions including fortification and genetic improvement of foods, supplementary feeding, Nutrition education for behaviour change.</p> <p>Health economics and economics of malnutrition</p> <ul style="list-style-type: none"> a. Its impact on productivity and national development b. Cost-Benefit <ul style="list-style-type: none"> ❖ Cost effectiveness ❖ Cost efficiency 	2

References:

1. Owen, A.Y. and Frankle, R.T. (1986): Nutrition in the Community, The Art of Delivering Services, 2nd Edition Times Mirror/Mosby.
2. Park, K. (2000): Park’s textbook of preventive and social medicine, 18th Edition, M/s. Banarasidas Bhanot, Jabalpur.

3. SCN News, UN ACC/SCN Subcommittee on Nutrition.
4. State of the World's Children, UNICEF.
5. Census Reports.
6. Berg, A. (1973): *The Nutrition Factor*, the Brookings Institution, Washington.
7. Beaton, G.H. and Bengoa, J.M. (Eds) (1996): *Nutrition in Preventive Medicine*, WHO.
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11. Gopalan, C. (Ed) (1987): *Combating Undernutrition – Basic Issues and Practical Approaches*, Nutrition Foundation of India.
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20. Documents and Reports of the International Nutritional Anemia Consultative Group
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24. Murray, C. and Lopez, A. (eds)(1996) *Global Burden of Disease and Injury* Harvard University Press, Cambridge, MA, USA.
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27. Ramakrishnan, U. (eds) (2001). Nutritional Anemias. CRC Press in Modern Nutrition, CRC Press, Boca Raton, FL.

NUTRITION FOR SPORTS AND EXERCISE THEORY

4 credits

Objectives:

This course will enable students to:

1. Understand the special nutritional requirements for physical activities related to sports and exercise
2. Apply the knowledge to improve the performance of sportspersons

Module No	Topics and Details	No of Credits
1	Introduction, Nutritional considerations for sports / exercising person as compare to normal active person. Energy substrate for activities of different intensity and duration, aerobic and anaerobic activities. Fluid balance in sports and exercise, importance, symptoms and prevention of dehydration, Sports drink,	1
2	Macro Nutrients-Carbohydrate as an energy source for sport and exercise. Carbohydrate stores, Fuel for aerobic and anaerobic metabolism, Glycogen re-synthesis, CHO Loading, CHO composition for pre exercise, during and recovery period.	1
3	Role of Fat as an energy source for sports and exercise. Fat stores, regulation of fat metabolism , factors affecting fat oxidation (intensity, duration , training status, CHO feeding) , effect of fasting and fat ingestion Protein and amino acid requirements, Factors affecting Protein turnover, Protein requirement and metabolism during endurance exercise, resistance exercise and recovery process. Protein supplement.	1
4	Important micronutrients for exercise. B complex vitamin and specific minerals. Exercise induced oxidative stress and role of antioxidants Chronic dieting and eating disorder. Female athletic triad, sports anemia Dietary supplements and ergogenic aids (nutritional, pharmacological and physiological)	1

References

1. Bucci, L., 1993 Nutrients as Ergogenic Aids for Sports and Exercise. Boca Raton, FL.:CRC Press.
2. Advances in Sport and Exercise Science : Nutrition and Sport , Edited by Don MacLaren. , ChPublished by Churchill Livingstone, Elsevier. 2007

3. Sports Medicine: The school age athlete by Bruce Reider. 1996. Published by W.B. Saunders.
4. Nutrition for Serious Athletes. Dan Banardot. 2000; Human Kinetics.
5. Energy-Yielding Macronutrients and Energy Metabolism in Sports Nutrition. Edited by Judy A Driskell , Ira Wolinsky, CRC Press 2000.
6. Recommended Dietary Intakes for Indian Sportsman and Women. Satyanarayan, K; Nageshwar Rao. C; Narsinga Rao,B.S.; Malhotra, M.S. (1985)., Hyderabad, National Institute of Nutrition.

APPLIED FOOD SCIENCE AND PRODUCT MODIFICATION (PRACTICAL) **(4 Cr)**

Objectives:

This course will enable students to:

1. Understand and apply various aspects of food science for dietary management and product development.
2. Develop products, which meet nutritional needs of consumers.
3. Understand theoretical concepts about sensory evaluation of food.
4. Use different sensory methods for evaluating variety of foods.
5. Analyse and interpret sensory evaluation data.

Contents:

Module No	Topic and Details	Number of Credits
1	Conducting the Test: <ul style="list-style-type: none"> - Preparing samples - Presenting samples - Using reference samples - Reducing panel response error - Consumer oriented tests - Product oriented tests - Shelf life studies - Product matching - Product mapping Taint Investigation and Prevention	1
2	Reducing viscosity and bulk in foods Increasing energy density Applications of fermentation, germination, malting	1
3	Use of different food ingredients for development of health foods – artificial sweeteners, modified starches, fat replacers, increasing fibre content, functional ingredients, low sodium food adjuncts, protein concentrates, whey New Food Products	2

	1. Definition, Classification 2. Characterization Factors shaping new product development- Social concerns, health concerns impact of technology and market place influence. 3: Planning, standardizing and testing the product, nutritional content	
	Tapping traditional foods and unconventional sources of foods. Modifying traditional foods Planning, standardizing and testing the product, nutritional content	

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