MSC. HOME SCIENCE
FOOD SCIENCE, NUTRITION AND DIETETICS

COURSE FRAMEWORK - 2018

SEMESTER – I

S NO.	SUBJECT	TITLE OF THE PAPER	C	LH/W	CIA	ESE	T
PART - I	CORE T I	Advanced Food Science	4	6	25	75	100
	CORE T II	Advanced Human Physiology	4	6	25	75	100
	CORE T III	Nutrition Through Developmental Stages	4	6	25	75	100
	CORE P I	Advanced Food Science Practical	4	6	40	60	100
	ELECTIVE I	Food Microbiology & safety	3	4	25	75	100
PART - II	SKILL BASED ELECTIVE	Teaching Skills	3	-	50		
			22	**28**			
TOTAL MARKS - MAJOR-400 ELECTIVE-100							

CIA—Continuous Internal Assessment
LH/W- Lecture Hour / week
ESE-End Semester Examination
C- Credits

SEMESTER – II

S NO.	SUBJECT	TITLE OF THE PAPER	C	LH/W	CIA	ESE	T
PART -I	CORE T IV	Research Method and statistics	4	6	25	75	100
	CORE T V	Nutritional Biochemistry	4	6	25	75	100
	CORE T VI	Advanced Dietetics	4	6	25	75	100

	CORE P II	Advanced Dietetics Practical	4	6	40	60	100
	ELECTIVE II	Food Product Development	3	4	25	75	100
PART - II	SOFT SKILLS	Swayam (MOOC)	4	-	50		
			23	**31**			
TOTAL MARKS - MAJOR-400 ELECTIVE-100 NME-100							

CIA—Continuous Internal Assessment ESE-End Semester Examination
LH/W- Lecture Hour / week C- Credits

SEMESTER – III

S NO.	**SUBJECT**	**TITLE OF THE PAPER**	**C**	**LH/W**	**CIA**	**ESE**	**T**
PPART -I	CORE T VII	Advanced Human Nutrition-Macro nutrients	4	6	25	75	100
	CORE T VIII	Nutrition in Critical Care	4	6	25	75	100
	CORE T IX	Performance Nutrition	4	6	25	75	100
	CORE P III	Analytical Techniques	4	6	40	60	100
	ELECTIVE III	Instrumentation and Clinical Biochemistry	3	4	25	75	100
PART - II	SKILL BASED ELECTIVE	Research Skills	3	-	50		
	INTERNSHIP	Internship	2	-	50		
			24	**28**			

CIA—Continuous Internal Assessment ESE-End Semester Examination
LH/W- Lecture Hour / week C- Credits

SEMESTER – IV

S NO.	**SUBJECT**	**TITLE OF THE PAPER**	**C**	**LH/W**	**CIA**	**ESE**	**T**
PART - I	CORE T X	Advanced Human Nutrition-Micro nutrients	4	6	25	75	100

	CORE T XI	Public Health Nutrition	4	6	25	75	100
	CORE T XII	Dissertation	4	6	25	75	100
	ELECTIVE IV	Advanced Food Service Management	3	4	40	60	100
	ELECTIVE V	Basic Concepts in Home Science	3	4	25	75	100
PART - II	EXTRA DISCIPLINARY	Swayam – (MOOC)	4	-	50		
			22	**26**			
TOTAL MARKS - MAJOR-400 ELECTIVE-100							

CIA—Continuous Internal Assessment ESE-End Semester Examination
LH/W- Lecture Hour / week C- Credits

CREDITS DISTRIBUTION

	Course Type	**Course**	**Credits**	**Total Credits**
PART I	Core (Theory)	11	4	44
	Core (Practical)	3	4	12
	Core (Elective)	1	4	4
	Elective	5	3	15
PART II	Internship	1	2	2
	Soft Skills	2	3	6
	Skill based	2	4	8
	Total			**91**

SEMESTER -I

CORE-I ADVANCED FOOD SCIENCE

Subject Code: 18PNDCT1001

Credits:4 **Marks:100**
Hours/week:6 **Internal:25**
Theory:75

OBJECTIVES:

To enable the students

- ☐ Gain knowledge on source and properties offood
- ☐ Familiarize students with changes occurring in various foodstuffs as a result of

processing andcooking.

- Enable students to use the theoretical knowledge in various applications and food preparations.

UNIT I

Cereals- Rice and wheat, Millets (Ragi, Maize, Barley & Oats) structure, Composition and nutritive value. Starch - Sources, Structure and composition of starch; Properties and characteristics of food starches; Effect of heat on food starch properties and the factors influencing gelatinization and dextrinisation changes.

Pulses- Types , composition, nutritive value and toxic constituents . Proteins-Classification and Chemical Composition of proteins, Denaturation, Protein concentrates, hydrolysates and texturized vegetable proteins.

UNIT II

Post harvest technology-post harvest losses, reasons for losses, techniques to overcome losses.

Fats and Oils- Structure, composition and properties of fat. Oil structure, composition and the properties. Modification of natural oils – Hydrogenation, Fat substitutes. Rancidity- Types, Mechanism and prevention.

UNIT III

Fruits and vegetables – Composition, classification, nutritive value. Pectins , Types of pigments, Effect of cooking on colour and texture of vegetables. Browning reactions-Enzymatic & non-enzymatic and its prevention.

Sugar cookery – Principles and stages of sugar cookery, Principles of sugar crystallization

UNIT IV

Flesh foods-Types, Composition and structure of muscle , Ripening and Tenderization of meat

Postmortem changes , Cooking and processing.

Egg – Structure, composition, selection, coagulation, foam formation and its role in cookery. Milk – Composition, types, nutritive value, physical and chemical properties, coagulation of milk protein.

UNIT V

Food additives- Definition, different food additives and Need for food additives.

Flavour compounds in vegetables, fruits and spices; Effect of processing on food flavours; Role of colours and flavours in food products.

Sweetners- Properties, Artificial and Natural sweetners and role of sweetners in food industry.

References:

- Srilakshmi B. (2015) : Food Science, New Age International (P) Ltd. Publishers.
- Potter, N. and Hotchkiss, J.H. (2007): Food Science, Fifth ed., CBS Publishers and Distributors, New Delhi.
- Swaminathan A (2010) : Food Science And Experimental Foods, Ganesh And Company Madras.
- Bennion, Marion and O. Hughes (2015): Introductory Foods, Edi: mac millian N.Y.
- Mahindru,[2008] S.N.: Food Additives, Characteristics, Detection and Estimation, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
- Charley M. J(I982): Food Science (2nd Ed), John Wiley And Sons.
- Desrosier, N.W. and James N. (2007). Technology of food preservation. AVI Publishers.
- Julians, B.O. (1985). Rice Chemistry and Technology, 2nd edition, American AssociationChemists, St. Paul Mimesota,USA.
- Manay, S. and Shadaksharamasamy,[2008] Food: Facts and Principles, New Age International (P) Publishers, New Delhi.

Journals

- Journal of food Science, The Institute of Food Technologists, Illinois,U.S.A.
- Nutrition and Food Science and Technology, Association of FoodTechnologists
- Food Technology Abstracts, Central Food Technological Research InstituteMysore.
- Food Technology, Journal Of The Institute Of Food Technology, Illinois,USA.
- Indian Food Industry AFSTI, CFTRI,Mysore.

Journal of Food Science and Technology CFTRI, Mysore.

CORE-II

ADVANCED HUMAN PHYSIOLOGY

Subject Code: 18PNDCT1002

Credits:4 **Marks:100**

Hours/Week:6 **Internal:25**

Theory: 75

Objectives:

This course will enable students to:

- Advance their understanding of some of the relevant issues and topics of human physiology.
- Enable the students to understand the integrated function of the systemUnderstand alterations of structure and function in various organs and systems in disease conditions**.**

UNIT I

1. Cell- structure and function. Cell membrane- transport across cell membrane. Cell Cycle. Mitosis and Meiosis. Tissue- structure andfunction
2. **Blood** and its composition.Functions of cellular components and their significance, Blood groups, Coagulation ofBlood.

UNIT II

1. **Heart** -Review of structure and function. Heart rate, Cardiac cycle, origin and conduction of heart beat, Cardiac output, Blood pressure & itsregulation.
2. **Respiratory System**: Review of structure and function. Mechanism of respiration and its regulations.

UNIT III

1. **Gastrointestinal System**: Review of structure and function. Secretory, Digestive and Absorptive functions. Hormones of GIT. Function of Liver, Pancreas and Gallbladder.
2. **Excretory System**: Structure and function of Nephron –Mechanism of urine formation. GFR and its regulation. Role of kidney in maintaining pH of blood. Water, electrolyte and acid basebalance.

UNIT IV

1. **Nervous System-** Review of structure and function of Neuron, conduction of nerve impulse, synapses, role of neurotransmitters, neuro-muscular contraction. Blood brain barrier and CSF.
2. **Senses organs** – Role of skin, eye, ear, nose and tongue in perception of stimuli. Regulation of bodytemperature.

UNIT V

1. **Endocrine System-** Physiology of different endocrine glands. Symptoms of deficiency and excess secretion of different endocrineglands.
2. **Reproductive System**: Role of hormones in reproduction. Menstrual Cycle. Spermatogenesis. Physiology of pregnancy, Parturition, Lactation andMenopause.

References

- Chatterjee C C (2016): Human Physiology, 11thEdition, CBS Publishers and Distributors PvtLtd.

- Guyton, A.G. and Hall, J.B. (2005): Text Book of Medical Physiology, 9thEdition, **W.B. Sanders Company, Prism Books Pvt. Ltd., Bangalore.**
- Sembulingam K and PremaSembulingam (2012): Essentials of Medical Physiology, 6th Edition, Jaypee Brothers Medical Publishers Pvt Ltd., NewDelhi.
- Tortora SJ and Grabowski SR (2004): Principles of anatomy and Physiology. New York, John Wiley andSons
- Waugh Anne and Grant Allison (2014): Ross and Wilson Anatomy and Physiology in Health and Illness, 12th Edition, Elsevier, NewYork.

COREIII

NUTRITION THROUGH DEVELOPMENTAL STAGES

Subject Code: 18PNDCT1003

Credits :4 **Marks:100**

Hours/week:6 **Internal:25**

Theory:75

OBJECTIVES:

To enable the students

1. Understand the role of nutrition in different stages of lifecycle
2. Gain knowledge about the methods of assessment of nutritional problems and their implications
3. Determine nutrient requirements/needs of individuals at different stages oflife.
4. Discuss the major nutrition related concerns at each stage oflife.

UNIT I :RECOMMENDED DIETARY ALLOWANCES AND NUTRITION DURING EXTREME ENVIRONMENTS

Different food groups, recommended allowances for Indians. Basis for requirements, Principles in planning of Balancedmenu.

Nutritional requirements for extreme environments- General adaptive mechanisms to environmental extreme and role of nutrition in successful acclimatization. Health Hazards associated with high altitude, Nutritional requirements in high altitude, Nutritional requirements in high cold and polar envelopment Nutritional requirements in hot environments, Nutritional requirements for space missions and sea voyage and army.

UNIT II :NUTRITION IN PREGNANCY AND LACTATION

Nutrient requirements and general health, Weight gain during pregnancy and nature of weight gain. Intrauterine growth of foetus from conception till full term. Storage of nutrients in normal pregnancy. Physiological cost, complications of pregnancy.

Physiological adjustments during lactation. Lactation in relation to growth and health of infants. Efficiency of milk production. Diet for lactating women. Implications of health programmes.

UNIT III : NUTRITION IN INFANCY AND PRESCHOOL CHILDREN

Nutritional status of infants. Rate of growth, weight as the indicator. Nutritional allowances for infants. Breastfeeding versus formula feeding. Weaning foods suitable for infants. Feeding the premature infant.

Growth and development of preschool children. Food habits and nutrient intake of preschool children, dietary allowances, supplementary foods, effect of food on brain and brain development in preschool age. Advances in pediatric nutrition

UNIT IV: NUTRITION DURING SCHOOL AGE AND ADOLESCENCE

Physical Development, school lunch programmes. Food habits and nutritional requirements, behavioural characteristics. Attention span and exploratory behaviour.

Changes of growth, characteristics of adolescents. Nutritional needs of the adolescents. factors influencing food intake, nutritional concerns – Anemia, obesity, anorexia and bulimia

UNIT V: NUTRITION FOR THE ADULTS AND AGED

Basis for requirement. Nutritional requirements, nutrition and work efficiency.

Nutrition requirements during old age, socio-economic and psychological factors, theories of aging, physiologic changes, nutrition concerns – dysphagia and senility disorders, community nutrition programme for old age, advances in geriatric nutrition.

REFERENCES:

BOOKS

1. Sue Rodwell Williams., Basic Nutirtion - Diet Theraphy ,Mosby Inc., 11 th edition,2000.
2. Davidson, Sir Stanely, Passmore and Brook, J.F., 2012. Human Nutrition and Dietetics, R& S Livingston Ltd., Edinburgh, 9thedition.
3. Gopalan C.V. and Rama Sastry,2016 Nutrient Requirements and Recommended Dietary Allowances for Indians, Indian Council of Medical Research.
4. Jelliffe,D.B.,2005. Assessment of the Nutritional status of the community, Second edition. WHO,Geneva
5. Robinson, C.H., Lawler, M.R., 1998. Normal and Therapeutic Nutrition, 19th edition, McMillan Publishing Co., NewYork.
6. Shanthi Ghosh, 1992. The feeding and care of infants and young children, 6th edition. Health Association of India, New Delhi.
6. Shubhangini.A.Joshi, 2005, Mawcgraw higher education,Mumbai.
7. Dr.Shoshi Goyal and Pooja Gupta, 2012, food , nutrition and health, s.chand andcompany

JOURNALS

1. Indian Journal of Nutrition and Dietetics, Avinashilingam Deemed University, Coimbatore.
2. Indian Journal of Medical Research, NewDelhi.
3. Proceedings of the Nutrition Society of India, NSI,Hyderabad.
4. American Journal of ClinicalNutrition.
5. British Journal of ClinicalNutrition

6. European Journal of ClinicalNutrition.
7. International Journal of Vitamin and NutritionResearch.
8. International Journal of Food Science andNutrition.

CORE-P-I

ADVANCED FOOD SCIENCE PRACTICALS

Credits:4 **Marks:100**
Hours/week:6 **Internal:40**
External:60

- Effect of solutes on boiling point and freezing point of water
- Effects of types of water on characteristics of cooked vegetables, pulses and cereals
- Microscopic examination of plant starches and study the gelatinization on starch
- Sugar cookery and the factors influencing the stages of sugar cookery
- Physiochemical and functional properties of proteins
- Preparation of protein concentrate/isolate
- Role of fats in cookery as shortening agents in bakery products
- Influence of heat on physicochemical properties of oil
- Effect of acid, salt, alkali, heat and enzymes on pigments
- Prevention of enzymatic browning reactions in cut fruits and vegetables

ELECTIVE I
FOOD MICROBIOLOGY AND SAFETY

Subject Code: 18PNDCE1001
Credits: 3

Hours/week: 4 **MARKS:100**

Internal:25 **Theory: 75**

OBJECTIVES

1. To understand the nature of microorganisms involved in food spoilage, food infections and intoxications.
2. To gain knowledge of principles of various techniques used in the prevention and control of the microorganisms in foods (food preservation).
3. To understand criteria for microbiological safety in various foods operations toavoid public health hazards due to foodcontamination

CONTENTS

UNIT I: OVERVIEW OF BASIC MICROBIOLOGY AND FOOD SPOILAGE

Definition, Scope of Food Microbiology. An introduction to microbial world. Types of microorganism and their role in food spoilage. Definition, sources of contamination and microorganisms involved in spoilages of various foods: Milk, Bread, Canned food, Vegetables and fruits, Fruit juices, Meat, Eggs and Fish

UNIT II: DETERMINATION OF MICRO ORGANISMS AND THEIR PRODUCTS IN FOOD

Sampling, sample collection, transport and storage, sample preparation for analysis. Microscopic and culture dependent method- Direct microscopic observation, culture, enumeration and isolation methods.

UNIT III: MICROORGANISMS IN HUMAN WELFARE

Importance of microbes in food biotechnology: genetically engineered organisms, psycobiotics, probiotics and single cell proteins. Food fermentation system-Submerged , surface and solid state, cereal , pulse ,milk, fruit and vegetable based fermented products of India/Asian countries. .

UNIT IV: FOOD PRESERVATION

Introduction to historical developments in food preservation,Physical methods – Drying, freeze, drying, , Cold Storage, heat treatment, Irradiation, High pressure processing and Chemical Preservatives. Recent advances in food preservation .

UNIT V: FOOD SAFETY AND QUALITY CONTROL

Public health hazards due to microbial contamination of foods: Important food borne infections and intoxications due to bacteria, moulds, viruses (Salmonella typhi, Helicobacter pylori, Yersinia enterocolitica, Bacillus cereus, Staphylococcus aureus, Clostridium botulinum, Escherichia coli, Mycotoxins)- Symptoms, mode of transmission and methods of prevention.

Assessing the microbiological quality of food: indicator organisms, microbiological standards, principles of GMP & HACCP in food processing. Safety management at household and industriallevel.

REFERENCES:

1. Frazier W.C and WesthoffD.C.(2013), Food Microbiology, Tata McGraw Hill Publishing Co., Ltd. NewDelhi.

2. Annak.Joshua, (2001). Microbiology, Popular BookDepot.Chennai-15.

3. Ray, B. (2001) Fundamental Food Microbiology, 2nd Ed, CRC press, Boca raton F.

4.JoshiVK&Pandey(2004).Biotechnology:food,fermentation,microbiology,biochemistryand technology,vol I &II,Educational publishers and distributors,New Delhi.

5. Crueger W and Crueger A (2003) Biotechnology: A textbook of Industrial Microbiology 2nd Edition,Panima Publishing Corpoartion,NewDelhi.

6. Guttierrez-Lopez GF and Barbosa-Canovas GV (Eds) (2003) Food Science and Food Biotechmolgy CRCpress,USA.

7. Halford NG (2003) 'Genetically Modified Crops' Imperial College Press, UK Modern Food Micro-Biology by James M. Jay, (2000), 6th edition, An Aspen Publication,Maryland, USA.
8. Food Microbiology: Fundamentals and frontiers by M.P. Doyle, L.R. Beuchat andThoma **J. Montville, (2001), 2nd edition, ASM press, USA.**
9.MichealPelczar MJ, Chan ECS, Krieg N. (2001) Microbiology. 5th ed. Tata McGraw-Hill Publishing Co.Ltd.
10. Prescott LM, Harley JP, Klein DA.(2008) Microbiology. 6th ed. WMCBrown
11.Adams Moss., Food microbiology, 3 edition 2007, Heritagepublisher.

SEMESTER II

CORE- IV

RESEARCH METHODS IN NUTRITION

Credits: 4 **Marks: 100**
Hours/Week: 6 **Internal: 25**
Theory: 75

Objectives: After completion of course, students will be able to-

- know importance of research in food science and nutrition
- understand the types, tools applicable to research problem
- construct common data collection tools
- develop skills of preparing out line of research work

Theory

Unit 1: Foundation of Scientific Research

1. Research – meaning and definition
2. Need of research in food science and nutrition
3. Research process
4. Selection and formulation of research problem
5. Specifying objectives
6. Formulating hypothesis
7. Deciding variables
8. Research Proposal

Unit 2: Design Strategies in Research

1. Descriptive studies
2. Correlation studies
3. Case studies
4. Cross sectional/Survey
5. Analytical studies
6. Observational studies
7. Cohort studies
8. Cross sectional studies/Survey

Unit 3:

1. Methods of Sampling

1. Characteristics of good sampling
2. Probability or random sampling
3. Non probability sampling

2. Scientific writing

1. Different forms of scientific writing. Significance, Different steps, Mechanics of writing reports and precautions to be taken while writing research reports
2. Articles in Journals, Research notes and reports, Review articles, Monographs, Dissertations, Bibliographies
3. Appendices: use and guidelines.

Unit 4:

1 Research Tools

1. Levels of data measurements and characteristics of good measurement
2. Validity, reliability, sensitivity and specificity of research tools.

2 Types of tools and their uses

1. Questionnaire
2. Schedule
3. Rating scale
4. Attitude scale
5. Interview – structured and unstructured
6. Observation – participant and non-participant

3 Concept of data

1. Types of Data – Qualitative and Quantitative data
2. Graphical and diagrammatic presentation, Measures of central tendencies (Mean, median and mode), Measure of dispersion (Range, Mean deviation and standard deviation) and their relative measures.
3. Interpretation of Data– Meaning of interpretation, Technique of interpretation,
4. Precaution in interpretation- Interpretation of tables and figures.

Unit 5: Statistical Testing of Hypothesis

1 Application of parametric tests

1. r test
2. t tests
3. Z test
4. F test
5. ANOVA

2 Application of non parametric tests

1. Chi square test
2. Spearman's Rank correlation

References

- Bandarkar, P.L. and Wilkinson T.S. (2000): Methodology and Techniques of Social

Research, Himalaya Publishing House, Mumbai.
- Bhattacherjee, A (2012): Social Science Research: Principles, Methods, and Practices, 2nd Edition. Jacob Foundation, Zurich.
- Kothari,C R (2004): Research Methodology: Methods and Technologies, 2nd Edition, New Age Pvt Ltd., Publishers, New Delhi.
- Gupta, S.P. (2005): Statistical Methods, Sultan Chand & Sons Pvt. Ltd. New Delhi.
- Copper, H.M. (2002). Intergrating research: A guide for literature reviews (2nd Edition). California: Sage
- Harman, E & Montages, I. (Eds.) (2007). The thesis and the book, New Delhi: Vistar.
- Kapoor, J.N. and Saxena, H.C. (2002): Mathematical Statistics, S. Chand & Sons Pvt. Ltd., New Delhi.

Core - V

NUTRITIONAL BIOCHEMISTRY

Time: 6 Hrs **Marks: 100**
Credit: 5 **Internal :25**
Theory : 75

Objectives of the Course:

To enables the students to

Understand the need for the study of biochemistry as the basis for nutritional sciences.

Make students aware of metabolism of proximate principles and others.

UNIT I

Biologic oxidation

Enzymes and Co-Enzymes involved in Oxidation and Reduction. The respiratory Chain. The Role of High Energy Phosphates in Biologic Oxidation and Energy Capture. Role of the Respiratory Chain in energy Capture. Mechanism of Phosphorylation.

UNIT 2

Metabolism of Carbohydrates:

Glycolysis, formation and degradation of Glycogen, gluconeogenesis, The Citric Acid Cycle, The Hexose Monophosphate Shunt, Regulation of Carbohydrate Metabolism – Bioenergetics.

UNIT 3

Metabolism of Lipids:

Biosynthesis and oxidation of saturated and unsaturated fatty acids, essential fatty acids, biosynthesis and oxidation of glycerides, phospholipids, lipo proteins and cholesterol, ketone bodies, bioenergetics.

UNIT 4

Protein and amino acid metabolism

Deamination, decarboxylation and transamination of amino acids, urea cycle, biosynthesis of non-essential amino acids, catabolism of essential amino acids

UNIT 5

Overview of intermediary metabolism

The regulation of carbohydrates, protein and lipid metabolism

Metabolism of nucleic acid

Biosynthesis and degradation of purine and pyrmidine nucleotides (no structure), nucleic acid structure and function, Structure of DNA and replication, RNA synthesis – types and functions and metabolism, translation.

Recombinant DNA technology, Genetic engineering.

Recommended Texts:

1. Campbell, Mary K (2009): Biochemistry, 6h Edition, Thomson Brooks/Cole, Canada.
2. Ferrier, Denise R,(2014) : Lippincott's Illustrated Reviews: Biochemistry, 6th Edition, Wolters Kluwer, London
3. Harper, H (1997).A,Review of physiological chemistry, Large Medical Publication, 21st edition, Los Angles.
4. Albert L.Lehninger (1992): The molecular basis of cell structure and function ,Kalyani Publishers, New Delhi.
5. Talwar .G.P. SriVatsava L.N and Moudgil .K.D (2003): Textbook of biochemistry and Human Biology-3rd edition, Prentice Hall of India (P) Ltd. New Delhi.
6. RamaKrishnan. Textbook of Clinical Biochemistry, T.R.Publications, Chennai.
7. Plummer. D.T (1997): introduction to Practical biochemistry, New Delhi,Tata McGraw Hill Publishing Company.
8. Deb, A.C (1999), "Concepts of Biochemistry", Books and Allied (P) Ltd., Calcutta.

9. Rama Rao AVSS (1990) – Text book of biochemistry 5th edition LK and Publishers, Visakhapatnam.
10. Sadasivam, S and Manickam, A (1997), "Biochemical Methods", 2nd Edition, New Age International Publishers, New Delhi.

WEBSITES and e- LEARNING SOURCES:

- http//www.gwu.edu/~mpb-metabolic pathways of biochemistry
- http//www.indstate.edu/thcme/mwking/inborn.html-Inborn errors of metabolism
- http//www.worhtington-biochem.com/introBiochem/introEnzymes.html-enzymes
- http//en.wikipedia.org/wiki/Biochemistry-biochemistry encyclopedia.

CORE-VI

ADVANCED DIETETICS

Credits:4 **Marks:100**
Hours/week:6 **Internal:25**
Theory:75

Objectives:

- To acquire Knowledge regarding the effect of various diseases on nutritional status and nutrient requirement
- To gain knowledge in diet counselling and educating patients.
- To understand the modifications in nutrients and dietary requirements for therapeutic condition.
- To Learn recent concepts in dietary management of different diseases.

UNIT I

Nutritional Assessment , Basic concepts of diet therapy – Therapeutic adaptations of normal diet, Principles and classification of therapeutic diets. Routine Hospital diets – Regular, soft, fluid diet.

UNIT II

Dietary management in Febrile condition –Etiology, diagnosis, symptoms, Metabolic changes during infection and dietary treatment for - Typhoid, Influenza, Malaria, Dengue, Tuberculosis and HIV.

Medical Nutrition therapy for Rheumatic disease- Etiology, Pathophysiology of Inflammation of Rheumatic disease, Rheumatoid disease, Osteoarthritis .

UNIT III

Dietary management in Weight Imbalance - Prevalence and Classification, Components of body weight, Guidelines for Calculating Desirable body weight and Etiology, Physiology, Dietary management in Obesity and Underweight.
Prevalence, Etiology, risk factors and dietary modifications of Diabetes and cardiovascular diseases.

UNIT IV

Upper Gastrointestinal tract Diseases – Nutritional care and diet therapy in Diseases of oesophagus- Oesophagitis, Gastroesophegealrefluxdisease[GERD] Hiatus hernia.
Disorders of stomach: Indigestion, Gastritis, Gastric and duodenal ulcers, and dumping syndrome
Lower gastrointestinal tract Diseases/Disorders-Common Symptoms of Intestinal dysfunction - Flatulence, constipation, haemorhoids, diarrhoea, steatorrhoea,
Diseases of the large intestine-Diverticular disease, Irritable bowel syndrome, inflammatory bowel disease
Diseases of Small intestine-Celiac disease, tropical sprue, intestinal brush border enzyme deficiencies.

Classification, Complications, Metabolic changes in protein and electrolytes and Dietary management of burns.

UNIT V

Symptoms and Diagnostic tests, Common food allergens and Mechanism of food allergy, Elimination diets , Milk allergy in infants and prevention of food allergy and Dietary management of food allergy.
Effect of drugs on ingestion, Digestion, Absorption and metabolism of nutrients. Effect of foods, nutrients and nutritional status on drug dosage and efficacy.

Etiology and Clinical features and Dietary management of cancer.

References

1. Swaminathan S.: Advanced Textbook On Food & Nutrition Vol. 1 & N (2nd Ed. Revised _ Enlarged) Bapp Co. 1985.
2. Mahan L.K., Sylvia Escott-Stump (2000): Krause‟s Food Nutrition and Diet Therapy 10th Edition, W.B. Saunders Company London.
3. B. Srilakshmi, (2007): Dietetics, published by K.K. Gupta For New age International Pvt. Ltd. New Delhi.
4. Sue Rodwell Williams, (1993): Nutrition, Diet Therapy, (7th Ed): W.B. Saunders Company London.
5. Antia F.P. And Philip Abraham (2001) Clinical Nutrition and Dietetics, Oxford Publishing Company.
6. Gopalan C., Ram Sastri B.V. And BalSubramaniam S.C., (2006) Nutritive Value of Indian Foods, Hydrabad, National Institute of Nutrition, Indian Council of Medical Research.
7. Raheena M. Begum (1989): A Text Book of Foods Nutrition and Dietetics, Wiley Eastern Ltd., New Delhi.
8. Passmore P. And M.A. East Wood: Human Nutrition And Dietetics, Churchill Living Stone.
9. WohlShils And Goodheart : Modern Nutrition In Health And Disease, McLAren And Ubrman, Philadelphia.

10. Robinson Ch., M.B. Lawlea, W.L., Chenoweth, And A.E., Carwick : Normal And Therapeutic Nutrition, Macmillan Publishing Company.
11. Benion M.: Clinical Nutrition, Harper and Row Publishing M.Y.
12. Anderson L., M. V. Dibble, P. R. Turkki, H. S. Mitchell and H. J. Rynbergen Nutrition in Health and Disease, 17th ed., J. B. Lippincott Co., Philadelphia, 1982.
13. Whitney, E. N. and C. B..Cataldo: Understanding Normal and Clinical Nutrition, West Pub. S1. Paul, 1983.
14. Shills and Young. Modern Nutrition In Health And Disease
15. Willims, S. R.: Nutrition and Diet Therapy, 4th ed., The C. V. Mosby Co., S1. Louis, 1981.
16. Willims S. R.: Essentials of Nutrition and Diet Therapy, 4th ed., Mosby College Pub. S. Louis, 1986.

CORE-P-II

ADVANCED DIETETICS PRACTICALS

Credits:4 **Marks:100**
Hours/week:6 **Internal:40**
External:60

- Routine hospital diet : Regular diet, Clear liquid, Soft diet, Full liquid diet.
- Planning and preparing diet in fevers and infections – Typhoid, Malaria and Tuberculosis, HIV with and without comorbidities.

- Assessing, planning and preparation of diets for the following conditions
  a. IBD – celiac disease
  b. IBS – Lactose intolerance.
  c. GERD
  d. Peptic ulcer
- Assessing requirements and planning diet for obese and underweight individual.
- Preparing nutrient dense -high calorie and high protein recipes.
- Planning and Preparing high fiber low calorie recipes for pre and post Bariatric surgery patients.
- Assessment and planning diet for post burn condition.

CASE STUDY

(1) Collect history of patients (personal, clinical, pathological, medicinal)
said in theory.
(2) Study the cases, correlate the patient data and set the objectives for
diet planning and counseling.
(3) Plan, prepare and evaluate diets.

ELECTIVE II

FOOD PRODUCT DEVELOPMENT

Credits: 3 **Marks: 100**
Hours/Week: 4 **Internal: 25**
Theory: 75

Objectives:

To enable students to:

- Understand the various aspects of food product development
- Develop products that meets consumer requirements and demands
- Formulate products that are nutritionally and commercially viable

Contents

UNIT I: Introduction to new food product development

Definition, significance of product development, food needs and consumer preferences, market survey and designing a questionnaire to find consumer needs for a product. Steps involved in product development, formulation of nutritious food products and standardization, Intellectual Property Rights and patenting of foods.

UNIT II: Sensory evaluation of the product

Assessing the sensory characteristics of food - color, texture, flavor, odor and taste. Sensory evaluation of foods - Laboratory set up, equipment, panel selection and training, judging quality. Subjective evaluation techniques - Difference tests: paired comparison test, duo-trio test, triangle test. Rating tests – Ranking single sample, two samples and multiple samples. Analysis of sensory data. Objective tests to assess the sensory properties of foods.

UNIT III: Essentials of food packaging

Importance, definition, principles and basic FSSAI laws governing food packaging. Types of packaging material - metal, glass, paper, plastic, edible and other miscellaneous packaging materials. Packages with special features - Boil-in-bag package, plastic-shrink package, cryovacfilm, microwave oven packaging and high barrier plastic bottles. Types of aseptic packaging and distribution packaging.

UNIT IV: Product labelling and regulations

Definition, purpose, importance and laws governing product labelling. Functions of labelling and types – smart labels, barcode labels, radioactive labels, antimicrobial labels, security labels and other specialized food labels. Nutrition information in labelling. Definition, importance and functions of nutrition labeling. Standards and regulations for nutrition labeling. Nutrition claims in food labels.

Unit V: Quality control, pricing and marketing

Analyzing the product stability, evaluation of shelf life, determining the changes in sensory attributes due to environmental conditions. Principles of pricing, determining the selling price and profit margin. Basic pricing strategies – skimming approach, demand pricing, penetration pricing, cost-plus pricing, competitive pricing, premium pricing, price bundling, economy pricing, promotional pricing and quantity discounts. Factors that influence new product development success, advertisements and new marketing strategies.

PROJECT

Conduct a market survey and develop a new food product based on the needs of your target audience. Conduct sensory analysis tests for the formulated product. Identify a suitable packaging material and design a label for your product. Determine the selling price and devise any two marketing strategies to promote your product.

ACTIVITY

Planning and Preparation of Value added food products for the following Disease Conditions

- Diabetes
- Hypercholesterolemia
- Micro Nutrient Difficiencies
- Gastro Intestinal Disorders
- Obesity
- Underweight

References:

- Lyon, D.H, Francombe, M.A, Hasdell, T.A, Lawson, K (eds), (2002), "Guidelines for Sensory Analysis in Food Products Development and Quality Control", Chepman and Hall, London.
- Fuller, G.W, (1994), "New Food Product Development from Concept to Market Place", RC Press, New York.
- Man, C.M.D. and Jomes, A.A., (1994), "Shelf Life Evaluation of Foods", Blackie Academic and Professional, London.
- Frewer, L. and Van Trijp,H, (2007), "Understanding consumers of food products", Florida, USA: CRC Press.

SEMESTER III

CORE: VII

ADVANCED HUMAN NUTRITION – MACRO NUTRIENTS

Subject Code: 18PNDCT3007
Time:6 Hrs **Marks:100**
Credit:4 **Internal:25**
Theory :75

OBJECTIVE:
To enable the students to understand the relationship between lipid, carbohydrate, protein and mineral metabolism.
To learn about the therapeutic uses of carbohydrates protein and fat in prevention of non-communicable disease.
To get insights in the inborn errors of metabolism

COURSE OUTLINE:

UNIT I:

Energy- Energy content of foods, physiological fuel value, – current research studies.
Estimation of total energy requirements (BMR, REE and physical cost of activities)
TEE, Energy balance, Basal metabolic rate, total energy requirements,
BMR & RMR, Factors affecting BMR,
Thermic effect of food.
Changes in body weight and body composition with the changing energy balance, Regulation of food intake- role of hunger and satiety centers. Energy balance and obesity.

UNIT II:
Carbohydrates – Adaptive effects of dietary carbohydrates on intestinal disaccharides activity in man. Therapeutic uses of carbohydrates – sugars in parenteral nutrition (glucose, fructose and xylitol). Glycemic index of foods and its uses. Toxic effects of fructose , xylitol and galactose. Sugar alternatives, Role of dietary fiber in health and disease.
Role of carbohydrates in dental caries, obesity, CVD's and Diabetes Mellitus and current research studies.

UNIT III:
Protein – Historical review of protein metabolism, amino acid patterns in protein & of animals and vegetable origin, critical study of methods of assessment of protein quality. Physiological functions of proteins. Essential amino acids, amino acid balance and imbalance, requirement of individual amino acid. Role of protein in health and disease. Supplementation of individual aminoacid.

UNIT IV:
Lipids –Concepts of visible and invisible fats, EFA, SFA, MUFA, PUFA, omega – 6 to omega – 3 ratio. – sources and physiological functions and their role in health and disease. Adipose tissue – Lipogenesis and lipolysis, lipoproteins – types and healthimplication.
Storage of body fat, effects of deficiency andexcess of fat. Fat substitutes,Hypocholesterolaemic foods – garlic, fiber and plant proteins.

UNIT V:
WATER –Distribution of water in the body, exchange of water in the body. Water imbalance – dehydration- water intoxication, water and electrolyte mechanism - ADH ,vasopressin.

References:

- Guthire, H.A. (2001) – "Introductory Nutrition" Tenth edition, C.V. Mosby Company, St.Louis.
- Bogert, J.G.V., Briggs, D.H, Calloway, (2000), "Nutrition and physical fitness", 11thedition W.B. Saunders Co., Philadelphia, London,Toronto.
- Wardlaw, G.M and kessel, M, (2002) " Perspectives in Nutrition", 5thedition, Mc Graw Hill, New York, NewDelhi
- William, S.R. (2000), "Nutrition and Diet Therapy", Mosby Co., St.Louis,
- Sizer, F.S and whitney E.R. (2003). " Nutrition, Concepts and Controversies". 9th edition, Thomas Wadsworth,Australia.
- Brown, J.E. (2002), "Nutrition Now", 3rdedition, Wadsworth Thomson Learning NewYork.
- Maurice, E.Shills, James A, obson, Moshe shike, (2000), "Modern Nutrition in Health and Disease", Eight edition, vol I and II, Lea &Febiger Philadelphia, A WaverlyCompany.
- Mahan L.K. and stump, S.E (2002), "Krause's Food Nutrition and Diet Therapy", 10thedition, W.B. Saunder's company,Philadelphia.
- Toteja,G.S and singh P (2004), "Micronutrient Profile of Indian Population", ICMR Publication, NewDelhi.
- M. Swaminathan (2002), "Principles of Nutrition and Dietetics", BAPPCO, 88, Mysore RoadBangalore – 560018.

WEBSITE, E- LEARNING RESOURCES:

www.nutrition.gov– Service of National agricultural library, USDA
www.nal.usdfa.gov/fnic- Food and nutrition information center
www.fantaproject.org-Fanta technical assistance for nutrition
http://dietary-supplements.info.nih.gov– Officer of dietary supplements,national institute of health.

CORE- VIII

NUTRITION IN CRITICAL CARE

Subject Code: 18PNDCT3008

Credits:4 **Marks:100**

Hours/Week:6 **Internal:25**

Theory: 75

Objectives

The course will enable the students to:

1. Understand the physiology, metabolism and special nutritional requirements of the criticallyill.

2. Be familiar with the special nutritional support techniques and feeding formulations to meet their nutritionalneeds.

Specific Objectives of Learning:

1. To learn the various methods of feeding in hospitalized / critically illpatients
2. To learn the nutrition support systems used duringemergency

Contents

UNIT-I Nutrition care process

- Introducing "MUST"- Malnutrition Universal Screening Tool. Introduction to malnutrition, symptoms, risk, consequences, four tenets of good nutritionalcare.
- Definition and model of NCP
- Patient care andcounseling
- Food and druginteractions

UNIT-II Medical nutrition therapy for metabolic stress

Nutritional goals and monitoring therapy in critical illnesses like stress, trauma, sepsis, burns, head injury, surgeries of head, neck, stomach and bariatric Cancer, AIDS, Gastroesophagel reflux Disorder (GERD) and complications.

Patho-physiological, clinical and metabolic aspects, understanding of the special nutritional requirements – Ebb phase and flow phase.

- Characteristics of metabolicphases
- Factors to consider in screening an ICUpatient
- ASPEN practice guidelines for criticallyill.

UNIT-III Special feeding methods in nutritional support

Rationale and criteria for special nutrition support, Types, routes, composition of feeds, precautions while feeding. and precautions while feeding. Complications of parenteral and enteral therapy, refeeding syndrome. Palliative care and rehabilitation diets in stages**.**

UNIT-IV Nutritional support systems and other life- saving measures for the critically ill.

Artificial nutrition, Cardiopulmonary resuscitation (CPR), Mechanical ventilation, dialysis

- Monitoring the criticallyill
- Method & Equations for Determining NutritionalRequirements
- Role of specific nutrients as immune enhancers conditionally essentialnutrients,
- Role of specific nutrients as immune suppressant's, and special diets in criticalcare.

UNIT-V Nutritional support system in emergency relief situations such as flood, cyclone, earthquake, drought, war etc.

- Causes of malnutrition in emergencysituation,
- Major deficiency diseases inemergencies,
- Specific deficiency diseases inemergencies
- Control of communicable diseases inemergencies,
- Role of immunisation andsanitation.

Activity-

Visit to a CCU and ICU to carry out case studies for at least five critically ill patients.

References:

1. Mahan, L.K. and Escott-Stump, S. Krause's Food Nutrition and Diet Therapy, 12th Ed. W.B. Saundaers Ltd2007.
2. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. (Ed). Modern Nutrition in Health and Disease, 10 th Edition, Williams and Wilkins,2005
3. Williams, S.R. (1993): Nutrition and Diet Therapy, 7th Edition, Times Mirror/Mosby College,Publishing.
4. Whitney, E.N. &Rolfes, S.R. (1999): Understanding Nutrition, 8th Edition, West Wadsworth, An International Thomson PublishingCo.
5. Carolllutz and Karen Przytulski. 5 th edition. Nutrition and diet therapy, FA Davis Company.UK.2010.

Journals and magazines

1. The MUST Report- Development and use of "Malnutrition Universal Screening Tool"
2. Nutrition journal – Elsevier publication
3. Journal of the Academy of Nutrition and Dietetics- Elsevierpublication
4. The American Journal of clinical nutrition - Elsevierpublication
5. Nutrition Today- Wolters Kluwerpublication
6. The British Journal of nutrition – Cambridge UniversityPress

CORE IX

PERFORMANCE NUTRITION

Subject Code: 18PNDCT3009

Credits: 4 **Marks:100**

Hours/Week: 6 **Internal:25**

Theory:75

OBJECTIVES

To enable the students to

- Learn about the role of nutrients in enhancing SportsPerformance
- Understand the fundamentals of planning diet for differentsports
- Know about the different types of ergogenic aids and alternative systems to boost AthleticPerformance

Unit 1

Energy Production -ATP-PC,anaerobic and aerobic systems, metabolism. Energy costs of power and endurance sports.Development of fatigue, Fuel system for Exercises. High energy requirements during Stress, Fracture and Injury.

Unit II

Carbohydrate intake and sport performance in events - timings and types, utilization of carbohydrates during exercises, Glycaemic index and Glycaemic load. Requirements in Pre and Post exercises

Importance of Proteins to Athletes, gaining lean body weight. Role of fats in competitive performance.Requirements of Protein and fats in exercises.

Unit III

Requirements of vitamins and minerals during exercises. Exercise induced oxidative stress and antioxidant nutrients.

Nutrition for Athlete's immune system. Weight gain and weight loss in Athletes. Body composition –importance and methodologies for assessment.

Unit IV

Water – thermoregulation and exercise in the heat – effect of dehydration in exercise performance – heat illness – fluid guidelines before, during and after exercise.

Effects of dehydration and rehydration on sports performance, Temperature regulation and Fluid and Electrolyte balance. Nutrition for Competition Performance. Ergogenic aids- Definition and types, Nutritional ergogenic.Female Athlete Triad.

Unit V

Nutrition for special population: children and young Athlete, Ageing Athlete. Nutrition for special needs-Athlete with diabetes,VegetarianAthlete,Athletes with Gastro Intestinal disorders, Athletes with disabilities, Nutrition issues for travelling Athletes.

REFERENCES:

1. Deakin, Burke(2006), 3rd Ed, Clinical Sports Nutrition, McGraw-HillAustralia.
2. Bean, Anita (2006), 5th Ed, Sports Nutrition
3. Bourns, Fred (2002), Essentials of Sports Nutrition, 2nd Ed. John andWiley.
4. Suzanne Girard Eberle (2000), Endurance Sports Nutrition, Human Kinetics.
5. Benardot, Dan (2000), Advanced Sports Nutrition, Human Kinetics
6. Burke, Louise (2007), Practical Sports Nutrition, Human Kinetics
7. Gleeson, Jeukendrup (2004), Sports Nutrition: An Introduction to Energy Production and Performance, HumanKinetics

8.British Journal of SportsMedicine,bjsm.bmj.com

9.International Journal of Behavioural nutrition and Physical

activityhttp://ijpnpa.biomedcentral.com

CORE PAPER III

ANALYTICAL TECHNIQUES

Credits: 4 **Marks: 100**
Hours/Week: 6 **Internal: 40**
Theory: 60

Objectives:

To enable students to:

- Learn the techniques of estimation of biochemical parameters in blood and urine.
- Learn the techniques of estimating the quantity of different nutrients present in food.

Contents:

Blood Analysis

- Estimation of glucose in serum
- Estimation of serum total protein
- Estimation of serum albumin and albumin/globulin ratio
- Estimation of serum cholesterol

Urine Analysis

- Analysis of normal and abnormal constituents in urine
- Estimation of glucose in urine
- Estimation of urinary creatinine

Food Analysis

- Estimation of moisture content in food
- Estimation of ash content in food
- Estimation of crude fibre in food
- Estimation of iodine number and acid number of oil
- Estimation of ascorbic acid in food
- Estimation of beta-carotene in food
- Estimation of calcium in food
- Estimation of iron in food

Demonstration Experiments

- Estimation of protein content in food by Kjeldahl method
- Estimation of fat content in food by Soxhlet method
- Paper chromatography

References:

- Sadasivam, S and Manickam, A (1997), "Biochemical Methods", 2nd Edition, New Age International Publishers, New Delhi.
- Jayaram, I, (1996), "Laboratory Manual in Biochemistry", New Age International Publishers, Fifth reprint, New Delhi.
- Raghuramulu, N, Nair, K.M, Kalayanasundaram, S.A, (1983), "Manual of Laboratory Techniques", National Institute of Nutrition, ICMR.
- Ranganna, S, (2001), "Handbook of Analysis and Quality Control for Fruit and Vegetable Products", 2nd edition, Tata-McGraw- Hill, India.
- Otles, S, (Ed.), (2005), "Methods of Analysis of Food Components and Additives" CRC Press, USA.

ELECTIVE III

INSTRUMENTATION AND CLINICAL BIOCHEMISTRY

Subject Code: 18PNDCE3003

Time:4Hrs/W **Marks:100**

Credit:3 **Internal:25**

Theory : 75

OBJECTIVE OF THE COURSE:

To enable students to

- Understand the Basic principles of Analytical techniques andinstrumentation
- Understand the Basic principles of Clinicalbiochemistry
- Gain basic knowledge on clinical findings and metabolicdisorders

COURSE OUTLINE

UNIT I:

Analytical Techniques

- Immune Assay- Radio active isotopes- Priciples detectionmeasurement.
- GM counter, Scintillation, Scintillation counter, Scanningtechniques.

UNIT II:

Analytical Instrumentation

- Centrifugation: Basic Principles ofCentrifugation.
- Chromatography – Principle and Application- Paper Chromatography, TLC, HPLC, Gel filtration Chromatography andGLC.
- Electrophoresis –Paper,Gel.
- Photometry – Colorimetry- Spectrophotometry andFlourimetry.
- Polarimetry and Electronmicroscopy.

UNIT III:

Disorders of Carbohydrate Metabolism:

- Blood Glucose- Homeostasis, Ketosis, Ketogenesis, Diabetes Mellitus- GTT, Hypoglycemia,Glycohaemoglobins.
- Inborn errors of Carbohydrate Metabolism - Pentosuria, Fructosuria, Hereditary Fructose Intolerance, Galactosemia, Hereditary Lactose Intolerance, Glycogen Storage Disease

UNIT IV

Disorders of Lipid Metabolism:

- Disorders of lipoproteins, phospholipids and cholesterol metabolism, liver function tests.
- Inborn errors of Lipid Metabolism - Gaucher’s Disease (Glucosyl ,Cermaide , Lipidosis)

UNIT V:

Disorders of Protein Metabolism:

- Disorders of Plasma protein,nitrogen and urea metabolism. Immuno Deficiency Syndrome.
- Inborn errors of Protein Metabolism - Alcaptonuria, Phenylketonuria, Tyrosinemias, Homocystinuria, Histidinemia, Albinisim, Primary Hyperoxaluria, Cystinuria, Cystinosis, Maple Syrup Urine Disease(MSUD)

REFERENCES

1. Harper H.A., (1997) Review of Physiological Chemistry, Lange Medical Publications, LosAngeles.
2. Ramakrishnan (1994), Text book of Clinical Biochemistry and Human Biology, New Delhi, Prenticehall.
3. Chatwal, G & Anand, S, Instrumental methods of chemical analysis, 2005, Himalaya PublishingHouse.
4. Jean F. Zilwa, Peter R. Pannale, Philip R. (1998), Clinical Chemistry in Diagnosis and Treatment, NewYork.
5. Plummer D.T (1997), An introduction to practical Biochemistry, New Delhi McGraw Hill PublishingCompany.

WEBSITE, E-LEARNING RESOURCES:

http://www.gwu.edu/mpb-metabolic pathways of biochemistry
http://www.indstate.edu/thcme/mwking/inborn.html- inborn errors of metabolism http://www.worthington-biochem.com/introBiochem/introEnzymes.html-enzymes
http://en.wikipedia.org/wiki/Biochemistry-biochemistry encyclopedia

SEMESTER – IV

PAPER: X

ADVANCED HUMAN NUTRITION- MICRO NUTRIENTS

Time: 6 Hrs
Credit: 4
Theory : 75

Marks: 100
Internal :25

OBJECTIVE OF THE COURSE:

To learn the functions, deficiency symptoms, food sources and requirements of the different micro nutrients.
To learn to estimate Vitamin C, total nitrogen, lipids, iodine, vitamin A, beta carotene, and iron in foods.

COURSE OUTLINE:

UNIT I:

Distribution in the body; functions, effects of deficiency, food sources, requirement of macro minerals - Calcium, Phosporous, Magnesium, Potassium, Sodium and Chloride and micro minerals - – iron, zinc, fluoride and copper, calcium, phosphorus, magnesium and sulphur. Recent concepts with reference to macro minerals.

UNIT - II

Distribution in the body, functions, effects of deficiency, food sources, requirement of Ultra trace Minerals- Iodine, Selenium, Manganese, Chromium, Molybdenum, Boron and Cobalt , Selenium and Vitamin E relationship, Chromium and glucose tolerance factor. Recent concepts with reference to ultra-traces minerals.

UNIT III:

Fat Soluble Vitamins – Functions, effects of deficiency, food sources, requirements, units of measurements, hyper vitaminosis, of vitamins A,D,E and K. Recent concepts with reference to fat soluble vitamin.

UNIT IV:

Water soluble vitamins – Functions, effects of deficiency, food sources, requirements and recent research. of ascorbic acid and B vitamins. Other vitamin like factors- choline, carnitine, Myo-inositol, biotin, Ubiquinones and Bioflavonoids. Role of ascorbic acid in transforming cholesterol to bile acids.

UNIT V:

RECENT CONCEPTS IN NUTRITION: Definition, Concept and Role in prevention of disease - Prebiotics, Probiotics, Bioactive compounds Immunonutrients, Functional foods, polypheonols, phytoestrogen, Antioxidents, Immunogentics, Nutrigentics, Nutrigenomics, ,Nutraceuticals, Metabolomics., xenobiotics .

References

- Guthrie, H.A. (2001) – "Introductory Nutrition", Tenth edition, C.V. Mosby Company, St. Louis.
- Bogert, J.G.V., Briggs,D.H, Calloway, (2000). "Nutrition and physical fitness", 11th edition W.B. Saunders Co., Philadelphia, London, Toronto.
- Wardlaw, G.M and Kessel, M, (2002) "Perspective in Nutrition", 5th edition, Mc Graw Hill, New York, New Delhi.
- Willium, S. R. (2000), "Nutrition and Diet Therapy", Mosby Co., St. Louis.
- Sizer, F.S and Whitney E. R. (2003), "Nutrition, Concepts and Controversies" 9th edition, Thomas Wadsworth, Australia.
- Brown, J.E. (2002), "Nutrition Now", 3rd edition, Wadsworth Thomson Learning New York.

- Maurice, E. Shils, James A. Obson, Moshe shike, (2000), "Modern Nutrition in Health and Disease", 8th Edition, Vol I and II, Lea &Febiger Philadelphia, A Waverly Company.
- Mahan L.K. and stamp, S.E (2000), "Krause's Food Nutrition and Diet Therapy", 11th edition, W.B. saunder's Company, Philadelphia.
- Toteja, G.S and Singh P (2004), "Micronutrient Profile of Indian Population", ICMR Publication, New Delhi.
- M. Swaminathan (2002), "Principles of Nutrition and Dietetics", BAPPCO, 88, Mysore Road Bangalore – 560 018.

E- LEARNING RESOURCES:

www.nutrition.gov – Service of National agricultural library, USDA
www.nal.usdfa.gov/fnic - Food and nutrition information center
www.fantaproject.org- Fanta technical assistance for nutrition
http://dietary-supplements.info.nih.gov – Officer of dietary supplements,national institute of health.
www. fda.gov/search.html
www.nutrition.about.com
www.lifelines.com/n tnink.html
www.blonz.com

CORE XI
PUBLIC HEALTH NUTRITION

Marks: External: 75 Internal Assessment: 25
Credits : 4 Hours : 6

OBJECTIVES:

- To understand the concept of Public Nutrition.
- To enable students to develop a holistic knowledge base on the importance of understanding the nutrition problems and their prevention.
- To understand the nutritional problems during emergencies / disasters as well as the strategies to tackle them.
- To develop skills in preparation of communication aids and planning nutrition education programme for the community

CONTENT:

UNIT I
Concept of Public Nutrition

- Nutrition and Health in National Development
- Relationship between health and nutrition, National Health Care Delivery System, Determinants of Health Status, Indicators of Health.
- Nutritional deficiency disorders in India -Prevalence, Aetiology, Symptoms, Current status and Recent updates- PEM, VADD, IDD, Anaemia.

- Food Security -Concepts, Meaning and significance, Food security act, Food fortification and Food enrichment, Genetic improvement of foods, Food production and distribution. National nutritional policy.
- Role of public nutritionists in the health care delivery system.

UNIT II

Assessment of Nutritional Status

- **Direct methods: Direct** methods of Nutritional assessment, Nutritional anthropometry, biochemical, clinical and dietary assessment and Growth charts - plotting of growth charts, growth monitoring and promotion (GMP).
- **Indirect methods:** Demography, population dynamics and vital health statistics and their health implications. Food balance sheets, recent nutritional assessment methods- MNA, SGA, SOAP. Indicators ofhealth and nutrition. Causes of Malnutrition- Vicious cycle of malnutrition
- Basic concepts of Nutritional Surveillance- Millennium Development Goals (MDG)

UNIT III

Strategies for Improving Nutrition Status and Health Status of the Community

- **Immunization**: Awareness, Importance and schedule of Immunization.
- **National and International Contributions**:
  State Nutrition Councils and Beaureaus – Central and State. Health education Boards, social welfare boards, women's voluntary services, Supplementary feeding programmes (Mid day Meal Programme), Balwadi Feeding Programme. Public Distribution System (PDS), Antyodaya Anna Yojana (AAY), Annapurna Scheme, Food for Work Programme, Special Nutrition Programme, NNMB, NIN, NFI, FAO, WHO, UNICEF, CARE, FAO, AID, ICMR,CSIR, ICAR, CFTRI, ICDS, World Bank, etc.
- **Nutrition Intervention Schemes and Programmes Operating in India-** Control programmes - Vitamin A, Anaemia, Goiter, Malnutrition.

UNIT IV

Nutrition Education

- **Nutrition Education for the Community** –Objectives, Definition and Importance of nutrition education to the community, Principles of planning, executing and evaluating nutrition education programmes.
- **Development and Use of AV aids in Public Nutrition Education**. (Charts, flip chart, posters, flannel board, models, OHP)

UNIT V

Nutrition in Emergencies and Disasters

- **Natural and Manmade disasters resulting in emergency situations**
- **Nutritional problems in emergencies in vulnerable groups**

Macro and Micronutrient deficiencies

Infection

- **Control of communicable diseases in emergencies-** Factors responsible for the spread of communicable diseases, mode of transmission and prevention of chicken pox, typhoid, malaria, swine flu, tuberculosis and AIDS.

PRACTICALS:

1. Development of a plan for nutrition education programmes in community. Preparation of communication aids for different groups.
2. Development of low cost recipes for infants, preschoolers, elementary school children, adolescents, pregnant and lactating mothers
3. Field visits to ongoing national nutrition programmes

REFERENCES:

1. Shanti Ghosh (1977), The feeding and care of infants and young children. Voluntary Health association of India – New Delhi.
2. Jelliffe. D.B. (1996), The assessment of nutritional status on the community – WHO,Monograph Series – No.53. Geneva.
3. Owen, A.Y. and Frackle, R.T., (2002): Nutrition in the Community. The Art of Delivering Services, 2nd Edition Times Mirror/Mosby.
4. Park, K. : "Park's Text Book of Preventive and Social medicine", BanarsidasBahnot publishers, Jabalpur
5. The management of Nutrition In Major Emergencies, (2002): WHO". Published by AITBS Publishers, New Delhi

WEBSITE, E-LEARNING RESOURCES:

http://www.hsc.wvu.edu/library/U-links/community nutrition.htm
www.asns.org/nnjun04a.pdf
www.fns.usda.gov/fsec/FILES/SafetyNet.pdf
www.ext.vt.edu/actionforhealthykids/assistanceguide/lesson5background.pdf

ELECTIVE- IV

ADVANCED FOOD SERVICE MANAGEMENT

Credits: 3 **Marks: 100**
Hours/Week: 4 **Internal: 25**
Theory: 75

Objectives

The course will enable the students:
1. To gain knowledge and develop skills in menu planning, purchasing and storage policies, and quality control in a food service establishment.
2. To acquire knowledge about safety hygiene and sanitation issues of a food service establishment

Specific Objectives of Learning

1. The students will know about the various purchasing policies, factors that determine menu planning of a food service, various styles in food serving.

2. To make students familiar with standard operating procedures, potential hazards in food production food safety regulations

Content

UNIT 1 HISTORY, DEVELOPMENT OF FOOD SERVICE SYSTEM AND FOOD MANAGEMENT, MENU PLANNING

- History and development, recent trends, types of food service establishments, commercial establishments, non-commercial establishments, understanding management, approaches to food service management
- The importance of menu and menu planning in food service organization, definition and functions of a menu, the need for menu planning, knowledge and skills required for planning menu, types of menu and its applications,uses of menus , steps in menu planning and its evaluation, construction of menu , how to plan a menu?, characteristics of a good menu, displaying a menu, and evaluation of menu.

UNIT 2 PURCHASE AND STORAGE, QUALITY FOOD PRODUCTION AND CONTROL

- Mode of purchasing, centralized purchasing, group purchasing, methods of purchasing, identifying needs and amounts to buy, minimum stock level, maximum stock level , receiving and inspecting deliveries, storage space , dry storage , low temperature storage , store room management
- Production control, use of standardized recipes, developing a programme for recipe standardization, safeguard in food production, quality control in food preparation and cooking, controlling microbiological quality

UNIT 3 FOOD MANAGEMENT: DELIVERY AND SERVICE STYLES

- Methods of delivery service system, centralized delivery system, decentralized delivery system choice of delivery/service systems, conventional food service system, commissary food service system - ready prepared food service system, assembly service system
- Different types of service in food service establishments, table and counter service, self-service, tray service, types of service in a restaurant, silver service, plate service cafeteria service,buffet service. specialized forms of service, hospital tray service,airline tray service, rail service, home delivery , catering and banquet , floor/room service , lounge service

UNIT 4 PERSONNEL MANAGEMENT, WORK PLACE SAFETY.

- Definition of leadership, components approaches, qualities, leadership styles, staff planning and management, recruitment, placement, laws governing employees, work productivity, organisation chart, design of jobs, productivity improvement measures
- Issue in worker safety and security, personal hygiene and sanitary practices,health of staff sanitation training and education for food service workers, sanitation training and education ,work place safety e prevention of accidents, types of accidents , precautions to prevent accidents

UNIT 5 SANITATION, HYGIENE AND ISSUES IN FOOD SAFETY

- Definition of hygiene and sanitation, Factors affecting hygiene and sanitation, checks to ensure hygiene and sanitation, Time temperature relationships, general restaurants safety rule.
- Flow of food through foodservice establishment, proper food handling, potential hazards in food production food safety regulations and standards, prerequisite programs, standard operating procedures HACCP, Seven principles of HACCP

REFERENCES

1. Mohini Sethi and SurjeetMalhan , 4 th Edition. (2011) Catering Management. An Integrated Approach. Wiley Eastern Ltd. New Delhi.
2. Bessie B and West Le Wood (1986) Food Service in Institutions (6th Ed.) Macmillan Publishing Co.
3. Mohini Sethi, (2008), 6 th edition, Institutional Food Management, New age publications, New Delhi
4. June Payne-Palacio, Monica Theis, 13 th edition. (2011) Foodservice Management: Principles and Practices, Prentice Hall
5. Sudhir Andrews (2017), ëFood and Beverage Service- Training Manualí, 23rd Reprint, Tata McGraw Hill Publishing Co.
6. V Suganthi and C Premakumari Food service management . I st edition (2017).New age international publishers.

ELECTIVE- V

BASIC CONCEPTS IN HOME SCIENCE

Credits: 3 **Marks: 100**
Hours/Week: 4 **Internal: 25**
Theory: 75

Objectives:

To enable students to have a sound knowledge in various branches of Home Science for strengthening the extension and research base.

Specific Objectives of Learning:

On successful completion of these units, students are expected:

- To describe the importance of each branch of Home Science
- To understand the essence of each subject
- To prepare them for UGC NET, SLET and ASRB

UNIT – I Extension Education

1. Meaning, Definition, objectives, characteristics, principles
2. Extension teaching methods- steps, types and methods
3. Qualities of a good Extension Worker
4. Communication, Innovation and Social change

UNIT – II Human Development

1. Human Development –Principles and Developmental Task
2. Life Span Development – Theories of Human Development and Behaviour- Sigmund Freud, Erickson, Jean Piaget, Kohlberg and Urie Bronfenbrenner. Child rearing practices and disciplinary techniques
3. Early Childhood Education – objectives and types of Nursery schools. Exception children- identification and rehabilitation. Play-importance, characteristics and stages.
4. Advanced child study methods and assessment.

UNIT – III Textiles and Clothing

1. General properties and structure of textile fibres.
2. Processing and manufacture of natural and man-made fibres.
3. Definition and classification of yarns: Identification of yarns and their use in various fabrics. Fabric construction, definition and types of woven, non-woven and knitted fabric
4. Clothing: Principles and selection of clothing
5. Clothing construction – basic principles
6. Textile design-principles and concepts.
7. Care and maintenance of textiles materials and garments; Laundry agents and equipment.

UNIT – IV Family Resource Management

1. Concept of Home Management and steps – Management of Family Resources
2. Classification of Resources; Basics characteristics of Resources
3. Time, Money and Energy management
4. Decision making in family, Steps in decision making; Methods of resolving conflicts
5. Work simplification; Importance of work simplification in home; Mundel's classes of Change
6. Interior design- Principles and Elements of Interior design. colour schemes.

UNIT – V-Guidance and Counselling

1. Meaning, nature, types and scope of guidance and counselling
2. Various steps and techniques of Guidance and counselling
3. Need and importance of educational guidance.

References:

- Craig, Grace J (2002), Human Development. Rue Education, USA
- Corbman.P.B. (1985). Fibre to Fabric. New York :Macraw Hill Book Company.
- Dantyagi. S. (1996). Fundamentals of Textiles and their Care, New Delhi: Orient Longman Limited.
- Gropu, (1987). Home Management, New Delhi : Arya Publishing House.
- Jha, J.K. (2002). Encyclopaedia of Teaching of Home Science, Vol.I,II and III . New Delhi: Anmol Publications.
- Suriakanthi.A., (2002). Child Development - An Introduction, Gandhigram : Kavitha Publications.
- Varghese , M.A.et al (1994). Home Management , New Delhi: Viley Eastern Limited.

Procedure for Internal Marks

THEORY

Internal Marks - 25

Distribution: Tests - 20
Group Discussion/Quiz Seminar / Assignments - 5

PRACTICAL

Internal Marks - 40
Distribution: Tests -40

Procedure for External Marks

Question Paper Pattern:

THEORY

Time: 3 hrs
MM: 75

PART A
Ten out of twelve questions (10x2=20)
At least two questions from each unit and not more than three questions from each unit.

PART B
five out of seven questions (5x5=25)
At least one question from each unit and not more than two questions from each unit.

PART C
Three out of five questions (3x10=30)
One question from each unit

PRACTICAL
Time: 3 hrs
MM: 6