M.A./ M.Sc. HOME SCIECE (FOODS & NUTRITION)

Department of Home Science

Banaras Hindu University

Semesterwise distribution of Courses and Credits

Semester-I		
Course Code	**Titles**	**Credits**
HFM101	Research Methods and Scientific writing	**3**
HFM102	Applied Physiology	**3**
HFM103	Nutritional Biochemistry and Methods of Investigation	**4**
HFM104	Institutional food Administration	**3**
HFM105	Women's Health and Nutrition	**3**
HFM106	*Practicals based on course* HFM101	**2**
HFM107	*Practicals based on course* HFM102	**2**
HFM108	*Practicals based on course* HFM103	***2***
Total		**22**
Semester-II		
HFM201	Statistics	**3**
HFM202	Advanced Nutrition –I	**4**
HFM203	Food Safety, quality control and sensory evaluation of foods	**4**
HFM204	Food Science and Microbiology	**3**
HFM205	Computer Application	**3**
HFM207	*Practicals based on course* HFM203	**2**
HFM208	*Practicals based on course* HFM204	**2**
	Optional paper	**2**
	Total	**23**
Semester – III		
HFM301	Pilot Survey for Dissertation and Synopsis Formulation and Seminar	**3**
HFM302	Experimental Foods	**3**
HFM303	Advanced Nutrition – II	**3**
HFM304	Nutritional Epidemiology	**3**
HFM305	Community Nutrition	**3**
HFM307	*Practicals based on course* HFM302	**2**
HFM308	*Practicals based on course* HFM303	**2**
	Optional paper	**2**
Total		**21**
Semester –IV		
HFM401	Dissertation	**6**
HFM402	Therapeutic Nutrition and Biochemical correlates	**3**
HFM404	*Practicals based on course* HFM402	**2**
	Total	**11**
	Grand Total	**77**

SEMESTER-I

Code: HFM101: RESEARCH METHODS AND SCIENTIFIC WRITING

Credits 3

PART – A – RESEARCH METHODS

Science, Scientific Methods, Scientific Approach: Role of Statistics and research in Home Science discipline: Objectives of research: Explanation, control and prediction.

Types of Research: Historical, survey, experimental, case study, social research, participative research; definition and identification of a research problem, selection of research problem, justification, theory, hypothesis, basic assumptions, limitations and delimitations of the problem.

Types of Variables

Theory of Probability: Population and sample, probability sampling: Systematic random sampling, Two stages and multi stage sampling, Cluster sampling, Non-Probability sampling: purposive, quota and volunteer sampling/snowball sampling.

Basic Principles of Research Design and hypothesises: Purposes of research design; Fundamental, applied and action exploratory and descriptive experimental, survey and case study, ex-post facto, Longitudinal and cross sectional.

Qualitative Research Methods: Theory and design in qualitative research, Definition and types of qualitative research, Methods and techniques of data collection, Informal group discussions, Interviews; Key informants, in-depth interviews, Observations

Data Gathering Instruments: Observation, questionnaire, interview, scaling methods, case study, home visits, reliability and validity of measuring instruments. Scales of measurement and the appropriate statistical techniques.

Critical analysis of research.

PART – B – SCIENTIFIC WRITING

Scientific writing as a means of communication: Different forms of scientific writing Articles in journals. Research notes and reports. Review articles, Monographs, Dissertations, Bibliographies.

How to formulate outlines: The reasons for preparing outlines, guide for plan of writing, skeleton for the manuscript, Kinds of outline, topic outlines, conceptual outline, sentence outlines, combination of topic and sentence outlines

Drafting Titles, Sub Titles, Tables, Illustrations: Tables as systematic means of presenting data in rows and columns and lucid way of indicating relationships and results, formatting Tables: Title, Body stab, Stab Column, Column Head, Spanner Head, Box Head, appendices; Use and guidelines

The writing process: Getting started, Use outline as a starting device, Drafting, Reflecting, Re-reading, Checking organization, Checking headings, Checking content, Checking clarity, Checking grammar, Brevity and precision in writing, Drafting and Re-drafting based on critical evaluation

Parts of Dissertation/Research report/Article: Introduction, Review of Literature, Method, Results and Discussion, Ask questions related to content, continuity, clarity, validity internal consistency and objectivity during writing each of the above parts.

Writing for Grants: Clearly state the question to be addressed, Rationale and importance of the question being address, Emperial and theoretical conceptualization, Presenting pilot study/data, Research proposal and time frame, Clarity, specificity of method, Clear organization, Outcome of study and its implications, Budgeting, Available infra-structure and resources, Executive summary

References

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

2. Bhatnagar, G.L. (1990): Research Methods and Measurements in Behavioural and Soxial Sciences, Agri. Cole Publishing Academy, New Delhi.

3. Dooley, D. (1995): Strategies for interpreting Qualitative Data; Saga Publications, Claifornia.

4. Gay, L.R. (1981, 2nd Ed.): Educational Research, Charles, E. Merill, Columbus, Ohio.

5. Long, J.S. (Ed.) (1988): Common Problems Proper Solutions: Avoiding Errors in Quantitative Research Beverly Hills, Sage Publications, California.

6. Mukherjee, R. (1989): The Quality of lIfe: Valuation in Social Research, Saga Publications, New Delhi. 7. Stranss, A. and Corbin, J. (1990): Basis of Qualitative Research: Grounded Theory Procedures and Techniques, Saga Publications, California.

PRACTICAL

HFM107: RESEARCH METHODS AND SCIENTIFIC WRITING **Credits 2**

➢ Abstract of different types of research should be given and discussed in the practical classes.

➢ Students should be asked to collect data from the household of B.H.U. Campus by using different sampling techniques in a group.

➢ The Student should be given exercises on different kinds of Scientific Report writings.

➢ Presentation should be made by the students on their field work reports.

References :-

1. APA (1984): Publication Manual of American Psychological Association (3rd Edition), Washington, APA 2. Copper, H.M. (1990): Integrating Research: A Guide for Literature Reviews (2nd Edition), California, Sage.

3. Dunn, F.V. & Others (ed.) (1994): Disseminating Research Changing Practice, NY: Sage.

4. Haman, E. &Montagnes, I. (Eds.) (1997): The Thesis and the Book, New Delhi: Vistaar.

5. Locke, L.F. and Others (1987): Proposals that work: A Guide for Planning Dissertations & Grant proposals (2nd Ed.), Beverly Hills: Sage.

6. Mullins, C.J. (1977): A Guide to Writing and Publishing in Social and Behavioral Sciences, New York: John Wiley & Sons.

7. Richardson, L. (1990): Writing Strategies, Reaching Diverse Audience, California: Sage.

8. Stemberg, R.J. (1991): The Psychologist's Companion: A Guide to Scientific Writing for Students and Researchers, Cambridge, OUP.

9. Thyer, B.A. (1994): Successful Publishing in Scholarly Journals, California: Sage.

10. Wolcott, H.F. (1990): Writing up Qualitative Research Newbury Park: Sage

HFM102: APPLIED PHYSIOLOGY **Credits 3**

General Physiology: Revision of structure of cells tissues, muscles, organs, system phenomena life, constancy of internal environment.

Body Fluids: Blood; blood composition, volume, plasma proteins; origin, composition and function, blood groups. red blood cells; structure and functions, origin and life history; number of blood cells in the blood, hemoglobin, its composition and functions, regulation of red blood cell formation.

Circulatory System: Working of the heart, anatomy, properties of heart muscle: origin of the heart beat, heart; sounds, control of heart rate, reflexes involving the heart, velocity of blood flow, resistance to blood flow and blood pressure. Blood vessels, arteries, capillaries, veins, control of blood vessels, pulse physiological constancy of blood pressure, origin and propagation of cardiac cycle.

Digestive System: Review of structure and function, Secretion, digestive and absorptive functions, Role of liver, pancreas and gall bladder and their dysfunction, motility and hormones of GIT

Respiratory System: Organs, structure, function, composition of inspired and expired and alveolar air respiration internal and external, its rate, factors affecting it, artificial respiration anoxia.

Excretory System: Urinary system, organs, structure, functions, mode of formation of urine, process of maturation, skin structure and function, temperature of the body and its regulation, maintenance of acid-base balance, electrolytes.

Reproduction: Reproductive organs-the ovary, development of graffian follicle, the testis, maturation of the sperm, fertilization development of the ovum, implantation, pregnancy, fetal membrane, parturition, lactation and its regulation, ovarian and uterine cycle and their regulations, Effect of hormones on menstruation, ovulation.

Musculoskeletal System and Sensory Organs: The spinal cord and brain, the neurons synapses, chemical, theory of conduction across nerve, pathways of the spinal cord, Reflux action, kinds of reflexes, functions of the different part of the brain, Sensory mechanisms, Different kinds of receptors with reference to the sense organs, Automatic nervous system, Sensory Organs, Eyes, Ear, Nose, Tongue and Skin.

Endocrine System: Endocrine glands and their hormones, hormonal regulation, its functions.

Immune System: Cell mediated and humoral immunity Activation of WBC and production of antibodies, role in inflammation and defense

HFM108: PRACTICALS BASED ON APPLIED PHYSIOLOGY Credits-2

1. Examination of slides of connective tissues, nerve tissues, muscular tissues, epithelial tissues. Section of kidney, skin, respiratory tract, lung, blood vessels, ovary tests, uterus, endocrine glands, different regions of the alimentary canal, digestive glands.
2. Recording of number and type of respiration, vital capacity, artificial respiration.
3. Estimation of haemoglobin; blood film preparation, staining, blood grouping and matching study of cells in normal coagulation of blood, Clotting and bleeding time, colour index, heart sound, blood pressure, pulse, clinical examination and recording.
4. Urine examination – normal abnormal physical examination and chemical examination, estimation of sugar and albumin.

References:-

1. Ganong, W.F. (1985): Review of Medical Physiology, 12th Edition, Lange Medical Publication.

2. Moran Campell E.J., Dickinson, C.J. Slater, J.D. Edwards, C.R.W, and Sikora K (1984): Clinical Physiology, 5th Edition, ELBS, Blackwell Scientific Publications.

3. Guyton, A.C. (1985): Function of the Human Body, 4th Edition, W.B. Sanders Company, Philadelphia.

4. Guyton, A.C. and Hall, J.B. (1996): Text Book of Medical Physiology, 9th Edition, W.B. Sanders Company, Prism Books (Pvt.) Ltd., Bangalore.

5. Wilson, K.J.W. and Waugh, A. (1996): Ross and Wilson Anatomy and Physiology in Health and Illness, 8th Edition, Churchil Livingstone.

6. McArdle, W.D., Katch, F. I. and Katch, V.L. (1996): Exercise Physiology, Energy, Nutrition and Human Performance, 4th Edition, Williams and Wilkins, Baltimore.

7. Jain, A.K.: Textbook of Physiology. Vol. I and II. Avichal Publishing Co., New Delhi.

HFM103: NUTRITIONAL BIOCHEMISTRY AND METHODS OF INVESTIGATION

Credits 4

PART – A - NUTRITIONAL BIOCHEMISTRY

Scope and importance of Biochemistry, important physical phenomenon influencing the reactions of living matter; surface tension, colloidal state, permeability, osmotic pressure hydrogen ion concentration, chemistry of carbohydrates; glycolysis, gluconeogenesis, citric acid cycle, hexose monophosphate pathway, Chemistry of lipids; beta oxidation, synthesis and break down of unsaturated fatty acids, cholesterol, phospholipids, triglycerides, 229 . Chemistry of proteins, amino acids, peptide linkage, nucleic aids, DNA replication and transcription, regulation of gene expression protein synthesis, RNA, electrolytes, pH buffers, chemistry of vitamins sources requirements, functions, deficiency, chemistry of minerals and trace elements, water balance, acid base balance, detoxification in the body; metabolism of foreign compounds.

PART – B - METHODS OF INVESTIGATION

Electrolytic dissociation: Acids, bases, salts, buffers, Hendersen; Hasselbach equation. Theory of indicators and principles of measurement of pH.

Basics of Instrumentation: Physico; chemical principles and methodology; Colorimetry, photometry, fluorimetry, flame photometry and atomic absorptiometry.

Chromatography: Principles and application in paper (circular, ascending and descending), ion-exchange, column, thin layer, gas liquid and high performance liquid chromatographic techniques.

Electrophoresis: Principle and applications in paper and gel electrophoresis.

Bioassays: Animal studies, human studies, microbiological assays, use of Isotopes: radioactive and stable isotopes. NMR and its applications.

Immunological methods: RIA, ELISA.

PRACTICALS

HFM108: NUTRITIONAL BIOCHEMISTRY AND METHODS OF INVESTIGATION

Credits 2

PART – A- NUTRITIONAL BIOCHEMISTRY

This course will enable the students to: Perform biochemical analysis with accuracy and reproducibility.

1. Proteins: Estimation of protein in food stuffs, estimation of albumin, globulin and albumin/globulin ratio in serum and urine, estimation of hemoglobin.

2. Glucose: Estimation of glucose in blood and urine.

3. Cholesterol: Estimation of cholesterol in blood.

4. Urea and Creatinine: Estimation of urea and creatinine in serum and urine.

5. Survey of pathological laboratories: To obtain information about the methods used for blood/serum analysis.

PART – B – METHODS OF INVESTIGATION

Objectives This practicals will enable the students to :

1. Orient themselves regarding the use of various analytical techniques for specific estimations.

2. Comprehend better the principles involved in different methods of investigation.

3. Become efficient in the use of some of the most commonly used techniques and instruments in high quality research.

4. Acid and Alkalis: Preparation of dilute solutions of common acids and alkalis and determining their exact normalities.

5. Buffers: Preparation of phosphate, carbonate-bicarbonate, boric acid, acetate, chloride and pthalate buffers and determination of their pH by the use of indicators and pH meters.

6. Spectrometry: Beer Lambert Law, absorption maximum, preparation of standard curve and nutrient estimations in UV and visible range, AAS, AES, Flamephotometry.

7. Fluorimetry: Estimation of thiamin and riboflavin.

8. Chromatography: Paper; identification of amino acids by circular, ascending and descending methods. Ion-exchange; separation of amino acids. Column - Separation of proteins. Thin layer;

Identification of amino acids. Gas-liquid; Estimation of fatty acids. HPLC – Estimation of β-carotene and α-tocopherol.

9. Electrophoresis: Fractionation of plasma proteins.

References:-

1. Boyer, R. (2000). 3rd Ed. Modern Experimental Biochemistry. Person Education, Asia.

2. Dawes, E.A. (1980). 6th Ed. Quantitative Problems in Biochemistry. Longman Group Ltd.

3. Khosla, B.D., Garg, V.C. and Khosla, A. (1987). 5th Ed. Senior Practical Physical Chemistry. R. Chand and Co., New Delhi.

4. Oser, B.L. (1965). 14th ed. Hawk's Physiological Chemistry. Tata McGraw-Hill Publishing Co. Ltd.

5. Raghuramulu N.; Madhavan Nair and K. Kalyanasundaram, S. (1983). A Manual of Laboratory Technique. NIN, ICMR.

6. Sharma, B.K. (1999). 8th Ed. Instrumental Methods of Chemical Analysis. Gel Publishing House.

7. Srivastava, A.K. and Jain, P.C. (1986). 2nd Ed. Chemical Analysis: An Instrumental Approach. S. Chand and Company. Ltd.

8. Varley, H.; Gowenlock, A.H. and Bell. M. (1980). 5th ed. Practical Clinical Biochemistry. Heinemann Medical Books Ltd.

9. Vogel, A.I. (1962). 3rd Ed. A Textbook of Quantitative Inorganic Analysis by the English Language Book Society and Longman.

10. Murray, R. K. Granner, D. K. Mayes, P.A. and Rodwell, V.W. (2000): 25th Ed. Harpers Biochemistry, Macmillan Worth Publishers.

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

12. Devlin, T.M. (1997): 4th Ed. Textbook of Biochemistry with Clinical Correlation; Wiley Inc.

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

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

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

16. Oser, B.L. (1965): 14th ed. Hawk's Physiological Chemistry. Tata McGraw-Hill Publishing Co. Ltd.

17. Varley, H. Gowenlock, A.H. and Bell, M. (1980). 5th ed. Practical Clinical Biochemistry, Heinemann Medical Books Ltd.

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

19. Vogel, A.I. (1962). 3rd ed. A Textbook of Quantitative Inorganic Analysis. The English Language Book Society and Longman.

20. Raghuramulu, N.; Madhavan Nair and K. Kalyanasundaram, S. (1983). A Manual of Laboratory Techniques. NIN. ICMR.

21. King, E.J. and Wootton, IDP (1956). 3rd ed. Micro-Anlysis in Medical Biochemistry. J and A Churchill Ltd.

22. Plummer, D.T. (1987). 3rd ed. An introduction of Practical Biochemistry. McGraw Hill Book Co.

23. Winton, A.L. and Winton, K.B. (1999). Techniques of Food Analysis. Allied Scientific Publishers. Code:

HFM104: INSTITUTIONAL FOOD ADMINISTRATION **Credits 3**

Introduction to Food Service Systems, Evolution of the food service industry, Characteristics of the various types of food service units, Approaches to Management, Theories of management, Aspects of management, Styles of management, Management tools, Strategies in Planning, Conceptual strategy, Marketing strategy, Financial strategy, Types of plans, Management of Resources, Finance, Determining the finance needed to establish or run an unit, Budgets, Sources of finance, Planning adequate cash flow, Space & Equipment, Steps in planning layouts, Determining equipment, Selection and placement, Layout analysis, Material, Menu planning, Planning the material needed, Methods of selection, Storage, Quantity food production, Service and modes of delivery, Planning Menus, banquet, outdoor, catering, packed meals, Restaurant, Staff, Manpower planning, Manpower placement, Recruitment, induction, training, motivation and performance appraisal, Time and Energy, Measures for utilisation and conservation, Techno-economic feasibility of food production/service enterprise, Cost Accounting / analysis, Food cost analysis, records to be maintained, reports and trend analysis, Marketing and sales management, marketing strategies, Sales analysis, Market promotion, Quality assurance, Food quality, Total quality management, Market Survey and analysis of processed and finished products, Visit to any food service unit

References:

Management

1. West, B Bessie & Wood, Levelle (1988) Food Service in Institutions 6th Edition. Revised by Harger FV, Shuggart SG &Palgne-Palacio June Macmillian Publication Company New York.

2. Sethi Mohini (1993) Catering Management An Integrated Approach 2nd Edition Wiley Publication.

3. Kotas Richard &Jayawardardene, C (1994): Profitable Food and Beverage Management, Hodder & Stoughton Publication.

4. Brodner, J., Maschal, H.T., Carlon, H.M. (1982): Profitable Food and Beverage Operation 4th Edition, Hayden Book Company, New Jersey.

5. Green, E.F., Drake, G.G. Sweeny, J.F. (1978) Profitable Food and Beverage Management; Planning, Operations, Hayden Book Company, New Jersey.

6. Knootz, H, O Donnel C (1968): Principles of Management McGraw Hill Book Company.

Personnel Management

7. Desseler, Garry (1987) Personnel Management Modern Concepts and Techniques, Prentice Hall, New Jersey.

8. Kumar, H.L. (1986) Personnel Management in Hotel and Catering Industries, Metropolitan Book Company N. Delhi.

9. Hitchcock, M.J. (1980): Food Service System Administration, Macmillan Publishing Company.

Cost Control

10. Keiser, J &Kaillo, E. (1974): Controlling and Analysis of Cost in Food Service Operations, Wiley and Sons N. York.

11. Khari, W.L. (I) (1977): Introduciton to Modern Food and Beverage Service. (1979) Advanced Modern Food and Beverage service. Printice Hall Series.

12. Coltman, M.M. (1977): Food and Beverage Cost Control. Printice Hall Series.

13. Levson (1976): Food and Beverage Operation Cost Control & System Management. Printice Hall Series.

Layout and Design

14. Kazarian, E.A. (1989) Food service Facilities Planning. 3rd Editon, Von Nostrand Reinhold.

15. Kotschwar, L.H. & Terrell, M.E. (1977): Food Service Planning and Layout and Equipment 3rd Edition John Wiley and Sons, N York.

16. Avery, A.C. (1980): Modern Guide to Food Service Equipment. Boston CBI Publishing Company.

17. Brichfield, J. (1988): Design and Layout of Food Service Facilities, New York. Van Nortrand Reinhold.

18. Tovel, A.P. (1984): Standardising Food Service for Quality and Efficiency. AVI Publishing Company INC.

HFM105: WOMEN'S HEALTH AND NUTRITION **Credits 3**

Role of Women in National Development: Women in Family and Community; Demographic changes, menarche, marriage, fertility, morbidity, mortality, life; expectancy, sex ratio, aging and widowhood, female-headed families.

Women and Work: Environmental stress, nutrition, health and gender, living conditions, occupational health, health facilities. Women's nutritional requirements and food needs.

Women and Society: Women's role, their resources and contribution to family and community and effect on nutritional status, Effect of urbanisation on women, Impact of economic policies, industrialization and globalization on women.

Women and Health: Health facilities, Disease patterns and Reproductive health, Gender and health, Health seeking behaviour, Women; pregnancy and lactation, Safe motherhood, Care of at-risk mothers, Family planning, Women and aging; Special concerns in developed and developing societies: menopause, osteoporosis, chronic degenerative diseases, neurological problems, Women and AIDS

Women and nutrition: Situation of women in global, national and local context, Improving the nutritional and health status, Interventions throughout the life cycle.

Policies and legislations: CEDAW (Convention on Elimination of all forms of Discrimination Against Women), Women's Right to Life and Health (WRLH), Legal status of women.

Empowerment of Women: Role of Education and various national schemes and programmes for women development

Problems and issues related to women in India: Child marriage, Female foeticide, infanticide, Socialization of girl child, Dowry, Employment, Women in Politics, Domestic Violence

Reference:

1. ACC/SCN Policy Discussion Papers

2. Wallance, H.M. and Giri, K. (1990): Health Care of Women and Children in Developing Countries, Third Party Publishing Co., Oakland, California.

3. UNICEF (1994): The Urban Poor and Household Food Security, UNICEF.

4. IDRC (1993): Gender, Health and Sustainable Development.

5. NGO Committee on UNICEF (1997): Women and Children in Urban Poverty – What Way Out?

6. Census Reports, Government of India.

7. NFHS Reports

8. UNICEF – State of the World's Children.

9. Weil, D.E.C.; Alicbusan, A.P.; Wilson, J.F.; Reich, M.R. and Brdley, D.J. (1990). The impact of Development Policies on Health. A Review of the Literature, World Health Organization. Geneva.

10. International Nutrition Foundation – Micronutrient Initiative (1999): Preventing Iron Deficiency in Women and Children; Technical Consensus on Key issues.

11. Gopalan, C. and Kaur, S (Eds) (1989): Women and Nutrition in India, Nutrition Foundation of India. Minor Elective

SEMESTER-II

HFM201: STATISTICS **Credits 3**

Nature of Scope of Statistics, methods of data representation -text, tabular and diagrammatic representation. Frequency distribution and their constructions: graphical representation of frequency distribution - histogram frequency polygons, Olives. Measurement of central tendency and their properties, partition values and their uses. Measurements of dispersion with their properties. Concept of skewness and kurtosis and their measures. Bivariate data , scatter diagram, coefficient of correlation and their properties, rank correlation, regression lines and their uses. Basic concept of probability and random variable and its probability distributions, binomial and normal distributions. Elements of testing of hypotheses, null and alternative hypotheses, simple and composite hypotheses type-1 and type II errors, level of significance critical region.

Chi- squre test for independence of attitudes for 2x2 and mxn contingency tables, tests of goodness of fit, normal test for significance of population mean and population proportion for one sample and two sample problems: application of t- test for small samples in testing significance of mean and equality of two population means.

References

1. Goon, A.M., Gupta, M.K. AND Dasgupta, B. : Fundamentals of Statistics, Vol I
2. Garrett, Heny E. (1971): Statistics in Psychology and Education, David Haley & Co.

HFM202: ADVANCED NUTRITION – I **Credits 4**

Energy: Energy content of foods. Physiological fuel value – review. Measurement of Energy Expenditure: BMR, RMR, thermic effect of feeding and physical activity, methods of measurement. Estimating energy requirements of individuals and groups. Regulation of energy metabolism: control of food intake, digestion, absorption and body weight.

Utilization of digestive nutrients and desirability

Carbohydrates: Types, classification, digestion, and transport; review, dietary fibre, fructooligosaccharides, resistant starch; chemical composition and physiological effects Glycemic index of foods. Sweeteners nutritive and non-nutritive.

Proteins: Classification, digestion, absorption and transport – review. Metabolism of proteins: Role of muscle, liver and gastro intestinal tract. Protein quality, methods of evaluating protein quality. Protein and amino acid requirements. Therapeutic applications of specific amino acids: Branched chain, glutamine arginine, homocysteine, cysteine, taurine.

Lipids: Classification, digestion, absorption, transport – review. Functions of EFA. Role of n-3, n-6 fatty acids in health and disease. Requirements of total fat and fatty acids. Trans fatty acids. Prostaglandins.

Minerals: Note: for each nutrient sources, bioavailability, metabolism, function, requirements, RD/ESADDI, deficiency and toxicity, interactions with other nutrients are to be discussed.

Macro minerals: Calcium, Phosphorous, Magnesium, Sodium, Potassium and Chloride.

Micro minerals: Iron, Copper, Zinc, Manganese, Iodine, Fluoride.

Trace minerals: Selenium, Cobalt, Chromium, Vanadium, Silicon, Boron, Nickel.

Vitamins: Historical background, structure, food sources, absorption and transport, metabolism, biochemical function, assessment of status. Interactions with other nutrients. Physiological, pharmacological and therapeutic effects, toxicity and deficiency with respect to the following:

Fat soluble: Vitamins A, D, E & K.

Water soluble: Thiamine, Riboflavin, Niacin, Biotin, Pyridoxine, Folic Acid, Pantothenic Acid, Ascorbic Acid, Cyanocobalamin, Choline, Inositol.

References:

1. Annual Reviews of Nutrition. Annual Review Inc, California, USA.

2. Shils, M.E.; Olson, J.; Shike, M. and Roos, C. (1998): Modern Nutrition in Health and Disease. 9th edition. Williams and Williams. A Beverly Co. London. 3

. Bodwell, C.E. and Erdman, J.W. (1988) Nutrient Interactions. Marcel Dekker Inc. New York.

4. World Reviews of Nutrition and Dietetics.

5. European Journal of Clinical Nutrition.

6. International Journal of Vitamin and Nutrition Research.

7. International Journal of Food Science and Nutrition.

8. Nutrition Research

9. Ann NutrMetab.

HFM203: FOOD SAFETY, QUALITY CONTROL AND SENSORY EVALUATION OF FOODS **Credits 4**

PART – A FOOD SAFETY AND QUALITY CONTROL

Introduction to quality assurance and food safety assurance, Current concepts of quality control, Quality assurance programme; Quality plan, documentation of records, products standards, Product and purchase specifications, process control and HACCP, hygiene and housekeeping, corrective action, quality programme and total quality process.

Product Evaluation: Specifications and food standards. International, National; Mandatory, Voluntary, Tests for specific raw food ingredients and processed, Proximate Principles, Nutrient Analysis, Quality Parameters and Tests to Adulterants, Consumer Protection.

PART – B SENSORY EVALUATION OF FOOD

Introduction to sensory analysis and uses of sensory tests.

General testing conditions.

Selection of test subjects and training of panel.

Types of tests: Discrimination/difference test: Paired test, triangle test and duo-trio test; tests for multiple samples, difference from control/reference, Qualitative Difference Tests; Ranking, Numerical scoring test, magnitude estimation, Descriptive Tests; Rating for sensory profile, Threshold tests, Acceptance test; Monadic, paired and sequential monadic. Descriptive analysis, concept alignment and selection of terms.

Consumer acceptability using sensory evaluation.

PRACTICALS

HFM207: FOOD SAFETY, QUALITY CONTROL AND SENSORY EVALUATION OF FOODS **Credits 2**

PART – A –FOOD SAFETY AND QUALITY CONTROL

Objectives

1. To test different foods for their quality

2. To detect adulteration in different foods.

3. To get familiarized with tests used for quality control.

Assessment of purity and quality using appropriate standard tests for the following: Milk and milk products, Ice creams and sherbets, Spices and condiments and salt, pickles, sauces and chutneys, Tea and coffee, Canned, dehydrated, frozen and bottled fruit/vegetable products, Flesh foods, Fruit juices, concentrates and beverages.

PART – B –SENSORY EVALUATION OF FOOD

1. Establishing sensory panels: Selecting and recruiting panelists, screening for trained panels, training panelists, monitoring performance. Recognition tests for 4 basic tastes, odour and aroma. Tests with other senses. Threshold tests.

2. Analytical tests: (i) Difference (ii) Ranking (iii) Descriptive (iv) Scoring and (v) Rating.

3. Planning a Sensory Experiment: (i) Designing the questionnaire and scorecard, (ii) identifying descriptors.

4. Conducting the Test

5. 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

6. Report Writing

References:

1. Martens, M.; Dalen, G.A.; Russwurm, H. (eds) (1987): Flavour Science and Technology, John Wiley and Sons, Chichester.

2. Jellinek, G. (1985): Sensory Evaluation of Food Theory and Practice. Ellis Horwood, Chichester.

3. Piggott, J.R. (ed.) (1988): Sensory Analysis of Foods. Elsevier Applied Science, London.

4. Moskowitz, H.R. (1983): Product Testing and Sensory Evaluation of Foods: Marketing and R & D approaches. Food ad Nutrition Press, Connecticut.

5. Watts, B.M., Ylimaki, G.L., Jeffery, L.E. and Elias, L.G. 91989): Basic Sensory Methods for Food Evaluation. The International Development Research Centre, Ottawa, Canada.

6. BIS 6273 (1972): Guide for Sensory Evaluation of Foods. Optimum Requirement. Part I. Bureau of Indian Standards, Manate Bhavan, New Delhi.

7. Early, R. (1995): Guide to Quality Management Systems for the Food Industry, Blackie, Academic and Professional, London.

8. Ranganna, S. (1986): Handbook of Analysis and Quality Control for Fruit and Vegetable Products, 2nd edition, Tata McGraw Hill Publishing Co. Ltd., New Delhi.

9. Bryan, F.L. (1992): Hazard Analysis Critical Control Point Evaluations. A Guide to Identifying Hazards and Assessing Risks Associated with Food Preparation and Storage. World Health Organisation, Geneva.

10. Food and Agricultural Organisation (1980): Manuals of Food Quality Control. 2. Additives Contaminants Techniques, Rome.

11. Bureau of Indian Standards: Specifications and Standard Methods.

12. Herschderfer (1987): Quality Control in Food Industry, Food Science and technology – A series of Monographs, Academic Press, London.

HFM204: FOOD SCIENCE AND MICROBIOLOGY **Credits 3**

PART – A – FOOD SCIENCE

Introduction to Food Science: Evolution of the Food Industry and Allied Industries. Development of Food Science as a discipline, Colloidal state, stabilization of colloidal systems, Rheology of food dispersions, Gels; Structure, formation, strength, types of permanence, Emulsions; Formation, stability, surfactants and emulsifiers, Foams; Structure, formation and stabilization

Enzymes: Review of nomenclature, properties and isolation; Factors influencing enzymes, Enzyme inactivation and control, Food modification by enzymes, Immobilized enzymes in food processing, Enzymes in waste management, Enzymes and health/nutrition/food issues

Lipids: Role of food lipids in flavour; Effects of processing on chemical structure and physical properties, Precursors of Aroma compounds, Physiological effects of lipids and safety issues, Lipids exposed by frying conditions, hydrogenated fat and irradiated foods, Lipids; protein complexes

Carbohydrates: Use of polysaccharides in food: Individual Polysaccharides; Agar, Alginates, Carrageenan, Gum Arabic, Xanthan, Guar gum, Tamarind flour, Pectin, Polysaccharide hydrolyses, Modified Starches; mechanically damaged starches, extruded starches, pregelatinized, tin boiling starch, cross-linked starches, starch ethers and esters, oxidized starches, Use of non-starch polysaccharides in food

Flavors: Methods of flavour analysis, Taste and non-specific saporous sensation, Individual aroma compounds: Vegetable, fruit and spice flavour, Flavours from lactic acid / ethanol fermentation, flavour volatiles from fats and oils, flavour volatiles in muscles foods and milk, Thermally induced

process flavours, Volatiles from oxidative cleavage of carotenoids, Interactions with other food constituents, Natural and synthetic flavours

Food Colorants: Pigments in animal and plant tissues, Food colours; Types and properties, regulatory aspects, safety issues.

Beverages: Harvesting, processing and by-products; Coffee, tea, cocoa, alcoholic beverages.

Problems of chemical residues in food: Recent advances in biotechnology; Recombinant DNA techniques, genetically modified foods.

PART – B – MICROBIOLOGY

Introduction to historical developments in food preservation, spoilage, infections and legislation, Factors affecting the growth of micro-organisms in food, Intrinsic and Extrinsic parameters that affect microbial growth, Methods of Isolation and detection of microorganisms or their products in food, Conventional methods, Rapid methods (Newer techniques), Immunological methods: Fluorescent, antibody, Radio immunoassay, ELISA etc., Chemical methods: Thermostable nuclear, ATP measurement and PCR (Polymers chain reacitons) – only principles in brief, Spoilage of different groups of foods: Cereal and cereal products, vegetables & fruits, meat & meat products, eggs and poultry, fish and other sea foods, milk and milk products, canned food, Food borne diseases: bacterial, and viral foodborne disorders, Food-borne important animal parasites, Mycotoxins, Role of microbes in fermented foods and genetically modified foods.

PRACTICALS

HFM208: FOOD SCIENCE AND MICROBIOLOGY **Credits 2**

PART – A –FOOD SCIENCE

1. a. Study of structure of starch from different sources. Effect of processing on starch – swelling and retrogradation, starch hydrolysis.

b. Viscosity measurement – in swelling and gelatinization of starch. c. Estimation of starch and non-starch polysaccharides.

2. Thermal stability of protein. Effect of added components; acid, alkali, organic solvents, organic solutes and detergents.

3. a. Effect of Factors affecting fat Lipolysis; Fatty acid composition, temperature, moisture, surface area, presence of pro and

b.anti-oxidants: Measurement of peroxide value, TBA, total and volatile components.

4. Surface tension: Measurement in hydrophilic, hydrophobic fluids and in emulsions.

5. Measurement of browning in a food system.

6. Polyphenol oxidase activity in enzymatic browning

PART – B – MICROBIOLOGY

1. Preparation of common laboratory media and special media for cultivation of bacteria, yeast & molds.

2. Staining of bacteria: Gram's staining, acid-fast, spore, capsule and Flagellar staining, Motility of bacteria, Staining of yeast and molds.

3. Cultivation and identification of important molds and yeast. (Slides and mould culture).

4. Study of environment around us as sources of transmission of micro-organisms in foods. Assessment of surface sanitation of food preparation units' swab and rinse techniques.

5. Demonstration of available rapid methods and diagnostic kits used in identification of micro-organisms or their products.

References:

1. Pelezar, M.I. and Reid, R.D. (1993) Microbiology McGraw Hill Book Company, New York, 5th Edition.

2. Atlas, M. Ronald (1995) Principles of Microbiology, 1st Edition, Mosby-Year Book, Inc, Missouri, U.S.A.

3. Topley and Wislson's (1983) Principles of Bacteriology, Virology and Immunity, Edited by S.G. Wilson, A. Miles and M.T. Parker, Vol. 1: General Microbiology and Immunity, II: Systematic Bacteriology. 7th Edition. Edward Arnold Publisher.

4. Block, J.G. (1999) Microbiology Principles and Explorations, 4th Edition John Wiley and Sons Inc.

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8. Garbutt, J. (1997) Essentials of Food Microbiology, 1st Edition, Arnold International Students Edition.

9. Doyle, P. Benehat, L.R. and Mantville, T.J. (1997): Food Microbiology, Fundamentals and Frontiers, ASM Press, Washington DC.

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11. Bensaon, H.J. (1990) Microbiological aplications, C. Brown Publishers, U.S.A.

12. Roday, S. (1999) Food Hygiene and Sanitation, 1st Edition, Tata McGraw Hill, New Delhi.

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17. Diehl, J.F. (1995) Safety of Irradiated Foods Marcel Dekker Inc, New York.

18. Friberg, S.E. and Larsson, K. (editors) (1997) Food Emulsions. Marcel Dekker, New York.

19. Goldberg, I. (ed.) (1994) Functional Foods Chapman and Hall, Inc.

20. Gunaskekaran, S. (ed) (2001) Nondestructive Food Evaluation Marcel Dekker Inc, New York.

21. Tombs, M.P. (1991) Biotechnology in the Food Industry Prentice – Hall Inc, India.

22. O'Brien, L.O., Nabors and Gelardi, R.C. (1991) Alternative Sweeteners. marcel Dekker, New York. 23. Risch, S.J. and Hotchkiss, J.H. (ed.) (1991) Food Packaging Interactions II. ACS Symposium Series 473, American Chemical Society, Washington D.C.

24. Marwaha, S.S. and Arora, J.K. (2000) Food Processing: Biotechnological Applications Asiatech Publishers Inc, New Delhi.

25. Mahindru, S.N. (2000) Food Additives – Characteristics – Detection and Estimation Tata McGraw Hill Publishing Co. Ltd.

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27. Borwankar, R.P. and Shoemaker, C.E. (1992) Rheology of Foods. Elsevier Science Publisher Ltd., England.

28. Charalambour, G. (1990) Flavours and Off-Flavours' 89, Elsevier Science Publisher Ltd., P.O. Box 211, 1000 AE Amsterdam, The Netherlands.

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30. FAO Food and Nutrition Paper: manual of Food Quality Control – Parts 14/1 (1979) to 14/8 (1986), FAO of the United Nations Rome.

Journals

1. Journal of Food Science Published by the Institute of Food Technologies, Chicago In. U.S.A.

2. Journal of Food Science and Technology published by Association of Food Scientists and Technologists (India) CFTRI – MYSORE.

3. Food technology published by the Institute of Food Technologists, Chicago Iu. U.S.A.

HFM205: COMPUTER APPLICATION **Credits 3**

Overview of a computer system, Software and hardware; Block diagram of computer; CPU, I/O and memory. Basics of operating systems MS-DOS and WINDOWS.Basic use of MS-WORD. Complications of the following statistical problems:

1. Diagrammatic, graphical and Tabular representation of data
2. Construction of frequency distribution and their graphical representation
3. Calculation of different measurement of central tendency, dispersion, skewness and kurtosis
4. Computations of coefficient of correlation, regression lines and rank correlation
5. Application of chi-square tests, t-test, z-tests and F test on empirical data

SEMESTER-III

HFM301: PILOT SURVEY FOR DISSERTATION AND SYNOPSISFORMULATION AND SEMINAR **Credits 3**

For this paper students are required to do the following:
Conduct pilot survey for collecting the data and formulate the synopsis for the dissertation.
Deliver a seminar for their above work

HFM302: EXPERIMENTAL FOODS **Credits 3**

Sugar Cookery: Relative sweetness, solubility and sizes of sugars,stages of sugar cookery, caramelization, crystallization, factor affecting crystal formation

Cereals and Cereal Products: Cereal grains: Structure and composition, Cereal products, Flours and flour quality**,** Extruded foods, breakfast cereals, wheat germ, bulgar, puffed and flakedcereals.
Fats, Oils and related Products: Sources, composition, effects of composition on fat properties, Functional properties of fat and use in food preparations, Fat substitutes, Fat deterioration and antioxidants, Radiolysis, Inter-esterification of fats.

Enzymes: Nature of enzymes, stability and action. Proteolytic enzymes, oxidases, lipases, enzymes decomposing carbohydrates and applications. Immobilized enzymes duration of protein

Milk and Milk Products: Composition. Physical and functional properties. Denaturation,Effects of processing and storage, Dairy products; cultured milk, yogurt, butter whey, cheese,concentrated and dried products, frozen desserts, dairy product substitutes.

Meat and Poultry: Muscle composition Characteristics and structure, Post mortem changes,Processing, preservation and their effects. Heat-induced changes in meat, Variables in meat
preparation, Tenderizers, meat Products.

Eggs: Structure and Composition, changes during storage, Functional properties of eggs, use incookery, Egg processing, Low cholesterol egg substitutes.

Fish and Sea Food: Types and composition Storage and changes during storage, changes duringprocessing, By-products and newer products.

Pulses and Legumes: Structure, composition, Processing, Toxic constituents.

Nuts and Oilseeds: Composition, oil extraction and by products.

Fruits and Vegetables: Plant anatomy, gross composition, structural features and activities of living systems, enzymes in fruits and vegetables. Flavour constituents. Plant phenolics.Pigments, Post harvest changes, Texture of fruits and vegetables, Effects of storage, processing and preservation, browning.

Spices and Condiments: Composition, flavouring extracts – natural and synthetic.

Processed Foods: Jams, Jellies, Squashes, Pickles.

Traditional Processed Products: Fermented Foods; cereal-based, pulse; based, fruit/vegetable – based, vinegar, pickles.

Leavened Products: Leavening agents, Biologically leavened and chemically leavened products, Batters and dough.

Salt and substitutes.

PRACTICALS

HFM307: EXPERIMENTAL FOODS **Credits 2**

1. Effect of solutes on boiling point and freezing point of water.
2. Effect of types of water on characteristics of cooked vegetables, pulses and cereals.
3. **Sugar Cookery:** Relative sweetness, solubility and sizes of sugars, stagesof sugar cookery, caramelization, crystallization, factors affecting crystal formation.
4. **Starches, Vegetable, Gums and Cereals:** Dextrinization gelatnization, retrogradation, thickening power. Factors affecting gels. Gluten formation and factors affecting glutenformation.
5. **James and Jellies:** Pectin content of fruits, role of acid, pectin and sugar in jam and jellyformation. Use of gums and emulsifiers/stabilizers.
6. **Fat and Oils:** Flash point, melting point and smoking point. Role of fats and oils incookery as: shortening agent, frying medium. Factors affecting fat absorption. Fatcrystals. Plasticity of fats. Permanent and semi-permanent emulsions.
7. **Milk and Milk Products:** Scalding, denaturation. Effect of acid, salt, alkali, sugar, heat,enzymes, polyphenols on milk. Khoa, curd, paneer, cheese (ripened and un-ripened).
8. **Egg:** Structure, assessing egg quality. Use of egg in cookery: Emulsions, airincorporation, thickening, binding, gelling. Method of egg cookery and effect of heat.Egg white foams and factors affecting foams.
9. **Pulses:** Effect of various cooking and processing methods on various characteristics,functional properties of pulses and their products.
10. **Gelatin:** Gelatin, gel strength and factors affecting gelation. Ability to foam.

11. **Fruits and Vegetables:** Pigments: Effects of cooking, metal ions, pH. Effect of variouscoking processes on different characteristics of vegetables. Prevention of enzymaticbrowning.

12. **Leavened Products:** Fermentation – Use of micro-organisms (lactic acid, yeast), steamas an agent, egg as an agent, chemical agents.

13. **Beverages:** Factors affecting quality of beverages.

14. **Frozen Desserts:** Factors affecting ice crystal formation. Quality characteristics offrozen desserts.

References:-

1. Charley, H. (1982): Food Science (2nd edition), John Wiley & Sons, New York.
2. Potter, N. and Hotchkiss, J.H. (1996): Food Science, Fifth edition, CBS Publishers and Distributors, New Delhi.
3. Belitz, H.D. and Grosch, W. (1999): Food Chemistry, (2nd edition), Springer, New York.
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7. Duckworth, R.B. (Ed) (1978): Water Relation to Foods, Academic Press, London.
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10. Tindall, H.D. (1983): Vegetables in the Tropics, MacMillan, Press, London.
11. Julians, B.O. (Ed.) (1985): Rice Chemistry and Technology, (2nd edition), American Association of Cereal Chemists, St. Paul Mimesota, USA.

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13. Peckham, G. and Freeland – Graves, G.H. (1979): Foundations of Food Preparation.
14. Becker, P. (1965): Emulsions: Theory and Practice, Reinhold, New York.

Journals

1. Journal of Food Science.
2. Advances in Food Research
3. Journal of Food Science and Technology
4. Journal of Agricultural and Food Chemistry.

5. Cereal Science
6. Journal of Dairy Sciences.
7. Journal of the Oil Chemists Society.

HFM303: ADVANCED NUTRITION – II **Credits 3**

Physiology of Hunger and Satiety: Role of central nervous system, gastric contractions, intestinal absorption, glucostatic regulation.

Nutrient requirements: The basis upon which nutrient recommendations are made.

Difference between requirements, recommended allowances and desired intake. Recommended intake for proteins, calories, fat, carbohydrates, vitamins, minerals and water, Trace elements in human nutrition, Nutrient interrelationships, Protein energy interrelationships, Amino acid interrelationships, Amino acid and Vitamin interrelationships, vitamin and mineral interrelationship, minerals, vitamins, hormones and enzymes interrelationships, Nutritional adaptations, Nutrition and natural resistance to infection and acquired immunity, Inborn errors of metabolism, The use of radio isotopes in the study of human nutrition.

PRACTICALS

HFM308: ADVANCED NUTRITION – II **Credits 2**

1. Calculation of nutrient requirements of individuals and population groups.
2. Factors to be taken into consideration for determination of recommended allowances.
3. Study of Dietary Standards.
4. Diagnosis of nutritional deficiencies and their prevention.
5. Estimation of Protein Quality using different methods PER, B.V., N.P.U., NDP – Cal%.
6. Estimation of energy value of foodstuffs using bomb calorimeter.
7. Estimation of Energy Requirements; BMR, Energy expenditure on physical activities, Factorial approach
8. Balance studies; Nitrogen balance

References:

1. Mitchell: Comparative nutrition of man and domestic animal, 1. I, II. 1964.
2. Alabnese: New method of nutritional Biochemistry, Vol. II, 1965.
3. Annual Reviews of Nutrition. Annual Review Inc, California, USA.
4. Shils, M.E.; Olson, J.; Shike, M. and Roos, C. (1998): Modern Nutrition in Health and Disease. 9th edition. Williams and Williams. A Beverly Co. London.
5. Bodwell, C.E. and Erdman, J.W. (1988) Nutrient Interactions. Marcel Dekker Inc. New York.
6. World Reviews of Nutrition and Dietetics.
7. European Journal of Clinical Nutrition.
8. International Journal of Vitamin and Nutrition Research.
9. International Journal of Food Science and Nutrition.

10. Nutrition Research
11. Ann NutrMetab

HFM304: NUTRITIONAL EPIDEMIOLOGY **Credits 3**

Introduction to Epidemiology and Branches of Epidemiology: Types of Epidemiology
Epidemiological Information: Collecting epidemiological data, Secondary Routine
Patterns of Disease: Descriptive Epidemiology, Cross sectional analysis, Prevalence and incidence, risk factors, risks and odds, Relative and Attributable risks**,** Principles of Nutritional Epidemiology.
Measurement Issues: Measurement of disease, Occurrence and Measures of association, Exposure and Outcome, Assessment of Food Consumption, Intake and validation of Assessment, Biochemical Markers of nutrient intake and nutritional status, Socio demographic and psycho social variables, Anthropometric measurements, Design and planning of nutritional epidemiological studies, assessing, applying and evaluating Epidemiological Studies. Discussion of selected case studies, Nutritional assessment as a tool for improving the quality of life of various segments of the population including hospitalized patients, Current methodologies of assessment of nutritional status, their interpretation and comparative applications of the following; Food consumption, Anthropometry, Clinical and Laboratory, Rapid Assessment &PRA, Functional indicators such as grip strength, respiratory fitness. Harvard Step test, Squatting test, Nutritional Surveillance; Basic concepts,uses and setting up of surveillance systems, Monitoring and Evaluation

References:

1. Anisa Basheer (1995): Environmental Epidemology, Rawat Publications, Jaipur
2. Margetts, B.M. and Nelson, M. (1998): Design Concepts in Nutritional Epidemiology, Oxford, New York.
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6. Health Medicine, Oxford, New York.
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12. HRSA/MCHB/UIC (1998): Analytic Methods in Maternal and Child Health, Division ofScience, Education and Analysis, Maternal and Child Health Bureau, Health Resources

and Services Administration, Editors Hardler, A, Roserberg, D., Monahan, C., Kennelly,J.
13. Kiely, M. (ed.) (1991): Reproductive and Perinatal Epidemology, CRC Press.
14. UK Nutritional Epidemiology Group (1993): Diet and Cancer: A review of theepidemology literature. The Nutrition Society, London.
15. Dunn, G (1989) Design and analysis of reliability studies. Edward Arnold, London.
16. Dwyer, J.H. Feinleib, M, Lipert, P., Hoffmeister, H (ed) (1992) statistical Models forLongitudinal Studies of Health. Oxford University Press, Oxford.
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19. Kok, F.J. and Van't Veer, P. (ed) (1991): Biomarkers of Dietary Exposure. Smith-Gordon, London.
20. Gibson, R.S. (1990) Principles of Nutritional Assessment. Oxford University Press,Oxford.
21. Dunn, G. (1989): Design and Analysis of Reliability Studies Edward Arnold, London.
22. Jelliffe, D.B. and Jelliffe, E.F.P. (1989): Community Nutritional Assessment, OxfordUniversity Press.
23. Beghin, I., Cap, M. and Dujardan, B. (1988): A Guide to Nutritional Status Assessment,WHO, Geneva.
24. Gopaldas, T. and Seshadri, S. (1987): Nutrition Monitoring and assessment, OxfordUniversity Press.
25. Mason, J.B., Habich, J.P., Tabatabai, H. and Valverde, V. (1984): NutritionalSurveillance, WHO.
26. Lee, R.D. and Nieman, D.C. (1993): Nutritional Assessment, Brown and BenchmarkPublishers.
27. Sauberlich, H.E. (Ed.) (1999): Laboratory Tests for the Assessment of Nutrition Status,CRC Press.
28. Cameron, N. (1984): Measures of Human growth, Sheridan House Inc. New York.

Code: HFM305: COMMUNITY NUTRITION Credits 3

Concept of community nutrition: Relationship between health and nutrition, role of public nutritionists in the health care delivery.

Primary Health Care of the Community: National Health Care Delivery System**,** Determinants of Health Status**,** Indicators of Health

Food and Nutrition Security: Nutritional Status; Determinants of nutritional status of individual and populations, Nutrition and Non-nutritional indicators; socio-cultural, biologic, environmental and economic.

Major Nutritional Problems: Etiology, prevalence, clinical manifestations, preventive and therapeutic measures; Macro and micro nutrient deficiencies**,** Other nutritional problems like

lathyrism, dropsy, aflatoxicosis, alcoholism and fluorosis. Overweight, obesity and chronic degenerative diseases.

National Food and Nutrition Policy, Plan of Action and Programmes: Health-based interventions, Food-based interventions, including fortification and genetic improvement of foods, supplementary feeding, Nutrition Education for Behaviour Change.

References:-

1. Owen, A.Y. and Frankle, R.T. (1986): Nutrition in the Community, The Art of DeliveringServices, 2nd Edition, Times Mirror/Mosby.
2. Park, K. (2000: Park's Textbook of Preventive and Social Medicine, 18th Edition, M/sBanarasidasBhanot, Jabalpur.
3. State of the World's Children, UNICEF.
4. Census Reports.
5. Bamji, M.S., Rao, P.N. Reddy, V. (Eds.) (1996): Textbook of Human Nutrition; Oxfordand IBH Publishing Co. Pvt. Ltd., New Delhi
6. Gopalan, C. and Kaur, S. (Eds.) (1989): Women and Nutrition in India, NutritionFoundation of India.
7. Gopalan, C. and Kaur, S. (Eds.) (1993): Towards Better Nutrition, Problems and Policies,utrition Foundation of India.
8. Gopalan, C. (Ed.) (1987): Combating Undernutrition – Basic Issues and PracticalApproaches, Nutrition Foundation of India.
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10. National Nutrition Policy (1993): Dept. of WCD, Govt. of India.
11. World Health Organization (1998): World Health Report: Life in the 21st Century, Reportof the Director General, WHO, Geneva, Switzerland.

Semester-IV

HFM402: THERAPEUTIC NUTRITION AND BIOCHEMICAL CORRELATES OF NUTRITIONALTHERAPY **Credits 3**

PART – A – THERAPEUTIC NUTRITION

Nutritional screening and assessment of nutritional status of hospitalized and outdoor patients: Identification of high-risk patients, Assessment of patient needs based oninterpretation of patient data-clinical, biochemical, biophysical, personal etc.

Newer trends in delivery of nutritional care and dietary counselling.

Diet, nutrient and drug interaction: Effect of drugs on ingestion, digestion, absorption andmetabolism of nutrients, Effect of food, nutrients and nutritional status on drug dosage andefficacy.

Nutritional support: Recent advances in techniques and feeding substrates.

Etiopathophysiology, metabolic and clinical aberrations, complications, prevention and recent advances in medical nutritional management of: Weight imbalances**,** Cardiovascular disorders**,** Diabetes mellitus and other metabolic disorders**,** GI Tract Disorders**,** Liverand gall bladder, Pancreatic disorders**,** Renal disorders**,** Stress and trauma**,** Cancer**,** Neurological disorders**,** Musculo-skeletal disorders**,** Immuno-deficiency disorders**,** Geneticdisorders**,** Infections, Respiratory problemsChildhood problems/disorders including inborn errors of metabolism and their nutritionalmanagement.

PART – B – BIOCHEMICAL CORRELATES OF NUTRITIONAL THERAPY

Biochemical tests used in nutrition: Merits and demands of various methods,

Organ function tests; Organ function tests of liver, kidney, thyroid, gastric, pancreas,

Nutrition and Cancer;Effects of cancer on nutritional requirements, Effects of food on incidence of certain cancers,Carcinogenic foods, Foods that prevent cancer,

Nutritional management of non-nutritionalconditions; Alcohol related diseases, Diseases due in tobacco chewing, betel leaf chewing, paan masala, etc., Dental diseases,

Role of nutrition in skin and hair care, Cosmetic effects of diet; Cellulite, Allergies, Anti aging foods, Foods as cosmetic agents, Eating disorders;Anorexia nervosa, bulimia nervosa, Food and Endorphins**;** Alteration of mental states by food, Sepsis and trauma; Metabolic alterations in injury, sepsis, Protein metabolism in sepsis,cytokines, nutritional support in trauma and sepsis, AIDS.

PRACTICALS

HFM404: THERAPEUTIC NUTRITION AND BIOCHEMICAL CORRELATES OF NUTRITIONALTHERAPY **Credits 2**

PART A – THERAPEUTIC NUTRITION

1. Collection and storage of biological samples for clinical investigations
2. Market survey of commercial nutritional supplements and nutritional support substrates
3. Commonly used tests for diagnosis of various diseases; 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.
4. Preparation of diet counselling aids for common disorders.
5. Planning and preparation of diets for patients with common multiple disorders and complications and discharge diet plans.

PART – B – BIOCHEMICAL CORRELATES

1. Diet planning for patients having multiple diseases
2. Case studies of selected patient/s in a local hospital.
3. Visit to the in-patient care section of a local hospital and evaluation of the kitchen in the hospital.

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): Modem Nutrition in Health and Disease, 9th Edition, Williams and Wilkins.
3. Escott-Stump, S. (1998): Nutrition and Diagnosis Related Care, 4th Edition, Williams and Wilkinson
4. Garrow, J.S., James, W.P.T. and Ralph, A. (2000): Human Nutrition and Diabetics, 10thEdition, Churchill Livingstone.
5. Williams, S.R. (1993): Nutrition and Diet Therapy, 7th Editioin, Times Mirror/MosbyCollege Publication.
6. Davis, J. and Sherer, K. (1994): Applied Nutrition and Diet Therapy for Nurses, 2ndEdition, W.B. Saunders Co.
7. Walker, W.A. and Watkins, J.B. (Ed.) (1985): Nutrition in Pediatrics, Boston, LittleBrown & 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 Poathology, 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 – AGlobal perspective, Washington E.D. WCRF

Journals and Other Relevance 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