

BHARATHIAR UNIVERSITY: COIMBATORE-641046
(M.Phil. /Ph.D. FOOD AND NUTRITION
(From October 2011 batch onwards)

PART-I
Paper-I- Research Methods in Nutrition

Unit-I

Types of nutrition research and studies- longitudinal, cross sectional, epidemiological, surveillance, retrospective, in-vivo, in-vitro and experimental.

Animal nutrition experiments- principles, selection of animal, comparative feeding trails, design, applications and ethics. Human nutrition experiments- Ethical clearance and consent.

Problem selection- factors to be considered.

Experimental designs- examples of nutrition research using the following experimental designs: single group, pre and post design, case study, cohort study, ex-post facto study, time series experiments and factorials designs.

Unit-II

Data collection- principles, definition and examples in nutrition and health for the following:

1. Quantitative tools
 - i Direct parameters- Application of anthropometry, dietary survey, clinical, biochemical and growth monitoring tests, body composition tests and physical fitness tests.
 - ii. Indirect parameters – vital statistics, population tests, socio economic indices, KAP surveys.
2. Qualitative research tools
 - i. Types of interviews
 - ii. Focus group discussions
 - iii. Free listing and pile sorting
 - iv. Narrative
 - v. Case studies
 - vi. Participatory methods
3. Integrating qualitative and quantitative methods.
4. Planning and implementation of a nutritional assessment survey.

UNIT- III

Indices and methods to assess the requirement and quality of the following in body and food: proteins, carbohydrates, lipids, energy, vitamins, minerals, trace elements and water.

Product development- need, scope and methods.

Subjective and objective methods for evaluation of food products- principles, methods and recent trends. Use of food and nutrition software tools- calculation of BMI nutrients.

UNIT- IV

Sampling methods, testing hypothesis.

Data analysis- uses of the following with example of and health data;

1. Descriptive statistics- mean median, mode and standard deviation percentile, T-test, chi-square test, F-test, correlation and regression.
2. Non- parametric statistics in nutrition research
3. Uncertainties in nutrition and health research- source, measurement (probability) and methods to minimize impact.
4. Organizing the results and report writing.
5. Use of SPSS Package for consolidation and statistical analysis.

UNIT- V

Introduction of nutrition and health management- definition, objectives and components of planning, implementation and evaluation.

Operations research and contribution to nutrition and health management.

Planning, implementation and evaluation of a nutrition project or programme from proposal development to report writing.

Critique of research of recent research studies- strengths and weakness, interdisciplinary perspectives.

References

1. **Ghai. O.P, Gupta. P,**(1999), Essential Preventive Medicine- A Clinical And Applied Approach.
2. **Hendrick. T.E, Bickmath and Rog. D.J,** (1993), Applied Research Design- A Practical guide, California, Sage publication, Inc.
3. **Miles M.B, Huberman A.M,** (1994), Qualitative Data Analysis- An Expanded Source Book, 2nd Edition, California, Sage publication, Inc.
4. **Wilson. K, Goulding. K.M,** A Biologist's Guide To Principle And Techniques In Practical Biochemistry.
5. Proceeding of N & I, 1993, No 40
6. **Suitor. C.W, and Crowley. H.F,** Nutrition- Principles And Application In Health Promotion.
7. **Pelleff. C.D and Young. V.R,** Nutritional Evaluation of Protein Foods.
8. **Harrison Clacke,** Application Of Measurements To Health and physical education ,5th edition ,Prentice Hall.
9. **Keith Wilson and John Walker,** Practical Biochemistry- Principles And Techniques.
10. **George. E,** Nutritional Bioavailability Of Zinc.
11. **Earl. B,** (1984), Practice Of Social Research, Wordsworth publishing, California.
12. **David. G.Alms, Basy. H, Katano Witz. Henry. L, Rcodiger,** (1995). Research Methods In Psychology, West publishing company, New York.
13. **Dumm Olive Jean, Virginia. A. Clark,** (1990), Applied Statistics, John Wiley and Sons.
14. **Snedecor. G.W,** (1992), Statistical Methods, The Iowa State University Press, Iowa.
15. **Deldert. C. Miller,** (1991), Handbook Of Research Design And Social Measurement, 5th edition, Sage publication, New Delhi.

Paper-II Advances in Foods and Nutrition

UNIT- I

Food Science and Application:

Nutritional factors and anti nutritional factors and active principles and changes of active principles during cooking and their nutritional implications for the following: cereals, pulses, vegetables and fruits, nuts and oilseeds, milk and milk products, tea, coffee, and cocoa, spices and condiments, meat, fish, poultry and egg, fats and oils

Food adjuncts- Applications of natural and synthetic flavours, colors, preservatives.

Functional foods- Latest trends in the concept of functional foods; their role in designer foods, nutraceuticals and food analogues and as phytochemicals and antioxidants.

Genetically modified foods- potential problems and solutions

UNIT- II

Biochemical Aspects Of Macro Nutrients:

Carbohydrate: Digestion, absorption and metabolism, effects of deficiency and toxicity.

Protein: Digestion, absorption and metabolism, effects of deficiency and toxicity.

Protein quality evaluation- methods and application, Amino acids- Essential and non essential amino acids, role of amino acids in health and diseases.

Fat: Digestion, absorption and metabolism, types of fatty acids, their role in health and disease.

Energy: Energy metabolism- BMR, SDA and energy requirement, respiratory quotient and metabolism in starvation, interrelationship between the nutrients.

Fibre –Role of fibre in the body.

UNIT- III

Biochemical Aspects Of Micro Nutrients:

Vitamins: Function, digestion, absorption and metabolism of fat soluble and water soluble vitamins, effects of deficiency and toxicity, bio assay of fat and water soluble vitamins, interrelationship.

Minerals and trace elements, function, absorption and metabolism, effects of deficiency and toxicity, interrelationship.

Water and electrolyte balance.

UNIT- IV

Nutritional through life cycle

RDA and nutritional importance during pregnancy- complications, foetal mal development related to nutrition. Weight management. Teenage pregnancy and its complications.

Lactation- special nutritional consideration during lactation.

Infancy & childhood years- Pre term infants and nutritional needs- vitamins & minerals needs, protein foods, obesity, changing nutritional needs of preschoolers.

Adolescents: Recent trends in growth and development and changing nutritional requirements.

Eating disorders and changes in foods habits and their effects.

Adults- Nutritional importance for men and women, menstrual abnormalities and complications.

Nutritional in post menopausal women, osteoporosis and diet modification.

Nutritional in Aging- Metabolic changes in aging, nutrition in aging process.

Nutritional problems in changing society- Psychosocial influences on food habits, food and gender, Religion, moral ethics, cultism and quackery, myths, taboos and superstition, physiological aspects of food choice and demographic choice. Malnutrition in learning situation, global trends and policy approaches. Implications of new approaches for nutrition education.

World food problem, food security in global & national level.

UNIT- V

Biochemical basis of health and diseases

Metabolic alteration in- obesity diabetes, cardiovascular disease, liver disorder, renal disorders, febrile conditions, cancer, AIDS and burns.

Nutritional in born error of metabolism, nutrition and immunity, drugs food-nutrient interaction, role of antioxidants in health and disease.

References

1. **Belle Lowe**, Experimental Cookery- From The Chemical And Physical Stand Point, 4th Edition John Wiley & Sons Inc.
2. **Pauline C. Paul & Helen H. Palmer**, Food Theory And Application, John Wiley & Sons.
3. **Gladys.G.Peckham**, Foundations Of Food Preparation, III Edition & Macmillan Publications.
4. IFIC Foundation Publication Lists.
5. Food Insight Of IFIC
6. **Marion BennionHarper**, (1980), The Science Of Food, Row Publishers, San Francisco, Pg : 129
7. **Seema Yadav**, (1997), Food Hazards And Food Hygiene, Ancco/ Pulation. Pvt Ltd, Pg :30
8. **Charles W. Feilix**, (1987), Food Protector Technology, Lewis Publisher, Inc, Pg : 325
9. **Z.S.C. Okoye**, (1992), Biochemical Aspects Of Nutrition. Prentice- Hall Of India, Pvt Ltd. Eastern Economy Edition.
10. **Agarwal.O.P**, (2000), Agarwal's Text Book Of Biochemistry (Physiological Chemistry), Goel Publishing House, Meerut.
11. **Ranjit Kumar Chandra**, (1991), Trace Elements In Nutrition Of Children, Nestle Nutrition Workshop Series- Vol 23, Raven Press Newyork
12. **Stanley Davidson, Passmore.R. Brock. J.F & Truswell. A.S**, (1975), Human Nutrition & Dietetics, 6TH Edition, The English Language Book Society & Churchill Livingstone
13. **Ayres. J.C, Kraft. A.A, Snyder. H.E.& Walker.H.W**, (1969). Chemical & Biological Hazards In Food, Hafner Publishing Company.
14. **Shils, Maurice.E**, (1988), Modern Nutrition In Health & Disease, 7th Edition, Young Vernon Publishers.

15. **Shils Et Al**, (1994), Modern Nutrition In Health & Disease, 8th Edition, Vol I & Vol II
16. **Ziegler E.E & Filer Jr L.J.** (1996), Present Knowledge In Nutrition, 7th Edition
17. **World Health Organization**, (1996), Trace Elements In Human Nutrition & Health.
18. ICMR (1991)
19. Nutrition News (NIN), Vol 19(3), July 1998.
20. **Paul Field House**, (1995), Food And Nutrition, Customs AND Culture Second Edition, Chandan Publishers.
21. **Phillips Foster, Howard. D. Leathers**, (1998), The World Food Problem, Lynne Rienner Publishers, London.
22. **Margaret Mc William**, (1976), Nutrition For Growing Years- Accn No.48012 John Wiley & Sons.
23. **Morris Rock Stein, Marvin. L. Suss Man**, (1976), Nutrition, Longevity And Aging .Academic Press, Newyork, Sanfrancisco, London
24. **Ralph Bemou, Martin.Pernoll**, (1994), Handbook Of Obstetrics And Gynaecology, Sixth Edition.
25. **Sinclair, H.M. And Howard, G.R**, (1980), World Nutrition And Nutrition Education, Oxford University Press, New York Toronto, UNESCO PARIS
26. **Ded.A.C**, (1999), Fundamentals Of Biochemistry. New Central Book Agency (P) Ltd. Calcutta.
27. A Manual Of Second Regional Workshop On Planning Diet For Health, (1999), Women's Christian College, Madras.
28. **Kumud Khanna**, Textbook Of Nutrition & Dietetics, Phoenix Pub House Pvt LTD
29. **Vijay Kumari Kausik**, Problems Of Nutrition And Child Care. Pienter Publishers.
30. **Corinne H. Robinson**, Normal & Therapeutic Nutrition 17th Ed. Mac Millon Pub Co
31. **E. Shils & Olson**, (1994) Modern Nutritional In Health & Disease 8th Ed Vol 1 & 2 Lea & Pebiger Publishers.
32. **Donald. S. Mc Laren**, Nutrition And Its Disorder, IV Edition Longman Publishers.
33. **Nettleton, Joyee. A**, Seafood And Health, Van Nostrand Reinold Publishers.
34. **Daphne A. Roe**, (1978), Drug Induced Nutritional Deficiencies, The AV1 Publishing Co.
35. American Journal Of Clinical Nutrition.
36. Journal Of American Dietetics Association.

PAPER III - SPECIAL PAPER I

1. FOOD PROCESSING, QUALITY CONTROL AND FOOD SAFETY

UNIT I

Status of food processing Industry in India: Status, scope, need and major constraints in growth of food processing in India.

Production trends of cereals (rice, wheat & corn) pulses turdhal, bengal gram and green gram) fruits and vegetables and milk and milk products,flesh foods and egg.

Food processing; Production of bakery items, breakfast cereals, dhal milling, jams and squashes, milk powder – cost, capacity and supplier of each of the equipment, setting up of pilot plant for bakery and fruit processing unit.

UNIT II

Principles of quality control and evaluation

General principles of quality control, quality attributes of raw materials, process control and finished product evaluation , subjective and objective methods of evaluation of foods

Physico-chemical characteristics of bakery products (bread, biscuits, cookies, and cakes), fruit and vegetable products (jam, squash & puree) milk and milk products (milk powder – toned & skimmed, cheese & ice cream)and pulses. Basic tests for identification of microbial contamination, water activity in processed foods – definition and importance.

UNIT III

Food safety and sanitation

Food safety, hazards, food toxins, causes and effects, types of food toxicants endogenous naturally occurring and synthetic toxicants. Adulteration and tests to detect adulterants, heavy metal and pesticide contamination, risk assessment for chemical and biological food hazards, sanitation and safety – significance and hygienic management, safety measures adopted in food industry.

UNIT IV

Methods to analyse food quality.

National food laws and standards- PFA, FPO, BIS, AGMARK, MPO, MMPO, APEDA, MPEDA

International Standards- FDA, TQM, HACCP, codex alimentarius.

UNIT V**Packaging and Labeling**

Principles and characteristics of packaging materials, labeling and its types codex guidelines, FDA guidelines for nutrition claims, ensuring proper labeling – guiding principles. Recent developments on the food labeling front in India. Food fortification- definition, need, scope, kind of fortification in cereals, fruits, vegetables, milk and milk products.

References

1. Journal of Food science and technology
2. Indian food packer
3. Processed food
4. Food Technology
5. Proceedings of International Food convention
6. Douglas M., Cousidine P.E and Glenn D. Comidine (1997) Food and food production Encyclopedia , CBS Publishers New Delhi
7. Robin M. Philip Convenience foods- Recent technology Boyes Data Corporation, New Jersey, USA.
8. Thomas Richards.m John W.Finley Chemical changes in food during processing –AVI Publication, West Port, Connecticut
9. Lal G.Sidappa, C.E.Tandon, Preservation of fruits and vegetables
10. Norman Desroisier (1970) Technology of preservation, The AVI Publishers Inc.

PAPER-III SPECIAL PAPER II
2. COMMUNITY AND PUBLIC HEALTH NUTRITION

UNIT-I

Nutrition for the community

Nutrition of the individual, family and community – general concept, nutritional problems in changing societies with special reference to nutrient deficiencies- prevalence, causes and remedies.

Effects of malnutrition through the life cycle.

Assessment of nutritional status – direct and indirect methods.

Nutrition for the tribal population.

UNIT-II

Nutrition education

Definition, planning, conducting and evaluation. Tools of nutrition education- merits and demerits, curriculum designs for nutrition education, nutrition education through health care systems.

Formulation of realistic developmental health plans based on needs with special reference to vulnerable group population and women.

Healthy nutrition through local produce .

UNIT-III

Population and Food availability

Size and growth rate of population in India. The food problem and policy. Measures to solve problem. New agricultural strategy.

Food security in India – problems and management: estimates of hunger and poverty : food deprivation.

Effective food security management.

Intra family food distribution, food fads and fallacies.

Demography, vital statistics and population control.

UNIT-IV

Nutrition Intervention Programmes and Nutritional Health Programmes

National- ICDS, Nutritious noon meal scheme, NNMB, PHC, MCH, MNP

International - CARE, WHO, FAO, UNICEF.

National Health Programmes- NTCP, NFPC, NLMP, MEP, AIDS control programme,

National Immunisation Programme and IDDC.

National anaemia prophylaxis programme, Vitamin A prophylaxis programme and Goitre control programme.

UNIT-V

Health Indices- IMR, MMR and Morbidity rates - Menace of population- hazards of agriculture, water and sanitation, air and health.

Epidemiology and control of communicable diseases – definition, etiology, transmission of bacterial, viral, parasitic infections, HIV and Hepatitis.

Vaccine preventable diseases.

References

1. Philips Foster and Howaid D. Leathers, (1999), The World Food Problem Tackling the Causes of Under Nutrition in the Third World, second edition. Lynne Rienner Publishers, Inc.
2. World Food Programme Enabling Development Food Assistance In South Asia, Publication Prepared By WFP Regional Office For South Asia.
3. Lillian Langseth, (1996), Nutritional Epidemiology- Possibilities And Limitations, International Life Sciences Institute.
4. Ghai O.P. And Gupta.P,(1999), Essential Preventive Medicine- A Clinical And Applied Orientation, Vikas Publishing House Pvt. Ltd.
5. The State Of Food Insecurity In The World(2000), Food And Agriculture Organizations Of The United Nations, Rome, Italy.
6. National Workshop On Alleviating Micronutrient Deficiency- Role Of Horticulture And Home Gardens – Background Papers Organized By M.S.Swaminathan Research Foundation, Chennai- 600113, Friday 29, 2001.
7. Food And Nutrition Bulletin,(1997), Supplement- Ending Malnutrition By 2020 An Agenda For Change In The Millennium.
8. National Conference On Opportunities And Challenges For Preventing Micronutrient Malnutrition Through ICDS, (1997), Sep 21-22, 2000. Conference Proceedinngs.
9. Preventing Micronutrient Malnutrition- A Guide To Food Based Approaches, (1997), A Manual For Policy Makers And Programme Planners Prepared By Food And Agriculture Organizations Of The United Nations And International Life Sciences Institute.
10. Rueldar Datt And Sundaram K.P.M, (1997), India Economy, S. Chand And Company Ltd., Ram Nagar, New Delhi-110055.

PAPER III – SPECIAL PAPER III
3. CLINICAL NUTRITION

UNIT-I

Assessment of nutritional status of the hospitalized patients, Diet counseling.
Role of Dietitian in assessing patients needs Based on Clinical, Bio clinical, Biophysical and personal data.
Current trends in nutritional support: Parenteral and enteral nutrition- Feeding of premature and LBW babies- pre and post operative diets
Incorporation of Novel Therapeutic foods in the exchange lists followed in Hospitals, Periodical nutritional screening of patients

UNIT II

Etiopathophysiology, metabolic and clinical aberrations, diagnostic features, complications, prevention and recent advances in the nutritional management of- Weight imbalances, diabetes Mellitus and other metabolic disorders, Cardio-vascular disorders .

UNIT III

Etiopathophysiology, metabolic and clinical aberrations, diagnostic features, complications, prevention and recent advances in the nutritional management of - Renal disorder, Cancer, Neurological disorders, Infection & febrile conditions and Respiratory problems

UNIT IV

Gastro intestinal tract disorders-ulcer,constipation,diarrhea,dumping syndrome,irritable bowel syndrome,ulcerative colitis,Hitaus Hernia,Regional Enteritis,Diverticulosis,Malabsorption Syndrome.
Liver, gallbladder and pancreatic disorders, Stress & trauma.
Nutrition and management in- Musculo skeletal disorders, Immuno deficiency & AIDS disorders.

UNIT V

Herbs and medicinal plants – medicinal uses
Functional foods: Types & medicinal uses
Antioxidants- types role & mechanism of action in scavenging free radicals, role in health & disease
Phytochemicals- Occurrence, types & role in health & disease
Probiotic & Prebiotic foods for health benefits.

References

1. Bakhru. H.K.(2001) Indian Spices & Condiments As Natural Healers, Jaico Publishing, Mumbai
2. Syed A.A. Sharma S.C (2000) Herbal Cure For Common & Chronic Diseases, Pushtak Mahal , New Delhi
3. Gala, R, Gala,D, Gala.S.(1999), NATURE Cure For Common Diseases, Navneet Publications (India) Ltd., Chennai.
4. Manohar Murali. C. H, (2000), Ayurveda For All, Pustrak Mahal. New Delhi.Pp133-136
5. Nutrition Principals And Applications In Health Promotion By Suitir & Crowley.
6. Food, Nutrition & Dietetics By Krause & Mahan, WB Saunders Co., Philadelphia, 1979.
7. Normal & Therapeutic Nutrition By Corinne H Robinson. Merlyn. R. Lawley. Mac Million Publishers & Co.
8. Maurice Shils, James Olson & Noshe, (1994), Modern Nutrition In Health & Disease 8th Edition, Vol I & II, Lea & Febiger Co, USA.
9. Human Nutrition And Dietetics By Davidson And Passmore. English Language Book Society,1985.
10. Garrow, J.S., James W.P.T., And Rajph,A,(2000), Human Nutrition And Dietetics, 10th Edition, Churchill Livingstone.

Journals

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. Nutrition Review.
-