

BHARATHIAR UNIVERSITY: COIMBATORE-641046
M.Phil. /Ph.D. - FOOD AND NUTRITION

PART-I SYLLABUS

(For the candidates admitted from the academic year 2018-19 onwards)

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 and 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

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3. **Miles M.B, Huberman A.M,** (1994), Qualitative Data Analysis- An Expanded Source Book, 2nd Edition, California, Sage publication, Inc.
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Paper-II ADVANCES IN FOODS AND NUTRITION

UNIT- I

Food Science and Application:

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:- Active principles and changes of active principles during cooking and their nutritional implications.

Nutritional factors and anti nutritional factors.

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:

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

Fibre –Role of fibre in health and diseases.

UNIT- III

Biochemical Aspects of Micro Nutrients:

Vitamins (Fat soluble Vitamins and water soluble vitamins) :- Function, digestion, absorption and metabolism, effects of deficiency and toxicity, bio assay and its interrelationship.

Minerals and Trace elements :- function, absorption, metabolism, effects of deficiency ,toxicity and interrelationship.

Water and electrolyte balance.

UNIT- IV

Nutritional through life cycle

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

Lactation :- special nutritional consideration during lactation.

Infancy & childhood :- RDA and nutritional importance, changing nutritional needs in special condition - Pre term infants and Malnutrition.

Adolescents:- Recent rents 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.

Geriatric Nutrition :- 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, trauma and burns.

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

References

1. **Belle Lowe**, Experimental Cookery- From The Chemical And Physical Stand Point, 4th Edition John Wiley & Sons Inc.
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35. American Journal Of Clinical Nutrition.
36. Journal Of American Dietetics Association.

PAPER III - 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 hazards 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

Food Safety Management System

ISO :- primary production, establishment design, facilities and control of operations.

Hazard Analysis Critical Control Point (HACCP):- principles and step in implementation.

Indexing Of Nutritional Quality (INQ) :- As an evaluation tool in the food industry.

Food Safety And Standards Act (FSSAI) :- Structure , powers of officers ,functions of food analyst.

Codex Alimentarius:- Structure, details and general principles of the functioning of National Codex Commission.

Patent:- Definition, Requirement, patent laws in India, Administrator need for patent .

UNIT V

Packaging and Labeling

Principles and characteristics of packaging materials. Labeling and its types, codex guidelines, FDA guidelines for nutrition claims and ensuring proper labeling . Recent developments on the food labeling front in India. Food fortification and enrichment:- definition, need, scope, kind of fortification in cereals, fruits, vegetables, milk and milk products, fats and oils and processed foods.

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2. Indian food packer
3. Processed food
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PAPER-III - 2. COMMUNITY AND PUBLIC HEALTH NUTRITION

UNIT-I

Nutrition for the community

Nutrition of the individual, family and community – general concept

Common nutrient deficiency in the community :- PEM, Vitamin-A, B1, B2, Niacin, Vitamin-C, Vitamin-D, Calcium, Iron and iodine- prevalence, causes, symptoms and Programme.

Defects of malnutrition on rural population, urban slums, agricultural labourer, tribal and hill population.

Nutritional and development of women and children; Empowerment of Women.

Assessment of nutritional status – direct and indirect methods.

UNIT-II

Nutrition education with special reference to water and food

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

Environmental sanitation, method of protecting water and rain water harvesting

Healthy nutrition through local produce. Concept of nutrition garden and organic farming,

Nutrition oriented agricultural planning and production.

UNIT-III

Population and Food availability

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

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

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 water and sanitation, air and health.

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

Vaccine preventable diseases —Immunization schedules.

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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

Gastro intestinal tract disorders-ulcer,constipation,diarrhea,dumping syndrome,irritable bowelsyndrome,ulcerativecolitis,HitausHernia,RegionalEnteritis,Diverticulosis,Malabsorption Syndrome.

Liver, gallbladder and pancreatic disorders, Stress & trauma.

Nutrition and management in- Musculo skeletal disorders, Immuno deficiency & AIDS.

UNIT III

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

UNIT IV

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

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 & diseases

Probiotic & Prebiotic foods for health benefits.

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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
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Journals

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