# M.Sc. Foods and Nutrition

## Semester I

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Semester I
Paper I: Research Methodology

1. Research Methodology – Meaning, objectives and types of research. Research approaches, Significance of research, Research and scientific methods, Research process and Criteria of good research.

   Definition and Identification of a Research Problem – Selection of Research problem, Justification, Theory, Hypothesis, Basic assumptions, Limitations and delimitations of the problem.

2. Research Design – Meaning and needs, Features of a good design; important concepts relating to research design, Variables, Experimental and Control groups, Different research designs–exploratory, descriptive and diagnostic, Hypothesis testing research. Sampling Design– Population and Sample, Steps in sampling design, Criteria for selecting a sampling procedure, Different types of sampling techniques–Probability sampling and Non-probability sampling.

   Methods of Data collection–Schedules and Questionnaires, Interview, Case study, Home visits, Scaling methods, Reliability and Validity of measuring instruments.

3. Concept and characteristics of a normal probability curve. Analysis of Data – Graphical and Diagrammatic presentation.

4. Interpretation – Meaning of Interpretation, Technique of Interpretation, Precaution in Interpretation– Interpretation of tables and figures. Report Writing - Significance of report writing, Different steps in writing report; Types of reports, Mechanics of writing a Research Report and precautions for writing research reports. Use of Computers in Statistical Analysis – The computer system and technology, important characteristics of computer applications in researches.

Practical

2. Rapid participatory observations with adolescent groups and families across various socio-economic status.
3. Rapid participatory observation among old people in institutions and non-institutional setups.
4. Exercises relating to preparation of research designs. Preparation of tools for data collection. Administration of these tools.
Paper II: Applied Physiology

1. Cell structure and function

   General cell structure. Structure and functions of the organelles, cell membrane. Review of structure and function of tissue, organs and systems.

2. Nervous System

   Review of structure and function of neuron, nerve, conduction of nerve impulse, synapse, and neurotransmitters.
   - General organization of the nervous system, protection structure and function of brain and spinal cord. Cerebrospinal fluid.
   - Structure, function and role of sensory organs (skin, eyes, ears, nose and tongue) in perception of stimuli.

3. Endocrine System

   Review of structure and function of endocrine glands. Mechanism of hormonal action. Control of hormonal secretion. Function and different syndromes resulting from hypo and hyper secretion of Endocrine gland mainly Pituitary, Adrenal, Thyroid, Ovary, Testes, Pancreas, Parathyroid.

4. Digestive system


5. Respiratory System

   Review of structure and function, Physiology of respiration, Exchange of gases and transport through blood, role of haemoglobin and buffer system. Pulmonary volume. Pulmonary Capacities.

6. Circulatory System

   Structure and function of Heart, Blood vessels

7. Excretory System

8. **Immune System**

   Cell mediated and humoral immunity. Antibody formation.

9. **Musculo Skeletal System**

   Structure and function of bone, cartilage and connective tissue. Types of muscles, structure and function.

10. **Reproduction**


**Practicals** : - Based on above topics.

**References:**

Paper III : Nutrition Biochemistry

1. Introduction to Nutritional biochemistry – Meaning and importance, Development of nutrition biochemistry and contemporary interests in nutritional biochemistry.

2. Carbohydrates – Classification, Properties, digestion, absorption and metabolism, Blood glucose level.


4. Lipid – Structure, Classification and properties: Digestion and absorption. Lipid metabolism, Hyper-lipoprotein amiasketosis.

5. Vitamins and Minerals – Classification structure, properties and functions.

6. Enzymes – Classification, enzymes, mechanisms of enzyme action, factors affecting enzyme activity and their role.


Practicals: -

1. Ph measurement
2. Qualitative tests for carbohydrates.
5. Determination of protein content using burett method
6. Determination of the iodine numbers of lipids using Hanus method.
7. Determination of the saponification number of fats.
8. Estimation of ascorbic acid.
10. Market survey of antioxidants, enzymes and hormones available in local market.

References:


Paper IV: Community Nutrition

1. Introduction to concept of community, rural and urban communities, community health, healthcare, community nutritional and its future projections.

2. Protein Energy malnutrition – etiology, prevalence, causes, prevention and control.

3. Other Major nutritional problems – Macro nutrient deficiencies and micronutrient deficiencies, etiology, symptoms, prevention and control.

4. Assessment of nutritional status – meaning need, objectives, and techniques. Primary Methods: Anthropometric measurement, Weight, Height skin fold, Head circumference MUAC. Chest circumference, use of growth chart, Biochemical assessment, clinical assessment, Diet surveys.


Practical:-

1- Assessment of Nutritional status
2- Identification of nutritional problems among vulnerable groups.
3- Planning nutritive recipes.
4- Development, use and evaluation of methods and aids for nutrition and health education.
5- Development of tools to assess nutrition knowledge, attitudes and practices.
6- Visit to Aganwadi and ICDS centre

Reference:-

Semester II
Paper I: Statistics and Computer Applications

2. Frequency distribution, histogram, frequency, polygons, ogive.
4. Normal distribution – Use of normal Probability tables
5. Parametric, non-parametric tests.
6. Testing of hypothesis, Type I and II errors. Level of significance.
7. Chi-Square test. Goodness of fit independence of attributes 2 X 2 and r X c contingency tables.
9. Correlation, Coefficient of correlation, ranks correlation.
11. MS-Office: MS-Word, MS Excel and Power Point. Introduction to Data-base Management system, Fox-Pro.

Practicals: Based on above topics.

References:

Paper II : Food Microbiology

1. Food spoilage – Causes, Microbial growth in foods, factors affecting the growth of micro-organisms in food.

2. Contamination and microorganism in spoilage of different kinds of foods – Cereals and cereal products, vegetables and fruits, fish and sea foods, milk and milk products, eggs, meat and meat products, canned and bottled food.

3. Contamination of water – Microorganisms in contaminated water, test for contamination, standards for drinking water.


5. Food Hygiene – Sources of contamination of food, cleaning and sanitation in food processing in home and industry. Food plant sanitation, hygienic handling, processing, packaging and service of food.

6. Food safety and quality control.


Practical:-

1. Study of various microbiological laboratory equipment.

2. Preparation of different culture medium.

3. Determination of bacteria and viable microbes by different techniques.

4. Simple staining, Gram staining, acid fast staining spore staining, capsule staining of culture.

5. Microbiological analysis of water, milk and curd

6. Microbiological analysis of fruits, vegetables, meat, cereals and canned foods.

7. Assessment of surface sanitation and hygiene of food preparation units.

8. Visit to food processing unit or any other organization dealing with advanced method in food microbiology.

References: -

Paper III : Food Science

1. Introduction to food science and modern development.
2. Methods of cooking and effect of cooking on nutrients.
4. Vegetable and fruits – Composition, recognition of quality, care in storage, methods of cooking, cooking losses.
7. Sugar, fats and oils – composition, types, characteristics and use in cooking.

Practical:

1. Study the effect of cooking on cereals, pulses, vegetables fruits, egg, meat and sugar.
2. Determination of physical characteristics and presence of any additives.
3. Determination of moisture and impurities in sample of fat.
4. Study the effect of various additives on the stability of Egg white foam.
5. Preparation of stable emulsions.

References:

Paper IV: Maternal and Child Nutrition


2. Lactation - Development of mammary tissue and role of hormones, physiology and endocrinology of lactation – synthesis of milk components, let down reflex, role of hormones, lactation amenorrhea, effects of breast feeding on maternal health.
   b. Management of lactation – Prenatal breast feeding skill education, rooming in, problems – sore nipples, engorged breast, inverted nipples etc. Exclusive breastfeeding.

3. Growth, development and nutritional problems during infancy and childhood.

Practical:

1. Identification of nutritional problems among pregnant ladies.
2. Planning nutritive receipies for pregnant and lactating mother.
3. Market survey of products available for pregnant and lactating mothers.
4. Planning nutritive receipies for supplementary feedings of infant.

References:

1. International Child Health: A Digest of current information.
Semester III
Paper I : Clinical and Therapeutic Nutrition

1. Introduction to dietetics, Role of dietitian in Healthcare, Nutritional assessment, Nutrition diagnosis, intervention, monitoring and evaluation, Patient care and counseling.


3. Prevalence, etiology, clinical manifestations, dietary management and recent advance in the management of the following.

   1. Weight imbalance
   2. Eating disorders.
   3. Coronary Heart Disease.
   4. Metabolic Disorders
   5. Gastrointestinal diseases
   7. Renal Diseases
   8. Cancer, Burns
   9. Infections, Fever and Allergies
   10. Stress and Food Intolerance.
   11. Preoperative and post operative condition
   12. Neurological disorders
   13. Pediatric and Geriatric Diseases.


Practical:

1. Planning and preparation of recepies of following type – Normal, soft, semi-solid, low fat, low calorie, high fibre, low fibre, low residue, bland, high protein, low protein etc.


3. Diet plan for following disorders.
   a. Weight imbalance.
   b. Diabetese Mellitus and Gout.
   c. Gastrointestinal disorders.
   d. Renal disease.
e. Liver disease
f. Fever
g. Lactose intolerance.
h. Heart Disease.

4. Preparation of diet counseling aids for common disorders.

References:

3. Garrow, J.S. and James WPT. Human Nutrition and Dietetics, 9th Ed.
Paper II : Nutrition for Health and Fitness

1. Carbohydrates – Classification, functions, sources, Digestion and absorption, Regulation of blood glucose concentration, dietary fibre, resistant starch, Glycaemic Index.

2. Proteins – Classification, food sources, functions, Digestion, absorption and transport, nutritional requirements.

3. Fats – Types, Functions, sources and its metabolism, nutritional requirements, diseases, excessive fat intake.


5. Vitamins and Minerals – Types, sources, functions, requirements, deficiency, toxicity and preventive measures.


10. Review of different energy systems for endurance and power activity – fuels and nutrients to support physical activity, shifts in carbohydrate and fat metabolism, Mobilization of fat stores during exercise.

Practical:

1. Calculation of the percent energy supplied by carbohydrate in the diet.

2. Planning and preparing protein rich recipies.

3. Planning diet for sports person.

4. Planning diet for obese person.

5. Market survey of ergogenic aids

References:


Paper III: Advance Nutrition

1. History of Nutrition, Nutritional requirements. National and International Recommendations on nutrient requirements.


3. Concept of body composition, calculation of body density, calculation of body water and body fat from body density. Concept of body cell mass, lean body weight and fat free body.

4. Evaluation of Protein Quality – Methods of assessing quality of Protein and estimation of protein requirements at different stages.

5. Nutrition, immunity and infection – Primary and secondary lymphoid organs, cell mediated and humeral immunity, mechanism of interaction, agent, host and environmental pattern in disease occurrence. Primary and secondary infection.

6. Regulation of food intake, hunger and appetite, gastrointestinal factors in regulation, role of hypothalamus, glucose utilization in body and fat stored in body as regulators of food intake.


8. Nutritional requirement for special conditions – Calamity and Emergency management. Nutritional requirements for extreme environments.


Practical:

1. Calculation of Energy Expenditure
3. Calculation of chemical score using the SAAP, PAAP reference protein.
4. Calculation of NDP Cal% of recipes.
5. Estimation of energy value of food stuffs using bomb – calorimeter.

Reference:


3. Wardlaw GM and Insel PM. Perspectives in Nutrition. Third Ed. Mostly
Paper IV: Food Quality Analysis

1. Importance of Food Standards: Quality control and assurance. Food standard, laws and regulations to ensure safety of food.


3. Hazards to food products: Microbiological, environmental, natural, toxicants, pesticide residues and food additives.


5. Sensory Analysis: Definition, use in product evaluation.

   Types of Tests:
   1. Discrimination/ Difference test Paired test, triangle test and duo-trio test for multiple samples, difference from control/reference.
   4. Descriptive Tests
   5. Threshold Tests
   6. Acceptance tests

   Determining consumer acceptability using sensory evaluation.


Practical:

1. Sensory evaluation of foods.

2. Designing of questionnaires and evaluation score cards.

3. Testing of food adulterants in different foods.


References:


Semester IV
Paper I: Food Processing and Technology

1. Introduction to food processing, food spoilage and causes, traditional methods of food processing.
3. Primary Processing – Introduction, Production, Harvesting and handling of fresh foods; Preparation of raw materials for processing. Primary processing of cereals, pulses and oil seeds.
4. Chemical, Physical and Nutritional alterations occurring in foods during processing and storage. Alterations occurring in cereals, Pulses, fruits and vegetables, Milk and milk products, Meat and Poultry, fish, egg, Nuts, Oil seeds and spices and their products.
5. Food Additives – Classification and use.
7. Packaging – Packaging materials and techniques.

Practicals:

1. Methods for Blanching vegetables.
3. Advance Diploma courses in food preservation, Bakery and confectionary.
4. Visit to food Processing units.

References:

**Paper II : Food Service Management**

1. History and Development of food service establishment. Factors affecting development, recent trends, Types of food service establishment.

2. Approaches to management – Theories of management Principles and aspects of management and management tools.

3. Entrepreneurship and Food service Management Conceptual perspective of entrepreneurship, creativity and innovation, Business requirements for food products, Entrepreneurship Development and training.

4. Personnel Management – Staff planning and Management, Employment process, staff recruitment and selection, placement and training, employee laws, trade unions and negotiations, leadership, formal relationships and duties, work design, work measurement in food service operations.

5. Food Management – Menu – Planning, purchase and storage, Quality food production, planning and control, kitchen production, records and control, delivery and service styles, types of food service systems.


7. Sanitation and safety – Plant sanitation and safety, considerations necessary for an efficient cleaning programme, Post cleaning care and cleaning premises and surroundings. The 3 E’s of safety, standards, Policies and schedules, Microbiology and food safety, food borne illness, Modes of Disease transmission, Food spoilage, importance of pest control, Hygienic food handling.

**Practica:****

1. Analyse the relationship between the purchased amount, edible portion and cooked weight of food stuffs.

2. Receipt conversion.

3. Market survey of food products to know the prices.

4. Visit to a Food service Establishments to study its planning and functioning.

5. Cost analysis of menu.

6. Analysis of food safety and hygiene in different food instructions.

7. Running a snacks and beverage service for about 1 ½ - 2 months (For about 30 people)

**Reference:**

