

BHARTI VISHWAVIDYALAYA DURG (C.G.)

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**SCHEME OF EXAMINATION
&
SYLLABUS OF
MASTER IN FOOD & NUTRITION
DEPARTMENT OF NUTRITION
UNDER
FACULTY OF SCIENCE
Session 2022-23
(Approved by Board of Studies)**



M.Sc. Food and Nutrition

Semester I		Max. Marks
Paper I	Research Methodology	70
Paper II	Applied Physiology	70
Paper III	Nutritional Biochemistry	70
Paper IV	Community Nutrition	70
Practical	Based on Paper III, IV	200
Semester II		
Paper I	Statistics and Computer Application	70
Paper II	Food Microbiology	70
Paper III	Food Science	70
Paper IV	Maternal and child Nutrition	70
Practical	Based on paper I, IV	200
Semester III		
Paper I	Clinical and therapeutic nutrition	
Paper II	Nutrition for Health and fitness	70
Paper III	Advance Nutrition	70
Paper IV	Food Quality Analysis	70
Practical	Based on paper I, II	200
Semester IV		
Paper I	Food processing and Technology	70
Paper II	Food Service Management	70
Paper III	Dissertation and Seminar	70
Paper IV	Implant Training / Internship	70
Practical	Based on paper III, IV	200



EXAMINATION SCHEME

SEMESTER - 1 (20 CREDITS)

THEORY (16 CREDITS)

PAPER	CREDIT	COURSECODE	DURATION	THEORY MARKS	TEACHER ASSESSMENT	TOTAL MARKS
Research Methodology	4	MFN101	3hr	70	30	100
Applied Physiology	4	MFN102	3hr	70	30	100
Nutritional Biochemistry	4	MFN103	3hr	70	30	100
Community Nutrition	4	MFN104	3hr	70	30	100

PRACTICAL (04 CREDIT)

PAPER	CREDIT	COURSECODE	DURATION	THEORY MARKS	TEACHER ASSESSMENT	TOTAL MARKS
Nutritional Biochemistry (L)	2	MFN 105	3hr	70	30	100
Community Nutrition (L)	2	MFN 106	3hr	70	30	100



Semester -I
Paper -I: Research Methodology

UNIT-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.

UNIT- 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.

UNIT -3.Methods of Data Collection–

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

UNIT- 4. Concept and Characteristics of A Normal Probability Curve. Analysis Of Data –

Graphical and Diagrammatic presentation.

UNIT- 5. Interpretation –

Meaning of Interpretation, Technique of Interpretation, Precaution in 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.



Paper -II: Applied Physiology

UNIT- 1. (A) 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.

(B) Nervous System

Review of structure and function of neuron, nerve, conduction of nerve impulse, synapse, and neurotransmitters.

1. General organization of the nervous system, protection structure and function of brain and spinal cord. Cerebrospinal fluid.
2. Structure, function and role of sensory organs (skin, eyes, ears, nose and tongue) in perception of stimuli.

UNIT- 2. SECTION (A) 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.

SECTION (B) Immune System

Cell mediated and humoral immunity. Antibody formation

UNIT- 3. SECTION (A) Digestive system

Review of structure of gastrointestinal tract and accessory organs. Secretory, Digestive and absorptive function of GIT. Role of Liver, Pancreas and gall bladder and their dysfunction. Hormones of GIT. Mechanism of absorption of carbohydrates, Proteins and fats.

SECTION (B) Circulatory System

Structure and function of Heart, Blood vessels
Blood – Characteristics, Composition, Structure, function and life span of components. Blood clotting. Blood groups. Homeostatics. Erythropoiesis, Blood Pressure.

UNIT- 4. SECTION (A) Respiratory System

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

SECTION (B) Musculo Skeletal System

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



UNIT- 5. SECTION (A) Excretory System

Structure and function of nephron. Anatomy and function of kidney.
Urine formation. Electrolyte and acid base balance

SECTION (B) Reproduction

Male and female organs of reproduction. Spermatogenesis, Menstrual Cycle. Pregnancy, Parturition, Menopause, Mammary glands and location.

References:-

1. Kale, C.A. and Nail, E Samson Wright's Applied Physiology, Oxford University press, 1994.
2. Griffins, M. Introduction to Human Physiology, Mac Millan and Co. 1974.
3. Green, J.H. An introduction to human physiology, Oxford University Press 1972.
4. Best C.H. and Taylor N.B., The living body, Asia publishing House, 1975.



Paper- III : Nutrition Biochemistry

UNIT-1. Introduction to Nutritional biochemistry –

SECTION(A) Meaning and importance, Development of nutrition biochemistry and contemporary interests in nutritional biochemistry.

SECTION(B) Hormones – Endocrine Glands, mechanism of hormone action and biochemical role of hormones.

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

UNIT -3. Proteins – Structure, classification and properties. Digestion, absorption and amino acid and nucleotide metabolism.

UNIT-4. SECTION (A) Lipid – Structure, Classification and properties: Digestion and absorption. Lipid metabolism, Hyper-lipoprotein, amino ketosis.

SECTION (B) Enzymes – Classification, enzymes, mechanisms of enzyme action, factors affecting enzyme activity and their role.

UNIT-5. SECTION (A) Antioxidants – Definition, free radicals, oxygen free radicals, natural and diet derived antioxidants.

SECTION (B) Vitamins and Minerals – Classification structure, properties and functions.

SECTION (C) Inborn Errors of metabolism – Concept disorders of protein metabolism, carbohydrates, metabolism, lipid metabolism and hemoglobinopathies.

Practical: -

1. Ph measurement
2. Qualitative tests for carbohydrates.
3. Blood glucose level test.
4. Separation of amino acids paper chromatography.
5. Determination of protein content using buret 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.
9. Estimation of calcium.
10. Market survey of antioxidants, enzymes and hormones available in local market.



References:

1. Command Stumph, Outlines of Biochemistry.
2. Devlin T.M., Biochemistry by Stryer Text book of Biochemistry with clinical correlations.
3. Lehninger, Principles of Biochemistry, by 4th Ed. By Nelson D.L. and Cox. M.M.
4. Murray R.K., Grammer, D.K., Mayer P.A., Rodwell V.W., Harpers Biochemistry, a lange medical book 26th Ed. Mc. Graw Hill, Health Professions Division.
5. West. E.S., Todal, W.R., Mason H.S. and Van Brygen J.T., Text Book of Biochemistry.



Paper -IV: Community Nutrition

UNIT-1. Introduction- To concept of community rural and urban communities, community health, healthcare of community nutrition and its future projections.

UNIT -2. Protein Energy Malnutrition –

SECTION (A) Etiology, prevalence, causes, prevention and control.

SECTION (B) Other Major nutritional problems – Macro nutrient deficiencies and micronutrient deficiencies, etiology, symptoms, prevention and control.

UNIT- 3. 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.

UNIT -4. Secondary Methods:

Vital statistics, Mortality rates, survival rate, morbidity rate, fertility rate.

SECTION (A) Nutrition Monitoring and Nutrition surveillance objectives and components of nutrition monitoring and current programmes. Nutrition Surveillance – Objectives, Uses, infrastructure and computerization

SECTION (B) Nutrition Education – Need and scope, importance, theories, Nutrition education programmes – formulations, Implementation and Evaluation.

UNIT- 5. Nutrition Programmes in developing and developed countries –

Role of various agencies – National, International and voluntary.

Practical:-

- 1- Assessment of Nutritional status
- 2- Identification of nutritional problems among vulnerable groups.
- 3- Planning nutritive recipies.
- 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:-

1. Mayer, J., Human Nutrition, Charles, C. Thomas, spring field.
2. Michael, J. Gibney, Barrie, M. Margetis, John, M. Kearney. Lenore Arab. Public Health Nutrition. Blackwell science, Blackwell Publishing Company (2004).
3. Willet Walter. Nutritional Epidemiology. Oxford University Press, Oxford, New York (1990).
4. Park, J.E. and Park, K. Text Book of Preventive and social medicine. BanarasiDas Bhanot Publishes.



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SEMESTER -2 (20 CREDITS)

THEORY (16 CREDITS)

PAPER	COURSE CODE	DURATION	CREDIT	THEORY MARKS	TEACHER ASSESSMENT	TOTAL MARKS
Statistics and Computer Application	MFN201	3 hr	4	70	30	100
Food Microbiology	MFN202	3 hr	4	70	30	100
Food Science	MFN203	3 hr	4	70	30	100
Maternal and child Nutrition	MFN204	3 hr	4	70	30	100

PRACTICAL (04 CREDIT)

PAPER	CREDIT	COURSE CODE	DURATION	THEORY MARKS	TEACHER ASSESSMENT	TOTAL MARKS
Statistics and Computer Application	2	MFN 205	3 hr	70	30	100
Maternal and child Nutrition	2	MFN 206	3 hr	70	30	100



Semester II

Paper I : Statistics and Computer Applications

UNIT -1.

SECTION(A) Conceptual understanding of statistical measures. Classification and tabulation of data. Measurement of central tendency, measures of variation.

SECTION (B) Frequency distribution, histogram, frequency, polygons, ogive, and Binomial distribution.

UNIT- 2.

SECTION (A) Normal distribution – Use of normal Probability tables

SECTION (B) Parametric, non-parametric tests.

SECTION (C) Testing of hypothesis, Type I and II errors. Level of significance.

UNIT -3.

SECTION (A) Chi-Square test. Goodness of fit independence of attributes 2×2 and $r \times c$ contingency tables.

SECTION (B) Application of student 't' test for small samples. Difference in proportion for means and difference in means.

SECTION (C) Correlation, Coefficient of correlation, ranks correlation.

UNIT -4. Fundamental of computer, History of computer, Generation of computer, Language, Components, Applications of Computers. Operating System & Internet: MS-DOS, MS-Windows, and Internet

UNIT- 5. MS-Office ,MS-Word, MS Excel and Power Point. Introduction to Database Management system, Fox-Pro.

Practical: Based on above topics.



References:

1. Basandra, S.K.: Computer for Managers, Designing An Effective Management Information System, Abhinav Publishing Industries, N. Delhi, 1965.
2. Diwan, Parag, Information System Management, Deep & Deep Publications, New Delhi, 1997.
3. Laudon, Kenneth C. and London, Jane Price, Management Information System: A Contemporary Perspective, Macmillan Publishing Company, New Delhi.
4. Mehta, Versham Management Information System, Anmol Publication, New Delhi, 1998.
5. Banerjee, Utpal K. and sachdeva, R.K., Management Information System: A New Framework, Vikas Publishing House, Pvt. Ltd., New Delhi.



Paper II: Food Microbiology

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

UNIT- 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.

UNIT -3.

SECTION (A) Contamination of water – Microorganisms in contaminated water, test for contamination, standards for drinking water.

SECTION (B) Food Borne Diseases – Sources, symptoms and methods of prevention and control.

UNIT- 4.

SECTION (A) 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.

SECTION (B) Food safety and quality control.

UNIT- 5. Beneficial microorganisms – Sources, characteristics biochemical activities and their use in food products.

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.



Paper - III: Food Science

UNIT- 1. Introduction-

SECTION (A) To food science and modern development.

SECTION (A) Methods of cooking and effect of cooking on nutrients.

UNIT -2.

SECTION (A) Cereals, Pulses and legumes – structure, composite types and selection, methods of cooking, cooking losses.

SECTION (B) Vegetable and fruits – Composition, recognition of quality, care in storage, methods of cooking, cooking losses.

UNIT-3.

SECTION (A) Milk and Milk products – Types and composition, preparation, effect of cooking and use in cookery.

SECTION (B) Egg, Meat, Fish and poultry – structure, composition, quality care in storage, methods of cooking, effects of cooking.

UNIT-4. Sugar, fats and oils – composition, types, characteristics and use in cooking.

UNIT-5.

SECTION(A) Sols, Gels and Emulsions – Colloids, Properties of sols, Gels and its properties, suspensions, foams, emulsions.

SECTION(B) Enzymes and Pigments- classification and structure, use in Food Industry.

References:

1. Gaman, P.M. and Sherrington, K.B. (1996), The science of food, oxford, Butterworth – Heinemann.
2. Potter, Norman N. and Hotchkiss (1996) Food Science, 5th ed. C.B.S. Publication.
3. Manay, N. Shakuntala and Shadaksharaswami, N. (1987), Foods: Facts and Principles, Wiley Eastern Ltd.
4. Meyer, Lilian H. Ed. (1987), Food chemistry. Indian Ed. CBS Publishers and Distributors.



Paper -IV: Maternal and Child Nutrition

UNIT-1.Importance of maternal nutrition: Physiology and endocrinology of pregnancy and embryonic and fetal growth and development. Nutritional requirements during pregnancy. Importance of nutrition prior to and during pregnancy. Prerequisites for successful outcome. Effect of under nutrition of mother and child including pregnancy outcome and maternal and child health, pregnancy and AIDS, T.B., Intra-uterine growth retardation, complications of pregnancy and management and importance of antenatal care.

UNIT-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.

UNIT-3. Human milk composition and factors affecting breastfeeding and fertility.

UNIT-4. Management of lactation – Prenatal breast feeding skill education, rooming in, problems – sore nipples, engorged breast, inverted nipples etc. Exclusive breastfeeding.

UNIT- 5. Growth, development and nutritional problems during infancy and childhood.

References :

1. International Child Health : A Digest of current information.
2. Barker, D.J. P (1998), Mothers, Babies and Health in later life. Edinburgh, Churchill livingstone.
3. Ward, R.H.T; Smith, S.K. Donnai, D. (Eds.) (1994) Early fetal Growth and Development. London, & COG Press.
4. Wallace, H.M. and Giri, K. (1990), Health care of women and children in developing countries, third party publishing co.Oakland.



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SEMESTER –III (20 CREDITS)

THEORY (16 CREDITS)

PAPER	CREDIT	COURSE CODE	DURATION	THEORY MARKS	TEACHER ASSESSMENT	TOTAL MARKS
Clinical and therapeutic nutrition	4	MFN 301	3hr	70	30	100
Nutrition for Health and fitness	4	MFN 302	3hr	70	30	100
Advance Nutrition	4	MFN 303	3hr	70	30	100
Food Quality Analysis	4	MFN 304	3hr	70	30	100

PRACTICAL (04 CREDIT)

PAPER	CREDIT	COURSE CODE	DURATION	THEORY MARKS	TEACHER ASSESSMENT	TOTAL MARKS
Clinical and therapeutic nutrition	2	MFN305	3hr	70	30	100
Nutrition for Health and fitness	2	MFN306	3hr	70	30	100



Semester III

Paper- I : Clinical and Therapeutic Nutrition

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

UNIT-2. Adaptation of therapeutic diets – Therapeutic diets, Types of therapeutic diets, Routine hospital diets, Mode of feeding.

UNIT-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
6. Liver, Gall Bladder and Pancreatic disorders.
7. Renal Diseases
8. Cancer, Burns

UNIT -4. Dietary Management –

Infections, Fever and Allergies
Stress and Food Intolerance.

Preoperative and post operative condition

Neurological disorders

Pediatric and Geriatric Diseases.

UNIT -5. Drug and Nutrient Interaction – Basic Concept, Effect of nutrition on drugs, Drug effects on Nutritional status, Drug and Drug interaction, Clinical significance and risk factors for drug – nutrient interaction.

Practical:

1. Planning and preparation of recipes of following type – Normal, soft, semi-solid, low fat, low calorie, high fiber, low fiber, low residue, bland, high protein, low protein etc.
2. Market survey of commercial nutritional supplements and nutritional supports substrates.
3. Diet plan for following disorders.
 - a. Weight imbalance.
 - b. Diabetes Mellitus and Gout.
 - c. Gastrointestinal disorders.
 - d. Renal disease.



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- e. Liver disease
 - f. Fever
 - g. Lactose intolerance.
 - h. Heart Disease.
4. Preparation of diet counseling aids for common disorders.

References:

1. Antia, F.P. and Philip A. Clinical Dietetics and Nutrition, 4th Ed.
2. Bamji, M.S. Rao, P.N. and Reddy. Text book of Human Nutrition. 1996. Oxford and IBH publishing housing.
3. Garrow, J.S. and James WPT. Human Nutrition and Dietetics, 9th Ed.
4. Williams, S.R. Nutrition and Diet Therapy, 6th Ed. Jones Mirror College Publishing.



Paper -II: Nutrition for Health and Fitness

UNIT-1.

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

SECTION(B) Proteins – Classification, food sources, functions, Digestion, absorption and transport, nutritional requirements.

SECTION(C) Fats – Types, Functions, sources and its metabolism, nutritional requirements, diseases, excessive fat intake.

UNIT -2.

SECTION (A) Water and Electrolyte Balance.

SECTION(B) Vitamins and Minerals – Types, sources, functions, requirements, deficiency, toxicity and preventive measures.

UNIT-3. Food components other than essential nutrients – Functional foods, Bioactive substances from protein foods, Non glycerides in edible oils, Probiotics and Prebiotics, Polyphenols, Phytoestrogens, other dietary factors with antinutritional effects like: Protease inhibitors, Saponins, Amylase inhibitors, Lectins or Haemagglutinins, Phytates and their health benefits.

UNIT 4. SECTION (A) Nutrition during different stages of life cycle.

Sports Nutrition – Concept Techniques of measuring body composition, work capacity, physical fitness, Nutritional demands of sports and dietary recommendations, ergogenic aids.

SECTION (B) Holistic approach to the management of fitness and health – Energy input and output Diet and exercise. Effect of specific nutrients on work performance and physical fitness. Nutrition, exercise, physical fitness and health inter – relationship.

UNIT-5. 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 recipes.
3. Planning diet for sports person.
4. Planning diet for obese person
5. Market survey of ergogenic aids



References:

1. Williams, S.R. B.S. Worthington Roberts (1988). Nutrition throughout the life cycle. Times mirror, mostly college publishing St. Louis.
2. Whitney. E.R. and S.R Kolfes (2002) Understanding Nutrition 9th ed. Wadsworth Thomson Learning, Australia.
3. Thompson, L.U. (1993) Potential Health Benefits and problems associated with antinutrients in foods. Food Research International. 26; 134 – 149.
4. Gibson, G.R. and M.B. Roberfroil (1999) Coloric Mirobio, Nutrition and health, Kluwer Academic Publishers, Dordecht.



Paper -III: Advance Nutrition

UNIT-1. Introduction-

SECTION(A) History of Nutrition, Nutritional requirements. National and International Recommendations on nutrient requirements.

SECTION(B)Energy Requirement – Energy definition and components of energy requirement, factors affecting energy expenditure and requirement. Methods of estimation of energy expenditure and requirement and energy balance. Energy estimation of foods.

UNIT-2. Body composition- 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.

UNIT-3.

SECTION (A) Evaluation of Protein Quality – Methods of assessing quality of Protein and estimation of protein requirements at different stages.

SECTION(B) 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.

UNIT-4.

SECTION (A) 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.

SECTION(B) Metabolic interrelationship between nutrients, concept of nutritional interrelationship. Protein Energy, carbohydrates, fat, and vitamins interrelationships. Effects of Protein quality and quantity on protein utilization.

UNIT-5.

SECTION (A) Nutritional requirement for special conditions – Calamity and Emergency management. Nutritional requirements for extreme environments.

SECTION (B) Nutritional regulation of Gene Expression – Gene Expression, Role of specific nutrients in controlling Gene Expression.

Reference:

1. Gibson, G.R. and M.B. Roberfoid (1999), Calonic microbiota, Nutrition and Health. Kulwer Academic Publishers, Dordecht.
2. Whitney, E.R. and S.R. Rolfes (2009) understanding Nutrition 9th ed. Wadsworth Thomson, Learning, Australia.
3. Wardlaw GM and Insel PM. Perspectives in Nutrition. Third Ed. Mostly 1895
4. Chandra, R.K. and Newberne, P.M., Nutrition immunity and infection. Plenum Press 1982.



Paper IV: Food Quality Analysis

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

UNIT-2.Product Evaluation: Sampling for product evaluation, sample preparation. Tests for raw food ingredients: Proximate principles, nutrient analysis.

UNIT-3.SECTION (A) Hazards to food products: Microbiological, environmental, natural, toxicants,pesticide residues and food additives.

SECTION (B) Food Adulteration –common adulterants Methods and tests for detectingadulterants.

UNIT-4.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.
2. Quantitative Difference Tests: Ranking.
3. Numerical Scoring Test: Magnitude Estimation.
4. Descriptive Tests
5. Threshold Tests
6. Acceptance tests
7. Determining consumer acceptability using sensory evaluation.

UNIT-5. Product development and Evaluation – Need for product development, how todevelop a new Product, new products and ingredients, functional foods, shelf life of Product.

References:

1. Amerine M.A., Pengtorn, R.M. Reoceasier E.B. (1965) Principles of sensory evaluation and academic Press, New York.
2. Bealon, G.H.and Begos J.M. (eds.) (1996) Nutrition in Preventitive Medicine. WHO.
3. Belity. H.D. an Grosch W. (1999) Food chemistry springer Verleg Berlin, Heidelberg.
4. Bamji, M.S., Rai, P.N. and Reddy V. (eds) Food chemistry (2nd ed.) springer, New York.



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SEMESTER-IV (20 CREDITS)

THEORY (16 CREDITS)

PAPER	CREDIT	COURSE CODE	DURATION	THEORY MARKS	TEACHER ASSESSMENT	TOTAL MARKS
Food processing and Technology	4	MFN401	3hr	70	30	100
Food Service Management	4	MFN402	3hr	70	30	100

PRACTICAL (04 CREDIT)

PAPER	CREDIT	COURSE CODE	DURATION	THEORY MARKS	TEACHER ASSESSMENT	TOTAL MARKS
Dissertation and Seminar	2	MFN403	3hr	70	30	200
Implant Training/Internship	2	MFN404	3hr	70	30	200



Semester- IV
Paper I : Food Processing and Technology

UNIT-1.

SECTION(A) Introduction to food processing, food spoilage and causes, traditional methods of food processing.

SECTION (B) Methods of food Processing – Thermal Processing, Dehydration, Preservation by concentration freezing, Microwave Processing, Food irradiation, Fermentation, Chemical Preservation.

UNIT-2. Primary Processing – Introduction, Production, Harvesting and handling of fresh foods; Preparation of raw materials for processing. Primary processing of cereals, pulses and oil seeds.

UNIT-3. 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.

UNIT-4. Food Additives – Classification and use.

UNIT-5. SECTION(A) Nutritional Implications of food processing – causes for loss of nutrients, enrichment, restoration and fortification.

SECTION(B) Packaging – Packaging materials and techniques.

Practical:

1. Methods for blanching vegetables.
2. Moisture removal techniques in foods.
3. Advance Diploma courses in food preservation, Bakery and confectionary.
4. Visit to food Processing units.

References:

1. Brooker, B.E. (1985), Food theory and application 2nd ed. New York: Mecomillan Publishing.
2. Lawson, H. (1997) Food oils and Fats, CBS Publisher and Distributors.
3. Charley. H. (1982) Food Science (2nd Ed.), John Wiley sons, New York.
4. Gopalan, C. (eds.) (1993) Recent trends in Nutrition, Oxford University Press.



Paper II : Food Service Management

UNIT-1.

SECTION (A) History and Development of food service establishment. Factors affecting development, recent trends, Types of food service establishment.

SECTION(B) Approaches to management – Theories of management Principles and aspects of management and management tools.

UNIT-2.

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

SECTION(B) 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.

UNIT-3. 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.

UNIT-4. Kitchen layout and equipment – steps in planning and layouts. Determining equipment selection and placement, maintenance of equipment.

UNIT-5. 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.

Practical:

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



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Reference:

1. Sethi. M. (2004), Institutional food management. New Age International Publishers, New Delhi.
2. Terry. G.R. (1972), Principles of Management 6th Ed. Irwin Dorsey International London.
3. Sethi, M. and Malhan, S.(1993) Catering management an integrated approach 2nd ed. New Age, International Publishers, New delhi.
4. Drucker, Peter F. The Practice of Management, Harper and Brother: New York 1954.



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