

COURSE NAME: M. Sc (Dietetics & Nutrition)

COURSE STRUCTURE:

FIRST SEMESTER

Sl No.	Code	Paper name	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	MDN 101	HUMAN ANATOMY & PHYSIOLOGY	3	1		40	4
2	MDN 102	PRINCIPLES OF FOOD SCIENCE	3	1		40	4
3	MPH 103	EPIDEMIOLOGY & CHANGING HEALTHCARE SECTOR	2	1		30	3
4	MDN 104	FOOD MICROBIOLOGY	3	1		40	4
5	MDN 105	NUTRITIONAL BIOCHEMISTRY	2	1		30	3
		Total of Theory					18
Practical:							
Sl No.	Code	Paper name	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	MDN 191	NUTRITIONAL PHYSIOLOGY & BIOCHEMISTRY			5	50	3
2	MDN 192	BIOMETRIC ASSESSMENT OF NUTRITIONAL STATUS			5	50	3
		Total of Practical					06
		Total of Semester					24

SECOND SEMESTER

Sl No.	Code	Paper name	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	MDN 201	DIETARY MANAGEMENT -I	3	1		40	4
2	MDN 202	BIOSTATISTICS	3	1		40	4
3	MDN 203	ADVANCED NUTRITION	2	1		30	3
4	MDN 204	WOMEN HEALTH AND NUTRITION	2	1		30	3
5	MDN 205	NUTRITIONAL POLICY & PROGRAMME FOR PUBLIC HEALTH	3	1		40	4
		Total of Theory					18

Practical:

Sl No.	Code	Paper name	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	MDN 291	THERAPEUTIC DIET CHART PREPARATION – I			5	50	3
2	MDN 282	INDUSTRY ASSIGNMENT: PUBLIC HEALTH AND NUTRITIONAL STATUS ASSESSMENT			6	60	3
		Total of Practical					06
		Total of Semester					24

THIRD SEMESTER

Sl No.	Code	Paper name	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	MDN 301	DIETARY MANAGEMENT -II	3	1		40	4
2	MDN 302	RESEARCH METHODOLOGY	3	1		40	4
3	MDN 303	PAEDIATRIC AND GERIATRIC NUTRITION	2	1		30	3
4	MPH 105	HEALTH INFORMATION MANAGEMENT & DECISION MAKING	2	1		30	3
5	MDN 305	FOOD SAFETY, PROCESSING & QUALITY CONTROL	3	1		40	4
		Total of Theory					18

Practical:

Sl No.	Code	Paper name	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	MDN 391	THERAPEUTIC DIET CHART PREPARATION – II			5	50	3
2	MDN 381	RESEARCH PROJECT			6	60	3
		Total of Practical					06
		Total of Semester					24

FOURTH SEMESTER

Sl No.	Code	Paper name	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	MDN 401	ENTREPRENEURSHIP IN FOOD SERVICE	2	1		30	3
2	MDN 402	FOOD PRESERVATION & PACKAGING	2	1		30	3
3	MDN 403	FOOD ECONOMICS & INSTITUTIONAL FOOD ADMINISTRATION	2	1		30	3
		Total of Theory					9

Practical:

Sl No.	Code	Paper name	Contact periods Per week			Total Contact Hrs	Credits
			L	T	P		
1	MDN 481	DISSERTATION					09
2	MDN 482	VIVA VOCE					6
		Total of Practical					15
		Total of Semester					24

Semester-I

MDN-01: HUMAN ANATOMY AND PHYSIOLOGY

- Structure & Functions of cells.
- Gastrointestinal System: Structure and function of various organs of the GI tract, Digestion and absorption of food. The role of enzymes and hormones on digestion and absorption.
- Blood and its composition, Blood groups, Coagulation of Blood, structure & function of Heart, Heart rate, Cardiac cycle. Cardiac output. Blood pressure & their regulations. Circulation of blood (general course of circulation).
- Respiratory System: Structure of respiratory system.
- Nervous System Elementary anatomy of Nervous System Sympathetic and Parasympathetic nervous System. Special Senses. .
- Reproductive System: Structure and function of Male and Female Sex glands and organs. Roll of hormones in reproduction. Menstrual Cycle Spermatogenesis. Physiology of pregnancy, Parturition, Lactation and Menopause.
- Excretory System: Structure and functions of kidney, bladder, formation of urine, role of kidney in homeostasis. Structure and function of Skin. Regulation of temperature of the body
- Endocrine System : Structure and functions of different endocrine glands. Symptoms of deficiency and excess secretion of different endocrine glands.

Reference

1. Guyton. A.C. Hall, J.E. : Text GBook of Medical Physiology – 9th Ed/ Prism Books (Pvt.) Ltd. Bangalore.
2. Winword. Sear's Anatomy and Physiology for nurses. London, Edward Arnell.
3. Wilson : Anatomy and Physiology in Health and Illness, Edinburgh Churchill Livingatome.
5. Ganong : Medical Physiology.

MDN-102 : PRINCIPLES OF FOOD SCIENCE

- Basic concept on Food. Nutrients. Nutrition.
- Classification of Food. Classification of Nutrients.
- Carbohydrates - Definition, Classification. Structure and properties.
- Lipids - Definition, Classification & Properties. Fatty acids - composition, properties, types.
- Proteins - Definition, Classification, Structure & properties. Amino acids - Classification, types, functions.
- Dietary Fibre - Classification, sources, composition, properties & nutritional significance.
- Minerals & Trace Elements and Vitamins - Bio-Chemical and Physiological Role, bio-availability & requirements, sources, deficiency & excess effects.

Reference :

1. Sunetra Roday : Food Science & Nutrition, Oxford University Press. 2. Mann and Truswell: Essentials of Human Nutrition, Oxford University Press.

MPH 103: EPIDEMIOLOGY & CHANGING HEALTHCARE SECTOR

Unit 1:

- Concepts & theories of Health & Disease, Health & Disease Spectrum , Iceberg of Disease
- Epidemiological triad, Principles of Epidemiology, Epidemiology of communicable and non-communicable diseases
- Application of Epidemiological Methods in Disease Control (Observational & Experimental Studies)
- Discussion of Case problems on cohort & case control studies (Association/Causation)

Unit 2

- Host defense Mechanisms, Types of Immunization, Hazards of immunization, Cold Chain & Cold life, Universal & National Immunization Schedules.
- Screening and Survey of a Disease, Disease Investigation and Reporting,
- Disease monitoring and Surveillance, Discussion with Case Studies

Unit 3

- Healthcare & its Changing Scenario, Emergence of new diseases, Prevention and control
- The levels of Healthcare - Development of Public & Private Healthcare Institutions in India

Suggested Books:

1. Preventive And Social Medicine - Dr. K. Park
2. Text Book Of Community Medicine - V K Mahajan
3. Epidemiology by P.V. Sathe, Popular Prakashan
4. Hospital administration - G.D. Kunders

MDN -104 : FOOD MICROBIOLOGY

- Fundamentals of control of microorganism in foods:
- Contamination and microorganisms in the spoilage of different kinds of foods and such as cereal and cereal products, vegetable and fruits, fish and other sea foods, meat and meat products, eggs and poultry, milk and products, canned foods.
- Cultivation of microorganisms, Nutritional requirements of micro organisms, types of media used, methods of isolation.
- Public health hazards due to contaminated foods:
- Food borne infections and intoxications: Symptoms, mode of transmission and methods of prevention, investigation and detection of food borne disease out-break.

Reference :

1. Peleezar, M.I. and Reid, K. D. (1978): Microbiology, McGraw Hill Company, New York.
2. Prazier, W. C. and Westhoff, D. C. (1988): 4th edition, Food Microbiology, MaGraw Hill Inc.

MDN 105: NUTRITIONAL BIOCHEMISTRY

Unit1: Carbohydrate Metabolism

- 1.1 Pathway of glycolysis & its regulation, Energetics & Role of hormone
- 1.2 Pathway of TCA cycle & its regulation, Energetics & Role of hormone
- 1.3 Glycogen metabolism & its regulation, Energetics & Role of hormones
- 1.4 HMP Shunt pathway & its regulation
- 1.5 Protein sparing action of carbohydrate
- 1.6 Inborn error of carbohydrate metabolism (galactosemia)
- 1.7 Glycoprotein & Proteoglycan

Unit 2:

Protein Metabolism 2.1 Deamination, Transamination & Transmethylation 2.2 Urea cycle 2.3 Protein structure 2.4 Inborn error of amino acid metabolism

Unit 3:

Lipid Metabolism 3.1 Fatty acid synthesis

3.2 Lipoprotein synthesis 3.3 β -oxidation & ω -oxidation 3.4 Forward cholesterol transportation (LDL & VLDL), Reverse cholesterol transportation (HDL) 3.5 Disorders of lipid metabolism, Dyslipidemia & Lipid storage disease 3.6 Ketosis & Ketone body

Unit 4: Nucleic acid Metabolism

- 1.1 Metabolism of Purine and Pyrimidine
- 1.2 Diseases due to abnormal nitrogen base metabolism
- 1.3 DNA replication, mutation, repair & recombination

Unit 5: Gene Expression

- 1.4 Gene expression in eukaryotes & its regulation (Normal)
- 1.5 Translation & post translational modification
- 1.6 Inhibitors of protein biology
- 1.7 Gene expression in mitochondria

Unit 6: Enzymes

- 1.8 Enzyme kinetics including inhibition in enzyme kinetics, Co-enzyme & Co-factors
- 1.9 Enzyme in clinical diagnosis

Unit 8: Free radical, ROS & Oxidation

Unit 9: Xenobiotics & its Metabolism

Practical Syllabus

MDN 191: NUTRITIONAL PHYSIOLOGY & BIOCHEMISTRY

1. Determination of -

- 1.1 Body mass index
- 1.2 Arm circumference
- 1.3 Head circumference

1.4 Waist hip ratio

1.5 BMR, anthropometric analysis of under nutrition and obesity

2. Estimation of -

2.1 Plasma protein

2.2 Plasma lactate

2.3 Serum iron

2.4 Serum calcium assessment

2.5 Serum triglyceride

2.6 Cholesterol

2.7 Lipoprotein assessment

3. Dialysis of Protein

4. Estimation of -

4.1 Vitamin-A

4.2 Vitamin C

4.3 Vitamin- D

4.4 Vitamin-E

4.5 Vitamin-B 12 & B6 from food extract and from serum using spectrofluorometer and spectrophotometer

5. Plasma glucose assessment by enzymatic method

6. Electrophoresis of protein.

MDN 192: BIOMETRIC ASSESSMENT OF NUTRITIONAL STATUS

- Weight for age, height for age, weight for height in Pre-adolescence group in different communities and its comparison with reference value.
- BMI, Mid upper circumference, head circumference, chest circumference of different age groups and comments on result.
- Body fat assessment in different zone, skin fold thickness in different age groups.
- Resting energy expenditure from height, weight and others parameters
- Use of Laboratory data and its application on its nutritional status assessment.
- BMR computation using primary and secondary data.
- Nutritional status assessment of preschool going children using growth curve.

Second Semester

MDN 201: DIETARY MANAGEMENT- I

1. Non communicable disease-
 - a. Diabetes (Type -I and Type- II)-
Epidemiology, pathophysiology, causes & dietary management
 - b. Hypertension –
Epidemiology, pathophysiology causes & dietary management
 - c. Hyperlipidemia-
Epidemiology, pathophysiology causes & dietary management
 - d. Atherosclerosis
Epidemiology, pathophysiology causes & dietary management
 - e. Nutritional anaemia
Epidemiology, pathophysiology causes & dietary management
 - f. Cancer
Epidemiology, pathophysiology causes & dietary management
 - g. Constipation
Epidemiology, pathophysiology causes & dietary management
 - h. Food allergy
Epidemiology, pathophysiology causes & dietary management.
2. Gastro Intestinal Diseases
 - a. Cholera
Epidemiology, Pathophysiology, Cause and dietary management
 - b. Diarrhoea
Epidemiology, Pathophysiology, Cause and dietary management
 - c. Dysentery
Epidemiology, Pathophysiology, Cause and dietary management

d. Flatulence

Epidemiology, Pathophysiology, Cause and dietary management

e. Junundice

Epidemiology, Pathophysiology, Cause and dietary management

f. Hepatitis

Epidemiology, Pathophysiology, Cause and dietary management

g. Gastritis

Epidemiology, Pathophysiology, Cause and dietary management

h. Ulcer

Epidemiology, Pathophysiology, Cause & dietary management

i. Irritable Bowel Syndrome

Epidemiology, Pathophysiology, Cause & dietary Management

j. Colitis Epidemiology, Pathophysiology, Cause & dietary management

3. *Rheumatic diseases*

a. Artharitis Epidemiology, Pathophysiology, Cause & dietary management

b. Osteoarthritis

Epidemiology, Pathophysiology, Cause & dietary management

c. Lupas arthritomatosis

Epidemiology, Pathophysiology, Cause & dietary management

MDN 202: BIOSTATISTICS

- Orientation to qualitative and quantitative analysis.
- Introduction to quantitative procedures.
- Basic principles and concepts in statistics

- Descriptive statistics and its applications
- Applications of descriptive statistics
- Characteristics of distributions: Skewness, Kurtosis
- Parametric tests of difference: T test, ANOVA and post hoc analysis of significance
- Non-parametric tests of association: Spearman's r.
- Chi square test

Reference: 1.Argyrous, G. (2000). Statistics for Social and Health Research. London: Sage.
 2.Bernard, H.R. (2000). Social Research Methods: Qualitative and Quantitative Approaches. Thousand Oaks, Ca: Sage. 3.Minium, E.W., King, B.M., & Bear, G. (1995/2004). Statistical Reasoning for Psychology and Education. New York: Wiley and Sons.4.Salkind, N. (2000). Statistics for People Who (they think) Hate Statistics. London: Sage.

MDN203:ADVANCED NUTRITION

- Energy metabolism Basal and resting metabolism –influencing factors. Methods to determine energy requirements and expenditure. Thermo genesis, adaptation to altered energy intake, latest concepts in energy requirements and RDA-ICMR and WHO
- Basis for computing nutrient requirements - latest concepts in dietary recommendations,: their uses and limitations. Body fluids and water balance - Body water compartments - Regulation of water balance - disorders of water balance - Body composition Methods of study - compositional changes during life cycle - nutritional disorders and their effect body composition.
- Lipids – Classification and Functions, Review of metabolism of Lipid, Concepts of visible and invisible fats, EFA, SFA, MUFA, PUFA – sources and physiological functions.
- Proteins – Classification and Functions, Review of metabolism of Protein, Concepts of essential and non-essential amino acids – their role in growth and development.
- Carbohydrates: Occurrence and physiological functions, Review of metabolism of carbohydrates. Lactose intolerance. Dental caries. Sugar alternatives. Role of dietary

fiber in health and disease

- Macro minerals: Calcium, phosphorus magnesium, sodium, potassium, chlorine and
Micro minerals: Iron, zinc, copper, selenium, chromium, iodine, manganese, Molybdenum and fluoride. Ultra trace minerals: arsenic, boron, nickel, silicon, vanadium and cobalt.
- Water soluble vitamins: vitamin C, thiamine, riboflavin, niacin, pantothenic acid, biotin, folic acid, vitamin B12, vitamin B 6.
- Fat soluble vitamins: Vitamin A, D, E& K.
- Detoxication –Definition, xenobiotics, enzyme systems involved mechanism of detoxification.

Reference:1. Shils, M.E., Olson, J. Shike, M. and Roos, C (2003). Modern Nutrition in Health and Disease, 9th edition Williams and Williams.A Beverly Co. London. 2. Bodwell, C.E..and Erdman, J.W. (2004) Nutrient Interactions. Marcel Dekker Inc. New York 3. Sareen, S, James, J (2005). Advanced Nutrition in Human Metabolism, 4th Edition, Thomson Wordsworth Publication, USA.

MDN 204:WOMEN HEALTH & NUTRITION

- Factors (non-nutritional) affecting pregnancy outcome, importance of adequate weight gain during pregnancy, antenatal care and its schedule, Nutritional requirements during pregnancy and modification of existing diet and supplementation, Deficiency of nutrients, specially energy, iron folic acid, protein, calcium, iodine. Common problems of pregnancy and their managements, specially - nausea, vomiting, pica, food aversions, pregnancy induced hypertension, obesity, diabetes. Adolescent pregnancy.
- Nutritional requirements during lactation, dietary management, food supplements, galactogogues, preparation for lactation. Care and preparation of nipples during breast feeding.

Reference Books

1. Ghosh, S. : The Feeding and Care of Infants and Young Children, VHAI. 6th Ed. Delhi.
2. WHO : A growth chart for International use In Maternal and Children Health Care, Geneva.
3. Mann and Truswell : Essentials of Human Nutrition, Oxford University press.
4. Indian Council of Medical Research: Nutrient Requirements and Recommended-Dietary Allowance for Indians, New Delhi.

MDN205: NUTRITIONAL POLICY & PROGRAMME FOR PUBLIC HEALTH

- Nutritional problems of the community and implication in public health, hazards of community health and nutritional status
- Nutrition policy in India and plan of action, national food and nutrition policy plan of action and programme
- Population dynamics
- Major nutritional problems and management
- Primary health care of the community. approaches and strategies for improving nutritional status and health
- communicable and infectious disease control
- Community water and waste management
- Community food protection
- Life style and community health
- Immunization – schedule during pregnancy and childhood
- Holistic approach to the management of fitness and health .Review of different energy system for endurance and power activity, nutrition in sports
- Nutrition and health care programmes for mother and child, nutritional requirements of the elderly people and dietary management to meet their nutritional needs
- Emergencies and disaster management, general concepts, disaster cycle
- Nutritional management of target group in disaster and emergencies situation- packet food and common kitchen in post disaster period
- Ration system in disaster and different types of nutrition rehabilitation disaster management

- Assessment process for nutritional rehabilitation at post disaster period

PRACTICAL

MDN 291 THERAPEUTIC DIET CHART PREPARATION – I

1. Non communicable disease-

- 1.1 Therapeutic diet chart preparation for Diabetes, case specific
- 1.2 Therapeutic diet chart preparation for Hypertension, case specific
- 1.3 Therapeutic diet chart preparation for Hyperlipidemia case specific
- 1.4 Therapeutic diet chart preparation for Atherosclerosis, case specific
- 1.5 Therapeutic diet chart preparation for Nutritional anemia, case specific
- 1.6 Therapeutic diet chart preparation for Cancer, case specific
- 1.7 Therapeutic diet chart preparation for Constipation, case specific
- 1.8 Therapeutic diet chart preparation for Food allergy, case specific

2. Gastro Intestinal Diseases

- 2.1 Therapeutic diet chart preparation for Cholera, case specific
- 2.2 Therapeutic diet chart preparation for Diarrhoea, case specific
- 2.3 Therapeutic diet chart preparation for Dysentery, case specific
- 2.4 Therapeutic diet chart preparation for Flatulence, case specific
- 2.5 Therapeutic diet chart preparation for Jaundice, case specific
- 2.6 Therapeutic diet chart preparation for Hepatitis, case specific
- 2.7 Therapeutic diet chart preparation for Gastritis, case specific
- 2.8 Therapeutic diet chart preparation for Ulcer, case specific
- 2.9 Therapeutic diet chart preparation for Irritable Bowel Syndrome, case specific
- 2.10 Therapeutic diet chart preparation for Colitis, case specific

3. Rheumatic diseases

- 3.1 Therapeutic diet chart preparation for Arthritis, case specific
- 3.2 Therapeutic diet chart preparation for Osteoarthritis, case specific
- 3.3 Therapeutic diet chart preparation for Lupus arthritomatosis, case specific.

Third Semester

Dietary Management –II

Paper code: MDN 301

3L+1T

- Renal disease-
 - Nephritis
Epidemiology, Pathophysiology, Cause and dietary management and critical care
 - Glomerulitis
Epidemiology, Pathophysiology, Cause and dietary management and critical care
 - Renal failure
Epidemiology, Pathophysiology, Cause and dietary management and critical care
- Kidney stone
Epidemiology, Pathophysiology, Cause and dietary management and critical care
- Nephrolithiasis
Epidemiology, Pathophysiology, Cause and dietary management and critical care
- Inborn error of metabolism-
 - Epidemiology, Pathophysiology, Cause and dietary management and critical care
- HIV
Epidemiology, Pathophysiology, Cause and dietary management and critical care
- Sepsis-
Epidemiology, Pathophysiology, Cause and dietary management and critical care
- Trauma-
Epidemiology, Pathophysiology, Cause and dietary management and critical care
- Burns-
Epidemiology, Pathophysiology, Cause and dietary management and critical care
- Phenyl Ketonuria
Epidemiology, Pathophysiology, Cause and dietary management and critical care
- Galactosemia
Epidemiology, Pathophysiology, Cause and dietary management and critical care

- Glycogen storage disease
Epidemiology, Pathophysiology, Cause and dietary management and critical care
- Maple syrup urine disease
Epidemiology, Pathophysiology, Cause & dietary management and critical care.
- *Neural diseases*
- Parkinson disease
Epidemiology, Pathophysiology, Cause & dietary management and critical care
- Alzheimer's disease
Epidemiology, Pathophysiology, Cause & dietary management and critical care
- Angelman disease
Epidemiology, Pathophysiology, Cause & dietary management and critical care
- Corea athotosis disease
Epidemiology, Pathophysiology, Cause & dietary management and critical care
- Lafora disease
Epidemiology, Pathophysiology, Cause & dietary management and critical care
- Huntington Corea disease
Epidemiology, Pathophysiology, Cause & dietary management and critical care
- Respiratory disease-
Asthama-Epidemiology, Pathophysiology, Cause and dietary management and critical care
- Chronic obstructive pulmonary disease
Epidemiology, Pathophysiology, Cause and dietary management and critical care
- Respiratory failure-Epidemiology, Pathophysiology, Cause & dietary management and critical care
- Tuberculosis-Epidemiology, Pathophysiology, Cause & dietary management and critical care

Research Methodology

Paper code: MDN 302

3L+1T

1. Types of research

- 1.1 Historical
- 1.2 Descriptive, Experimental
- 1.3 Case study
- 1.4 Social research
- 1.5 Participatory research

2. Definition & Identification of Research Problem

- 2.1 Selection of research problem
- 2.2 Justification
- 2.3 Theory
- 2.4 Hypothesis
- 2.5 Basic assumption
- 2.6 Limitation & delimitation of the problems
- 2.7 Types of variables

3. Theory of Probability

- 3.1 Probability
- 3.2 Sampling
- 3.3 Simple Random Systematic, Random Sampling
- 3.4 Two stages & multistage sampling
- 3.5 Non-probability sampling : purpose
- 3.6 Quota & Volunteer Sampling/Screwball sampling

4. Basic principle of research design

- 4.1 Purpose of research design/ fundamental
- 4.2 Applied & Action
- 4.3 Explanatory & descriptive
- 4.4 Experimental survey & case study
- 4.5 Longitudinal & Cross Sectional study
- 4.6 Co-relational study

5. Qualitative research in food and nutrition

- 5.1 Type of quality of research
- 5.2 Tools
- 5.3 Techniques and methodology
- 5.4 Rapid assessment procedure
- 5.5 Project reorientation and evaluation

6. Quantitative research method

- 6.1 Theory and design in quantitative research
- 6.2 Definition and quantitative research
- 6.3 Methods and techniques of data collection
- 6.4 Group discussion
- 6.5 Interviews: key information, in depth interview
- 7.1 Critical analysis of research
- 7.2 Writing a research proposal
- 7.3 Analysis of data and research report

8. Ethics in research

Pediatric and Geriatric Nutrition

Paper code: MDN 303

2L+1T

1. Pediatric nutrition

Pediatric nutrition assessment-

1.1 Anthropometric measurements

1.2 Biochemical parameters

1.3 clinical and dietary data

1.4 Measuring ,recording and plotting growth

2. Normal nutrition for infants – requirements , importance of breast feeding ,bottle feeding , commercial formulas,weaning foods ,other family foods ,physiology and care of the preterm infant.

3. Nutritional considerations for LBW children and children with development disabilities.

4.1 Nutrition in childhood; Growth and development; nutrient needs

4.2 Assessment of nutritional status of children

4.3 Providing an adequate diet - Factors affecting food intake.

4.4 Feeding the preschool child, the school- aged child.

5. *Nutritional concerns*

5.1 Childhood obesity; Underweight and Undernutrition- shottern and long term consequences in brief, Failure to thrive;

5.2 Growth faltering and detection Mineral and vitamin deficiencies

5.3 Dental caries

5.4 Allergies

5.5 Attention-deficit hyperactivity disorder

6. *Nurological disease in children i.e. epilepsy (ketogenic diets)*

7. Pulmonary disease in children, cystic fibrosis

8. Geriatric Nutrition The ageing process-physiological, metabolic, body consumption changes and impact on health and nutritional status

9. *Socio-psychological aspects of ageing-special problems of elderly women*

10. Nutritional and health status of elderly. Factors influencing food and nutrient intake, health status including lifestyle pattern, medication, psychosocial aspect etc.

11. Chronic degenerative disease and nutritional problems of the elderly-their etiopathogenesis, management, prevention and control

12. Policies and programmes of the government and NGO sector pertaining of the elderly

13. Critical care

Nutritional screening and nutritional status assessment of the critically ill

14. Nutritional support system and other life - saving measures for the critically ill

15. Enteral and parenteral nutrition support. Role of immune enhancer,

conditionally essential nutrients, Immune suppressants, and special diets in critical care

16. Complications of nutritional support system including re-feeding syndrome and rehabilitation diets

17. Enteral nutrition

17.1 Various sites for enteral nutrition

17.2 In brief, discussion on Ryles tube and its care

17.3 Types of feeds, advantages and disadvantages of home based feed

17.4 Commercial formula feed – incorporation of easily digestible food

17.5 Requirement of nutrients according to problems e.g. renal, respiratory etc.

18. Total parental nutrition

18.1 The importance of TPN

18.2 Long term effect of its use

18.3 Site of TPN and its care

18.4 Composition

Health Information Management and decision making

Paper code: MPH 105

3L+1T

Unit 1:

- Introduction to Health Information System: Objectives, Concept of Data & Information, Source of Health Information, Importance in Research.
- Electronic Medical Records and its Importance, Data Standards in Public Health
- System Concept, Components of a system, Components of a data Communication system Interfaces & boundaries, Environment of a system, Types of Systems, System Software & Application Software
- Data communication & Networking , Need for Computer Networking, Types of networks: LAN, MAN , WAN; Application of networking in public health

Unit 2:

- Decision Support System (DSS), Definition, Relationship with MIS , Evolution of DSS, Characteristics, Classification, Objectives, Components, Applications of DSS.

- Database Management System (DBMS): Need for using DBMS, Concept of tables, records, attributes.
- SQL, Outsourcing: Concept of BPO, KPO

Unit 3:

- Data Warehousing and Data Mining: Concepts of Data warehousing, data mart, meta data, multi-dimensional modelling
- Online Analytical Processing (OLAP), Online Transaction Processing (OLTP)
- Basics of Computer: Components of computer, Knowledge about computer softwares & programmes commonly used in healthcare sector
- Emerging communications technology in Public Health practice

Suggested Books:

1. Data Management Soft Ware's – Galgotia
2. Bharat, Bhaskar : Electronic Commerce – Technologies & Applications. TMH
3. Forouzan : Data Communication & Networking, TMH
4. Joseph, P.T.: E-Commerce An Indian Prespective
5. Management Information Systems. M.M.Oka. EPH
6. Management Information Systems, O'Brien , TMH
7. Management Information Systems, Arora & Bhatia , EXCEL BOOKS

Food Safety, Processing and Quality Control

Paper code: MDN 305

3L+1T

Cereal and cereal products technology

1. **Cereals:** Wheat, rice, maize, barely, oat, rye- Structure, cultivation, harvesting, properties, composition and commercial value.
2. **Milling process:** Complete milling process, break rolls, reduction rolls, milled products and their nutritive value and applications.
3. **Baking technology:** Bread, biscuits/ Cookies and cake, Principles of baking, Ingredients and their functions, methods of preparation, in- process control, faults, causes and remedies, methods of leavening: physical, biological and chemical, scoring of quality parameters.

Meat, fish, poultry, egg and its products technology

1. **Meat:** Composition, variety, slaughtering and related practices, pre- slaughter handling, grading, ageing, curing, smoking and tenderizing of meat, meat pigments and colour changes, cooking, storage, methods of preservation for value addition and spoilage.
 2. **Poultry:** Production considerations, Processing plant operations (slaughter and bleeding, scalding, defeathering, eviscerating, chilling and packaging), cooking, tenderness, flavour and colour changes.
 3. **Eggs:** Composition, quality factors, storage, bacterial infection and pasteurization, freezing, drying and egg substitutes.
- **Fish:** Composition, onboard handling & preservation, drying and dehydration, salt curing, smoking, marinades, fermented products, canning, Modified Atmosphere Packaging, and quality factors.

Public health hazards due to microbial contamination of foods: Important food borne infections and intoxications due to bacteria, moulds, viruses (*Salmonella typhi*, *Helicobacter pylori*, *Campylobacter jejuni*, *Yersinia enterocolitica*, *Bacillus cereus*, *Staphylococcus aureus*, *Clostridium botulinum*, *Escherichia coli*, *Mycotoxins*, *Hepatitis A virus* & *Rota virus*)- Symptoms, mode of transmission and methods of prevention. Assessing the microbiological quality of food: indicator organisms, microbiological standards, principles of GMP & HACCP in food processing. Safety management at household and industrial level.

Practical :

Therapeutic Diet chart preparation II

Paper Code :MDN 391

Paper Code: MDN 391

1. Renal disease

- 1.1 Therapeutic diet chart preparation for Nephritis, case specific
- 1.2 Therapeutic diet chart preparation for Glomerulitis, case specific
- 1.3 Therapeutic diet chart preparation for Renal failure, case specific

1.4 Therapeutic diet chart preparation for Kidney stone , case specific
1.5 Therapeutic diet chart preparation for Nephrolithiasis, case specific

2. Respiratory disease

- 2.1 Therapeutic diet chart preparation for Asthama, case specific
- 2.2 Therapeutic diet chart preparation for Chronic obstructive pulmonary disease, case specific
- 2.3 Therapeutic diet chart preparation for Respiratory failure, case specific
- 2.4 Therapeutic diet chart preparation for Tuberculosis, case specific

- 3.0
- 3.1 Therapeutic diet chart preparation for Inborn error of metabolism, case specific
- 3.2 Therapeutic diet chart preparation for HIV, case specific
- 3.3 Therapeutic diet chart preparation for Sepsis, case specific
- 3.4 Therapeutic diet chart preparation for Trauma, case specific
- 3.5 Therapeutic diet chart preparation for Bums, case specific
- 3.6 Therapeutic diet chart preparation for Phenyl ketonuria, case specific
- 3.7 Therapeutic diet chart preparation for Galactosemia, case specific
- 3.8 Therapeutic diet chart preparation for Glycogen storage disease, case specific
- 3.9 Therapeutic diet chart preparation for Maple syrup urine disease, case specific

RESEARCH PROJECT

Paper Code: MDN 381

Each student will undertake a research project 6 Hrs per week. The students will be guided and supervised by a member of the teaching faculty of the concerned department.

Fourth Semester

ENTREPRENEURSHIP IN FOOD SERVICE

Paper Code: MDN 401

2L+1T

Space and Equipment

8

a) Layout planning :

- Preliminary preparation-Information gathering , Menu analysis , Determining type of service
- Determining: basic units and equipment
- Steps in planning: Prospectus, planning team
- Design development.- Types of kitchen areas , Flow of work and work area relationship

b) Determining equipment needs

- Types of Equipments
- Features of equipments
- Factors affecting selection of equipments
- Equipment needs for different situations

Financial Management

- a) Importance of Financial Management in a food based enterprise
- b) Budgets and Budgeting process,
- c) Records: Menu, Purchase, Store, Production, Sales, Personnel, Utilities
- d) Basic concepts in business transactions: Cash memo, Receipt, Pay-in- slip, Cheques Vouchers
- e) Books of Account: Journal, Sales Return Book, Purchases Return Book, Sales Book, Purchase Book, Cash Book, Ledger
- f) Pricing and its methods, Costing, concepts and controlling techniques; cost effective procedures, Concept of Break Even Point (BEP)
- g) Reports :Cost analysis: Concept of Trial Balance, P&L Account

Marketing and Sales Strategies

- a) Product Differentiation
- b) Marketing techniques and strategies
- c) Sales management

Food Hygiene Sanitation and Safety

Importance of hygiene and sanitation in food service units

- a) Sanitation measures for Food , Personnel and UnitHygiene, Training techniques for food service personnel in Sanitation.
- b) Safety- causes of accidents , types, safety techniques, 3 Es of Safety
- c) Food laws/Food bill- FPO, ISI, AGMARK, PFA, New Food Bill 2006
- d) Quality standards-HACCP, ISO

UNIT V: Planning the set up:

- a) Identifying resources
 - Facility available and equipments needed
 - Menu and precosting
 - Manpower required
 - Utilities
- b) Developing Project plan and Determining investments
- c) Feasibility assessment
- d) Project Proposal

RECOMMENDED READINGS

- West B Bessie & Wood Levelle (1988) Food Service in Institutions 6th Edition Revised By Hargar FV, Shuggart SG, & Palgne Palacio June, Macmillian Publishing Company New York.
- Sethi Mohini (2005) Institution Food Management New Age International Publishers
- Kazarian E A (1977) Food Service facilities Planning 3rd Edition Von Nostrand Reinhold New York
- Kotas Richard & Jayawardardene. C (1994) Profitble Food and Beverage Management Hodder & Stoughton Publications
- Kotler Philip Marketing management (2001) Millennium Edition Prentice Hall of India
- Taneja S and Gupta SL (2001) Entrepreneurship development, Galgotia Publishing

FOOD PRESERVATION & PACKAGING

Paper Code: MDN 402

2L+1T

Food Preservation:

Importance & Scope of Food Preservation

1.1 Principle & methods of food preservation

1.2 Selection & purchase of foods

2. Food Spoilage

2.1 Cause of spoilage, biological changes, action of enzyme, physical changes

2.2 Microorganisms responsible for spoilage in preserved foods

3. Preservation by Low & High Temperature

Principle, Methods, Commonly preserved foods by low & high temperature

4. Preservation by Drying & Dehydration Principle, Methods, Dehydrated Foods

5. Preservation by Preservatives

Principles, Types of Preservatives, Action on Foods

6. Preservation by Osmotic Pressure

6.1 Preservation by high concentration of Sugar

6.2 Preservation by low concentration of Sugar

7. Preservation by Irradiation

Electromagnetic Irradiation & Ultra violet Rays.

Food Packaging

- Introduction to food packaging: Functions of food packaging, Packaging environment. Characteristics of food stuff that influences packaging selection.
- Packaging Systems and methods: Vacuum Packaging, Controlled atmospheric packaging, Modified atmospheric packaging, Aseptic Packaging, Retort processing, Microwave packaging, Active Packaging, intelligent packaging, Edible packaging, Shrink and stretch packaging.
- Packaging material and their properties: Glass, Paper and paper board, Corrugated fibre board (CFB), Metal containers: Tin Plate and Aluminum, Composite containers, Collapsible tubes, Plastic Films, Laminations, Metalized films, Co extruded films, Testing of packaging material.

- Packaging of fresh and processed foods: Packaging of Fruits and vegetables, Fats and Oils, Spices, meat, Poultry and sea foods, Dairy Products, Bakery, beverages, Dehydrated and frozen foods. Liquid and powder filling machines
- Packaging Design & Environmental Issues in Packaging: Coding and marking including bar coding; Packaging Laws and regulations, safety aspects of packaging materials; sources of toxic materials and migration of toxins into food materials; Environmental & Economic issues, recycling and waste disposal.

Reference:1. Robertson, G.L. 2006 Food Packaging: Principles and Practice (2nd ed.), Taylor & Francis 2. NIIR.(2003). Food Packaging Technology Handbook, National Institute of Industrial Research Board, Asia Pacific Business Press Inc. 3. Ahvenainen, R. (Ed.) 2003 Novel Food Packaging Techniques, CRC Press,4. Han, J.H. (Ed.) 2005 Innovations in Food Packaging, Elsevier Academic Press.

FOOD ECONOMICS & INSTITUTIONAL FOOD ADMINISTRATION

Paper Code: MDN 403

2L+1T

- Statistical profile of the world food economy. The Structure of the World Food System. Early human food systems and subsistence agriculture.
- Statistical profile of the Indian economy Agricultural production and the supply of food. Economic causes and consequences of resource degradation. Components of Indian Food Systems, Food Policies in India :Food and agricultural policies, Supply side policies, Agricultural research and development Infrastructure and production policies, Demand side policies, Income support and redistribution Food assistance programs
- Global Institutions and the WTO, World food systems: food security, food self-sufficiency and the role of trade. Foreign aid, food aid and development. Global sustainability: environmental impacts of the world food system.
- Food security: Hunger and malnutrition, Definition and measurement. Food security model, Food availability. Foreign aid, food aid and development. Global sustainability:
- environmental impacts of the world food system. Hunger, conflict, government failure and international intervention. Globalization of the food system.

Reference :1.Leathers, H.D. and Fosters, P., The World Food Problem: Tackling the Causes of Under nutrition in the Third World, 3rd Edition. Lynne Rienner Publishers, 2004.
2.Fogel, R. W. 2004. Health, nutrition, and economic growth. Economic Development & Cultural Change 52(3): 643-658.

Additional Book References for the Course

1. Dietetics (MULTI COLOUR EDITION) by Srilakshmi, B.
2. Fundamentals of Foods, Nutrition and Diet Therapy” by Sumati R Mudambi
3. Nutritional Anthropology: Biocultural Perspectives on Food and Nutrition (Revised)” by Darna L Dufour and Goodman
4. Dictionary of Food and Nutrition” by Sharma / Caralli
5. A Textbook Of Foods,Nutrition And Dietetics by M Raheena Begum
6. Statistical Aspects of Community Health and Nutrition (Woodhead Publishing India in Food Science and Nutrition) by A K Nigam
7. Handbook of Food and Nutrition by Dr M Swaminathan
8. Textbook of Nutrition and Dietetics Paperback – 2014 by Sharda Gupta, Santosh Jain Passi, Rama Seth, Ranjana Mahna & Seema Puri Kumud Khanna
9. Nutrition and Dietetics Paperback – 1 Jul 2017 by Shubhangini A. Joshi
10. Handbook Of Nutrition And Dietetics Paperback – 30 Jun 2008 by Dr. Jyoti Singh
11. Nutrition and Clinical Dietetics by Herbert Swift Carter ; Paul Edward Howe; Howard Harris Mason
12. Clinical Dietetics And Nutrition (2001 4th Edition) by F. P. Antia, Philip Abraham