COURSE NAME: M. Sc (Dietetics & Nutrition)

COURSE STRUCTURE:

FIRST SEMESTER

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Total of Theory 18

Practical:

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Total of Practical 06

Total of Semester 24
# SECOND SEMESTER

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**Total of Theory** 18

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**Total of Practical** 06

**Total of Semester** 24
## FOURTH SEMESTER

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**Total of Theory**

9

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**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.
- Respiratory System: Structure of respiratory system.
- Excretory System: Structure and functions of kidney, bladder, formation of urine, role of kidney in homeostasis. Structure arid-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
MDN-102: **PRINCIPLES OF FOOD SCIENCE**

- 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:

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 :

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


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


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


• 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.

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.

and Disease, 9th edition Williams and Williams.A Beverly Co. London. 2. Bodwell, C.E..and 
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


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
- Plane 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 Bowl 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 Lupas arthritomatosis, case specific.
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
- Alzemer's disease
  Epidemiology, Pathophysiology, Cause & dietary management and critical care
- Angeleman 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-
  Asthma
  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 - stunting 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. Neurological 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
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 Asthma, 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 Therapeutic diet chart preparation for Inborn error of metabolism, case specific
   3.1 Therapeutic diet chart preparation for HIV, case specific
   3.2 Therapeutic diet chart preparation for Sepsis, case specific
   3.3 Therapeutic diet chart preparation for Trauma, case specific
   3.4 Therapeutic diet chart preparation for Burns, case specific
   3.5 Therapeutic diet chart preparation for Phenyl ketonuria, case specific
   3.6 Therapeutic diet chart preparation for Galactosemia, case specific
   3.7 Therapeutic diet chart preparation for Glycogen storage disease, case specific
   3.8 Therapeutic diet chart preparation for Maple syrup urine disease, case specific
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

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
f) Pricing and its methods, Costing, concepts and controlling techniques; cost effective procedures, Concept pf 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 Unit Hygiene, 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**

FOOD PRESERVATION & PACKAGING

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 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.


**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


• 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.

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
7. Handbook of Food and Nutrition by Dr M Swaminathan
11. Nutrition and Clinical Dietetics by Herbert Swift Carter; Paul Edward Howe; Howard Harris Mason