THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI

REGULATIONS OF THE UNIVERSITY

(Post-graduate Degree course under Allied Health Science) M.Sc., (CLINICAL NUTRITION) Combined Master's Degree and **Dietetic Internship** Program.

In exercise of the powers conferred by Section 44 of the Tamil Nadu Dr.M.G.R.Medical University, Chennai Act 1987 (Tamil Nadu Act 37 of 1987) the Standing Academic Board of the Tamil Nadu Dr.M.G.R.Medical University, Chennai hereby makes the following regulations:-

1. SHORT TITLE AND COMMENCEMENT:-

These regulations shall be called as **"M.Sc.,(CLINICAL NUTRITION)"** of the Tamil Nadu Dr. MGR Medical University, Chennai.

They shall come into effect from the academic year 2012-2013

The regulations framed are subject to modification from time to time by the Standing Academic Board.

2. OVER ALL OBJECTIVES

M.Sc., (CLINICAL NUTRITION) DEGREE COURSE UNDER ALLIED HEALTH SCIENCE is offered to assist Medical and Allied Health Professionals to understand the principles of dietary management and apply, while providing Quality Patient Care in the selected areas of Clinical Specialty in the Hospital and Community.

3. ELIGIBILITY FOR ADMISSION

Candidates for admission to the **M.Sc., (CLINICAL NUTRITION) DEGREE COURSE UNDER ALLIED HEALTH SCIENCES** should have passed Degree in any one of the following courses from a recognized University

B.Sc., Nutrition Dietetics and Food Service Management
B.Sc., Food Science and Nutrition
B.Sc., Clinical Nutrition and Dietetics Food Service Management and Dietetics.

0 B.Sc., Home Science (with majors in Nutrition and Dietetics)
1 B.Sc., Human Science(with majors in Nutrition and Dietetics)
2 B.Sc., Clinical Nutrition(with majors in Nutrition and Dietetics)

4. ELIGIBILITY CERTIFICATE:

Candidate who has passed any qualifying examination as stated in Regulation No.3 above other than the Tamil Nadu Dr. M.G.R. Medical University shall obtain an "Eligibility Certificate" from this University by remitting the prescribed Fees along with the Application Form and required Documents before seeking admission to any one of the affiliated institutions. The application form is available in the University website: www.tnmgrmu.ac.in.

5. REGISTRATION:

A Candidate admitted in the **M.Sc., (CLINICAL NUTRITION) DEGREE COURSE UNDER ALLIED HEALTH SCIENCES** in any one of the affiliated institutions of this University shall register his / her name with this University by submitting the prescribed Application Form for registration duly filled, along with the prescribed Fee and a declaration in the format to the Controller of Examination of this University through the affiliated institution within 30 days from the cut-off date prescribed for admission. The applications should have date of admission of the course.

6. MIGRATION/TRANSFER OF CANDIDATE:

¾ A student studying in the **M.Sc., (CLINICAL NUTRITION) DEGREE COURSE UNDER ALLIED HEALTH SCIENCES** in any one of the affiliated institution shall be allowed to migrate/transfer to another institution of this University.

Under extraordinary circumstances, the Vice Chancellor shall have the powers to place any migration/transfer of he/she deems fit before the Governing Council and get its approval for grant of permission/ratification for Migration/Transfer to the candidates undergoing the course of study in affiliated institutions of this University.

7. COMMENCEMENT OF THE COURSE:

The academic year for the M.Sc., (Clinical Nutrition) Post-graduate Degree course shall commence from 2nd May / 1st October and the candidates admitted upto 31st May / 31st October will be registered for the course.

**** Resolved in the 43rd SAB dt. 19.12.2011**

8. MEDIUM OF INSTRUCTION:

English shall be the Medium of Instruction for all the Subjects of study and for examinations of the **M.Sc., (CLINICAL NUTRITION) DEGREE COURSE UNDER ALLIED HEALTH SCIENCES**

9. CURRICULUM:

The Curriculum and the syllabus for the course shall be as prescribed in these regulations and are subject to modifications by the Standing Academic Board from time to time.

10. WORKING DAYS IN THE ACADEMIC YEAR:-

Each academic year shall consist of not less than 270 working days

Total No. of days in a year		**365 days**
No. of weekly off (Sundays)	-	52 days
No. of Government Holidays	-	22 days
No. of Holidays	-	21 days
		95 days
Total No. of working days including Examination period		270 days

11. DURATION OF THE COURSE:

0 The duration of certified study for the **M.Sc., (CLINICAL NUTRITION) DEGREE COURSE UNDER ALLIED HEALTH SCIENCES shall** extend over a period of two academic years and six months Residency Training.

¾ The candidate should complete this course in 4 years (double the duration) from the date of joining the course.

12. RE-ADMISSION AFTER BREAK OF STUDY:

The regulations for re-admission are as per the University Common Regulation for Re-admission after break of study for all courses.

13. ATTENDANCE REQUIRED FOR ADMISSION TO EXAMINATION:

No candidate shall be permitted to appear in any one of the paper/subjects of M.Sc**.,(CLINICAL NUTRITION) DEGREE COURSE UNDER ALLIED HEALTH SCIENCES**
Examinations unless he/she has attended the course in the subject for the prescribed period in an affiliated institution recognized by this University and produce the necessary certificate of study, attendance and satisfactory conduct from the Head of the institution.

A candidate is required to put in a minimum of 90% of attendance in both theory and practical separately in each subject before admission to the examination.

14. INTERNAL ASSESSMENT MARKS:

The Internal Assessment should consist of the following points for evaluation:-

5888 Theory

5889 Practical

5890 Viva

A minimum of two written examinations shall be conducted in each subject during a year and the average marks of the performances shall be taken into consideration for the award of Internal Assessment marks.

15. CUT-OFF DATES FOR ADMISSION TO EXAMINATIONS:

The candidates admitted upto 31st May / 31st October shall be registered to take up their First Year examinations after fulfillment of the regulations from 15th April / 15th October of the next year.

All kind of admissions shall be completed on or before 31st May / 31st October of the academic year. There shall not be any admissions after 31st May / 31st October, even if seats are vacant

**** Resolved in the 43rd SAB dt. 19.12.2011**

16. COMMENCEMENT OF THE EXAMINATIONS:

23 15th April / 15th October

23 If the date of commencement of examination falls on Saturdays / Sundays or declared Public Holidays, the examination shall begin on the next working day. The University paper will be awarded for 100 marks and Internal 50 marks.

17. DISSERTATION & EVALUATION OF DISSERTATION:

23 The topic of the dissertation should be submitted at the end of first year. The candidate should also inform the name of the Guide for the dissertation to the University while submitting the dissertation topic.

24 If any changes in the dissertation topic, the same has to be informed before the end of the first year.

25 The dissertation should be submitted three months well in advance duly signed by the Professor of that branch and the same has to be forwarded to the Controller of Examination through the Dean or Principal of the College three month prior to the Examination.

26 If the dissertation is not approved or rejected by the majority of the examiners, the results shall be withheld till the submission of dissertation is approved. (XXVIII S.A.B. dated 22.12.2004)

27 If the candidate fails in the Written/Practical Examination, but his / her dissertations approved, the approval of the dissertation shall be carried over to the subsequent examinations.

28 For Dissertation 200 Marks, Viva-voce on Dissertation 50 Marks and IA/Presentation 50 Marks – Minimum to pass 150 mark.

29 Evaluator for the Dissertation-Practicing Dietician with minimum of 10years experience in Clinical Nutrition and with Masters Degree in Nutrition and Dietetics (1 External + 1 Internal)

18. MARKS QUALIFYING FOR PASS:

50% of marks in the University Theory Examinations

50% of marks in the subject where Internal evaluation alone is conducted

50% of marks in aggregate in Theory, Practical I.A. & Oral taken together

19. CLASSIFICATION OF SUCCESSFUL CANDIDATE:

A successful candidate:

23 Who secures not less than 75% of marks in any subjects shall be declared to have passed on distinction in that particular subject provided she/he passes the whole examinations in the first attempt.

24 Who passes the examinations in all subjects at the first appearance obtaining not less than 60% of marks in aggregate shall be declared to have passed the examinations in the first class.

¾ All the other successful candidate shall be declared to have passed the examination in the second class.

¾ A candidate passing any of the examination in more than one attempt will be given "Pass Class" irrespective of percentage of marks secured by the candidate in the examinations.

20. CARRY OVER OF FAILED SUBJECTS:

¾ A candidate has to pass in theory and practical examination in each of the paper.

¾ If a candidate fails in theory examinations, he/she has to reappear.

0 Only three attempts are allowed in each subject including 1st attempt.

1 The candidate has to complete the course in double the duration of the course (i.e. 4 years from the date of joining)

21. CONDONATION OF LACK OF ATTENDANCE:

There shall be no condonation of lack of attendance.

22. VACATION:

There is no vacation

23. REVALUATION / RETOTALLING OF ANSWER PAPERS:

Revaluation of answer papers is not permitted. Only retotalling of theory answer papers is allowed, in the failed subjects.

24. RESIDENCY TRAINING

After successful completion of the course (two years/ the candidate is eligible to undergo Residency Training (Hospital posting).

Residency Training for 6 months is compulsory rotation in the following departments.

- Ā Ā Ā Ā Ā Ā Ā ĀÀĀÀ□Ā Ā Ā Ā Ā Ā Ā Ā 512 Working hours/day -8
- Ā Ā Ā Ā Ā Ā Ā ĀÄĀÄ□Ā Ā Ā Ā Ā Ā Ā Ā 513 Time allotted for each specialty:

The order of posting	Time (in weeks)
General Medicine	1
Surgery	2
OG Obstetrics & Gynaecology	1
Geriatric	1
Oncology	1
Cardiology	1
Gastroenterology ,Hepatology	2
Neurology	1
Pediatrics	2
Endocrinology	3
Nephrology	2
ICU-Cardio, Medical, Surgical, Pediatric	3
Food Service Area (Dietary/Diet Kitchen)	4

(To include store keeping (receiving and holding of provision, stock levels in the stores), supervision of the kitchen area, pre-preparation area and preparation of patient diet and hospital made enteral feeds, quality Control,kitchen hygiene and patient tray service

Objectives:

To enable the students

23 To assess ,evaluate ,monitor and interpret the nutritional problems of different disease conditions of the patients or interpretations of various nutritional case studies in the Hospitals

24 To provide adequate nutritional counseling etc

25 To obtain direct knowledge in hospital settings

26 To evaluate the nutritional needs of patients

EXAMINATION PATTERN – I YEAR

MSc., Clinical Nutrition

S.L.No	Subject	IA		Theory	
		Max	Min	Max	Min
1	Applied Physiology	50	25	100	50
2	Nutritional Biochemistry	50	25	100	50
3	Medical & Food Microbiology	50	25	100	50
4	Advance Nutrition	50	25	100	50
5	Principles of Food Science	50	25	100	50
6	Research Methods and Biostatistics	50	25	100	50

IA-Internal Assessment

EXAMINATION PATTERN – II YEAR

MSc., Clinical Nutrition

S.No	Subject	IA		Theory		Practical	
		Max	Min	Max	Min	Max	Min
1	Applied Nutrition	50	25	100	50	-	-
2	Clinical Nutrition & Dietetics	50	25	100	50	100	50
3	Entrepreneurship and Food Service Management	50	25	100	50	-	-
4	Public Nutrition	50	25	100	50	-	-

II nd YEAR PRACTICAL (Duration)6hrs

2. Clinical Nutrition and Dietetics Practical

Two Therapeutic Diets (25x2) = 50 Marks

(Planning and Preparing)

Viva (External) = 10 Marks

Record (External 10 Marks and Internal 10marks) = 20 Marks

Spotters 5 = 10 Marks

Internal Assessment = 10 Marks

EVALUATION OF DISSERTATION & LOG BOOK

Evaluation of Dissertation	200
Viva/Presentation	50
IA*	50
Total	**300**
Passing Minimum	150

** Resolved in the 43rd SAB Dated 19.12.2011.

*(IA)-Internal Assessment for Log book (Details of Field visit and Residency Program) Total 50 Marks with 20%and 80% weightage respectively

1. Public Nutrition = 25 Marks
2. Residency Program log book = 25 Marks

Record: This includes all the case studies and diet plans as per the practicals schedule

Log Book: Is a register to get it signed by the respective mentors posted under them

Residency Programme(Log book ***)***

SYLLABUS FOR M.SC.,(CLINICAL NUTRITION)

Ist YEAR

BRIEF SUBJECT TITLE TO BE COVERED

S.No. Subjects

0 Applied Physiology
1 Nutritional Biochemistry
2 Medical & Food Microbiology
3 Advance Nutrition
4 Principles of Food Science
5 Research Methods and Biostatistics

II YEAR

0 Applied Nutrition
1 Clinical Nutrition& Dietetics
Clinical Nutrition & Dietetics Practical
0 Entrepreneurship and Food Service Management
1 Public Nutrition
Dissertation

POST SECOND YR (RESIDENCY TRAINING)

Residency Programme : Duration - 6 months

Nutrition assessment (SGA /MUST/MNA/SOAP /CASE SPECIFIC) of 70 cases from the above departments, and detailed case study of 30 patients-cAssociation ABCD (SGA /MUST/MNA/SOAP /Case Specific), 3 Day Recall, Food Exchange Calculations, and Dietary Recommendations and Conclusion Completion of **the RD Residency Training** as per RD Internship of Indian Dietetic Association (IDA) **Log book** is compulsory (emphasis to be given to the following

23 Anemia

24 Pregnancy and Lactation

25 Enteral and Parenteral nutrition

26 Cancer patient i) Chemo Therapy ii) Radiation Therapy

27 Cardio vascular diseases

28 Gastro Intestinal Diseases

29 Liver Diseases

30 Pancreatitis

31 Pediatric-

23) Inborn Errors of Metabolism PKU/MSUD/GSD/GA etc
T-1DM
Underweight child
Feeding difficulties
v) Failure to thrive
vi) Overweight & Obesity
0 Nephritis, Chronic Renal Failure
1 Cancer

10. Diabetes Mellitus-i) T-1 DM ii) T-2DM iii) GDM iv) Diabetes With complications

11. Weight management: i) Overweight & Obesity: Adult cases

ii) Underweight: Adult cases

12. Renal Diseases- Acute and Chronic Renal Failure

Ā□̀(ㄱ)□ĀĀĀĀÀĀ▯ Ā▯ Ā▯ Ā▯ Ā▯ Ā▯ Ādd(ㄱ)□恿□Àdd(ㄱ)□恿□ĀÁ
onservative treatment

Ā□̀(ㄱ)□ĀĀĀĀÀĀ▯ Ā▯ Ā▯ Ā▯ Ā▯ Ā▯ Ādd(ㄱ)□恿□Àdd(ㄱ)□恿□ĀÁ
enal replacement therapy

5888 Dialysis -Hemodialysis, Peritoneal dialysis

5889 Transplant

13. Critically ill in ICU

I YEAR

PAPER I - *APPLIED PHYSIOLOGY*

Unit I INTRODUCTION TO PHYSIOLOGY

- **Introduction**
- **Physiology as a discipline**
- **How Cells Join Together**
  - Body Systems

4. **Physiology of growth and development**

- **Physiology of ageing**
  - Age Related Changes
  - Theories of Ageing
  - Modulating Process of Ageing
  - Nutrition and Physiology

Unit II Cell and Blood

2.1. **Introduction**

Cell: The Basic Unit of Life

- Discovery of Cell
- Cell Theory
- Unicellular and Multi cellular Organisms

Structure of Cell

- Eukaryotic Cell and Organization
- Prokaryotic Cell and Organization

Cell Cycle

- ← Mitosis
- ← Meiosis

Tissue and Their Functions

- ← Epithelial Tissue
- ← Connective Tissue
- ← Muscle Tissue
- ← Nervous Tissue

← **Blood**

- ← History and Milestones

← **Blood Composition**

- ← The Plasma
- ← Blood Cells

← **Erythropoiesis**

- ← Regulation of Erythropoiesis
- ← Blood Groups

← **Abo Blood Grouping System**

- ← Rh Blood Grouping System

← **Anaemia**

← **Haemostasis**

Unit 3

- ← **Introduction**
- ← **The Immune System**
- ← **Non Specific Defence Mechanism**
- ← External Defence Mechanism
- ← Internal Defence Mechanism

3.4 Specific Defence Mechanism

← Major Histocompatability Complex (MHC)

← Antibodies

3.5 Innate Immunity

← Phagocytosis

← The Complement System

← Humoral Mechanisms

← **Specific Acquired Immunity**

← Antibody Mediated Immune System (Amis

← Cell Mediated Immune System (Cmis)

← **The Leukocytes: Development and Regulation**

← Development of Granulocytes

← Growth factors which affect Granulopoiesis

← Development of Agranulocytes

← **In-Vitro Detection of Antigen-Antibody Interaction Unit-4 Cardiovascular System**

Structure

← **Introduction**

← **Design of Cardiovascular System**

← Heart : The Pump

← Blood Vessels: The Pipelines

← Control of our Heart through Nerves

← Control of our Blood Vessels through Nerves

4.3. What is the Heart made up of ?

← Pacemaker and Conduction Tissues

← The Cardiac Muscle

4.4. The Uniqueness of our Heart

← **Cardiac Output**

← **The Cardiac Cycle**

← **Blood Pressure**

← What is Blood Pressure?

← Factors affecting Blood Pressure

← Factors regulating Blood Pressure

4.8. Pathophysiology of Hypertension

← **Myocardial Ischemia and Infarction**

← Aerobics Exercise and Diet: How to keep your Heart Healthy

← ECG-What it is and why do we need it?

Unit 5 Respiration

← **Introduction**

← **Organs of the Respiratory System**

← The Nose and the Nasal Cavity

← The Pharynx

← The Larynx

← The Trachea

← The Bronchi

← The Bronchioles and Smaller Air Passages

← The Lungs and the Pleura

← The Mechanics of Respiration

← Pulmonary Volumes

← Interchange of Gas within the Lungs

5.5.1 Transport of Oxygen

5.5.2 Transport of Carbon Dioxide

← Regulation of Respiration 5.6.1

Neural Control of Respiration

5.6.2 Chemical Control of Respiration

← Internal Respiration

← Respiratory Adjustments

← Artificial Respiration

Unit 6 Physiology of Gastrointestinal System

← **Introduction**

← **Description of the Gastrointestinal Tract**

← **Mouth**

← Tongue

← Teeth

← Salivary Glands

← The Pharynx

← The Esophagus

← The Stomach

← Structure of the Stomach

← Functions of the Stomach

← Composition and Functions of Gastric Juice

← Mechanism of Secretion of Gastric Juice

6.8 The Pancreas

← Structure of the Pancreas

← Functions of the Pancreas

← Mechanism of Pancreatic Secretion

6.9 The Liver and Billiard System

← Liver-Structure and Functions

6.9.2 The Gall Bladder and the Bile Ducts

← The Small Intestine

← The Large Intestine

← Movements of the Gastrointestinal Tract

← Gastrointestinal Hormones

← Absorption and Utilization of Carbohydrates, Proteins and Fats 6.14.1 Absorption and Utilization of Carbohydrates

6.14.2 Absorption and Utilization of Proteins

6.14.3 Absorption and Utilization of Fats

← Some Common Disorders of the Digestive System

Unit-7 Physiology of Renal System

← **Introduction**

← **Organs of the Urinary System**

← Kidney: Structure and Functions

← Gross and Microscopic Structure of Kidney and Nephron

← Functions of the Kidney

← How the Kidney Works

← Counter Current Mechanism

← Non-Excretory Functions of Kidney

7.4 Ureters

7.5.The Urinary Bladder

← The Urethra

← Constituents and Examination of Urine

← Normal and Abnormal Constituents of Urine

← Examination of Urine

7.8 Renal Function Tests

← Pathophysiology of Kidney

← Dialysis

← Kidney Transplant

Unit 8 Maintenance of Body Homeostasis

← **Introduction**

← **Homeostasis –An Introduction**

← **Body Fluids**

← Intracellular Fluid Compartment

← Extra cellular Fluid Compartment

8.4 Measurement of Body Fluid Volumes

← The Dilution Principle for Measuring Fluid Volumes

← Determination of Blood Volume

← Measurement of Extra cellular Fluid Volume

← Measurement of Total Body Water

8.5 Transports across Cell Membranes

← Passive Transport

← Active Transport

8.6 Solute-Solvent Interaction

Unit 9 Nervous System

9.1. Introduction

← **How does our body know 'what to do'?**

← **Nerve Cell**

← Nerve Cell Morphology

← Communication between Neurons

← The Process of Synaptic Transmission

← Neurotransmitter and Neuromodulators

← The fate of the Neurotransmitter

← How do you Perceive and Respond to a Stimulus

← How the Signals are Conveyed to the CNS

← Descending Fibers of the Sensory System

← **Structural Organization of Nervous System**

← **The Central Nervous System**

← Organization of Brain

← The Spinal Cord

← The Peripheral Nervous System (PNS)

9.6.1 Somatosensory System

9.6.2 Autonomic Nervous System (ANS)

← Electroencephalogram (EEG)

Unit 10 Special Senses

← **Introduction**

← **Vision**

← Structure of the Eye

← Mechanism of Color Perceptions

← Optics of Vision

← Beyond the Eye

10.3 Hearing

← The Nature of Sound

← The Ear-the Organ of Hearing

← Structure and Function of the Internal Ear

← Beyond the Ear

← Applied Auditory Physiology

10.4 A Sense of Taste – Gustation

- Organs involved in Taste Perception
- Mechanism of Taste Perception

10.5 A Sense of Smell-Olfaction

Unit XI Physiology of the Endocrine Glands

- **Introduction**
- **Hormones**
- **Endocrine Glands**
- **The Pituitary Gland**
- Anterior Pituitary
- Posterior Pituitary
- **The Thyroid Gland**
- The Parathyroid Glands
- **The Pancreas**
- **The Pineal Gland**
- The Thymus Gland
- Kidney as an Endocrine Gland

Unit-12 the Reproductive System

- **Introduction**
- **The Reproductive System**
- **The Female Reproductive System**
- External Genitalia
- Internal Organs
- Menstrual Cycle
- Accessory Glands-Breast or Mammary Glands

12.4 The Male Reproductive System

12.4.1 What Is The Male Reproductive System?

12.4.2 Male Puberty

12.5 Growth and Development during Pregnancy?

- The Placenta
- Foetal Growth and Development

12.6 Physiology of Lactation

- Anatomy of the Mammary Gland
- Physiology of Lactation
- **Role of Hormones in Reproduction**
- **Disorders of the Reproductive System**
- Disorder of the Female Reproductive System
- Disorder of the Male Reproductive System
- **Contraception**
- Common Tests during Pregnancy?

References:

- K Sembulingam, Prem Sembulingam. Essentials of Medical Physiology.
- Garrows. Textbook of Physiology.

PAPER – II -NUTRITIONAL BIOCHEMISTRY

- Unit 1 : Carbohydrates
- Unit 2 : Lipids and Proteins
- Unit 3 : Vitamins
- Unit 4 : Enzymes and Coenzymes
- Unit 5 : Digestion, Absorption and Transport of Carbohydrates, Lipid and Proteins
- Unit 6 : Carbohydrate Metabolism
- Unit 7 : Lipid Metabolism
- Unit 8 : Protein and Nucleic Acid Metabolism
- Unit 9 : Antioxidants
- Unit 10 : Vitamins and Minerals
- Unit 11 : Hormones

Nutritional Biochemistry

Unit I Carbohydrates

- Introduction
- **Introduction to Nutritional Biochemistry**
- Meaning and Importance of Nutritional Biochemistry
- Development of Nutritional Biochemistry
- Contemporary Interests in Nutritional Biochemistry
- Chemistry of Carbohydrates
- Monosaccharide's
- Isomerism of Monosaccharide's
- Properties of Monosaccharide's
- Oligosaccharides
- Polysaccharides

Unit-2-Lipids and Proteins

- Introduction
- **Chemistry of Lipids-Introduction**
- Lipids – Structure and Classification

2.3.1 Fatty Acids (Saturated and

Unsaturated) 2.3.2 Neutral Fats

2.3.3 Phospholipids

2.3.4 Steroids 2.3.5

Eicosanoids

- **Chemical Properties of Fatty Acids and Neutral Fats**
- Chemical Properties of Fatty Acids
- Chemical Properties of Neutral Fats

← Chemistry of Proteins and Nucleic ~~Acid~~

← **Amino Acids – Structure, Classification and Properties**

← Classification of Amino Acids

← Properties and Chemical Reactions of Amino Acids

← Peptides - Classification and Biologically Important Peptides

2.7 Proteins – Structure, Classification and Properties

← Classification of Proteins

← Structure of Proteins

← Physio - Chemical Properties of Proteins

2.8 Structure and Classification of Nucleic Acids

Unit-3- Vitamins

3.1. Introduction

← **Vitamins – Introduction and Classifications**

← **Structure and Properties of Water Soluble Vitamins**

← Thiamin (Vitamin B1)

← Riboflavin (Vitamin B2)

← Niacin (Vitamin B3)

← Pantothenic Acid (Vitamin B5)

← Pyridoxine (Vitamin B6)

← Cyanocobalamin (Vitamin B12)

← Biotin (Vitamin H)

← Folic Acid (Vitamin B)

← Ascorbic Acid (Vitamin C)

3.4 Structure and Properties of Fat Soluble Vitamins

← Vitamin A (Retinol and Related Compounds)

← Vitamin D (Cholecalciferol and Related Compounds)

- Vitamin E (Tocopherols)
- Vitamin K

Unit-4-Enzymes and Coenzymes

- Introduction
- Introduction to Enzymes and Coenzymes
- Nomenclature and Classification of Enzymes
- Specificity of Enzymes
- Mechanism of Enzyme Activity
- Enzyme Kinetics
- Factors Affecting Enzyme Activity
- Enzyme Inhibition
- Role of Enzymes and Coenzymes in Metabolism
- Isozymes
- Enzymes in Clinical Diagnosis

Unit-5 Digestion, Absorption and Transport of Carbohydrates, Proteins and Lipids

- **Introduction**
- **Digestion, Absorption and Transport-Basic Concept Digestion**
- **Digestion**
- Digestion in Mouth
- Digestion in the Stomach
- Role of Pancreas in Digestion
- Role of Bile in Intestine

5.4 Digestion of Food Materials

- Digestion of Carbohydrates
- Digestion of Proteins

← Digestion of Lipids

← Digestion of Nucleic Acids

5.5 Absorption and Transport

← Absorption of Carbohydrates

← Absorption of Proteins

← Absorption of Lipids

Unit -6- Carbohydrate Metabolism

← **Introduction**

← **Carbohydrate Metabolism: An Overview**

← **Glycolysis**

← Glycolytic Pathway

← Fate of Pyruvate

← Energy Production in Glycolysis

← Regulation of Glycolysis

6.4 Oxidation of Pyruvate of Acetyl CoA

6.4.1 Reactions Involved In the Oxidation of Pyruvate to Acetyl

CoA 6.4.2 Regulation of Pyruvate Dehydrogenase

6.4.3 Genetic Defect in Pyruvate Dehyrogenase

6.5 Citric Acid Cycle

← Functions of Citric Acid Cycle

← Reaction of the Citric Acid Cycle

← Regulation of the Citric Acid Cycle

← Generation of High Energy Phosphates (From Oxidation of Glucose)

← Anaplerotic Reactions

6.6 Gluconeogenesis

6.6.1 Functions of Gluconeogenesis

← Gluconeogenesis-Substrates

← Gluconeogenesis-Pathway

← Regulation of Gluconeogenesis

6.7 Metabolism of Glycogen

← Glycogenesis

← Regulation of Glycogenesis

← Glycogenolysis

← Regulation of Glycogenolysis

← Regulation of Glycogen Metabolism

← Glycogen Storage Diseases

6.8 Hexose Monophosphate Pathway

← Metabolic Reactions in the HMP Pathway

← Regulation of HMP Pathway

← Metabolic Significance of HMP Pathway 6.9

Entry of Other Sugars into Glycolytic Pathway

6.10 Regulation of Blood Glucose Level

6.11 Electron Transport Chain

← Mitochondrial Electron Transport Chain

← Transfer of Electrons

← Components of Electrons Transport Chain

← Electron Transport Inhibitors

← Oxidative Phoshorylation

Unit -7- Lipid Metabolism

← **Introduction**

← **Lipid Metabolism – I**

7.2.1 Oxidation of Fatty Acids

← Oxidation of Mono and Poly Unsaturated Fatty Acids

← Lipogenesis-Synthesis of Fatty Acids

← Metabolism of Eicosanoids

7.3 Lipid Metabolism-Ii

← Metabolism of Triacylglycerols

← Synthesis of Phospholipids

← Metabolism of Cholesterol

← Lipoprotein Metabolism

← Hyperlipoproteinemias

← Ketosis

Unit-8-Amino Acid and Nucleotide Metabolism

← **Introduction**

← **Amino Acid Metabolism**

← Transamination Reaction

← Deamination Reaction

← Urea Cycle

← Metabolism of Carbon Skeletons of Amino Acids

← Biosynthesis of Nonessential Amino Acids

← Synthesis of Specialized Products from Amino Acids

← Decarboxylation Reaction and Biogenic Amines

← Non-Protein Function of Amino Acids

8.3 Nucleotide Metabolism

← Purine Nucleotide Synthesis-De Novo Synthesis

← Salvage Pathway for Purines

← Degradation of Purine Nucleotides

← Pyrimidine Synthesis

8.3.5 Regulation of Deoxyribonucleotide Synthesis

Unit-9-Antioxidants

- Introduction
- Antioxidants and Free Radicals
- Role of Oxygen Free Radicals
- Production of Oxygen Free Radicals
- Physiological Mechanisms to Limit Free Radical Damage
- Free Radical in Human Pathology and Disease
- Natural and Diet-Derived Antioxidants

Unit-10-Vitamins and Minerals

- **Introduction**
- **Vitamins**
- **Fat-Soluble Vitamins**
- Vitamin A
- Vitamin D
- Vitamin E
- Vitamin K

10.4 Water-Soluble Vitamins

10.4.1 Energy-Releasing Water-Soluble Vitamins

- Thiamin (Vitamin B1)
- Riboflavin (Vitamin B2)
- Pyridoxine (Vitamin B6)
- Niacin
- Pantothenic Acid
- Biotin

10.4.2 Hematopoietic Water Soluble Vitamins

Folic Acid

Cyanocobalamin (Vitamin B12) 10.4.3

Other Waste Soluble Vitamins

← Ascorbic Acid (Vitamin C)

10.5 Minerals – An Introduction

10.5.1 Macro Minerals

10.5.1.1 Calcium

10.5.1.0 Phosphorous

10.5.1.3 Magnesium

10.5.2. Micro Minerals

← Iron

← Iodine

← Zinc

← Selenium

← Copper

← Chromium

← Cobalt

← Manganese

Unit-11- Hormones

11.1 Introduction

The Endocrine System

Regulation of Endocrine System

Mechanism of Hormone Action

11.3.1 The Target Cell Concept

11.3.2 Hormone Receptors

11.3.3 Classification of Hormones

Signal Transduction

Signal Generation

G Protein-Coupled Receptors (GPCR)

Second Messengers

11.5 Biochemical Role of Hormones

- Pancreas
- Thyroid
- Parathyroid
- Adrenal Medulla
- Adrenal Cortex
- Hypophysis (The Pituitary Gland)

Unit-12- Inborn Errors of Metabolism

- Introduction
- Inborn Errors of Metabolism – General Concepts
- Disorders of Protein Metabolism
- Alcaptonuria
- Phenylketonuria (Phenylpyruvic Oligophrenia)
- Tyrosinemias
- Glutaric aciduria
- Arginemia (Hyperargininemia)
- Homocystinuria (Homocysteinemia)
- Histidinemia
- Primary Hyperoxaluria
- Cystinuria (Cystine –Lysinuria)
- Cystinosis
- Maple Syrup Urine Disease (Msud)

12.4 Disorders of Carbohydrate Metabolism

← Pentosuria (Essential Pentosuria)

← Fructosuria (Essential Fructosuria)

← Hereditary Fructose Intolerance

← Galactosemia

← Hereditary Lactose Intolerance

← Glycogen Storage Disease

12.5 Disorders of Lipid Metabolism

← Gaucher's Disease (Glucosyl , Cermaide , Lipidosis)

← Niemann-Pick Disease (Sphingomyelin Lipidosis)

← Tay-Sach's Disease (Tsd) (Ganglioside Lipidosis) 12.5.4.Fatty acid Oxidation Defects

12.6 Haemoglobinopathies

← Sickle Cell Anaemia

← Thalassemias

References:

← Dasgupta, S. K., Biochemistry Vol. I; N & Iii, Mc Milan Co. of India Ltd

← Das, Debajyoti, Biochemistry 2nd Ed., 1980, Academic Publishers, India.

← Harper, H. A. etal, A Review Of Physiological Chemistry, Los Altos,Lange Medical Publications, 1985.

← Lehninger, A. L., Principles Of Biochemistry

← Orten J. M. & Newhaus O. V, Human Biochemistry, C. V Mosby

← Co. S1. Lois, Jsa 1982.

← Chaterjee. Textbook Of Medical Biochemistry

PAPER – III - MEDICAL AND FOOD MICROBIOLOGY

Unit 1 : Microbiology of Foods
Unit 2 : Food Safety – Basic Concept
Unit 3 : Occurrence and Growth of Microorganisms in
Foods Unit 4 : Food Spoilage
Unit 5 : Food Hazards of Microbial
Origin Unit 6 : Food Contaminants
Unit 7 : Food Adulteration
Unit 8 : Risk Analysis
Unit 9 : HACCP – A Food Safety Assurance System
Unit 10 : Food Regulations – Standards and Quality Control

Medical & Food Microbiology

Unit 1

- Introduction
- Food Microbiology – Basic Concept
- History of Food Microbiology
- Role of Microbiology in Biotechnology
- Role of Microorganisms in Fermented Food
    - Fermented Baked Preparations
    - Fermented Vegetable Foods
    - Fermented Soya Bean Products
    - Fermented Dairy Products
    - Other Fermented Food Preparations
    - Economically Important Fermentation Products
    - Other Uses of Microbes in Industry

Unit 2

2.1.Introduction

Food Safety and Importance of Safe Food

Factors Affecting Food Safety

- ← Physical Hazard
- ← Biological Hazard
- ← Chemical Hazard

Microorganisms in Foods

- ← Bacteria
- ← Fungi
- ← Yeasts
- ← Moulds
- ← Viruses
- ← Parasites

Recent Concerns of Food Safety

- ← Prions
- ← Concerns of Genetically Modified Foods
- ← Concern of Dioxin-Contaminated Foods

Unit 3

- ← Introduction
- ← Microbiology of Air, Water and Soil
- ← Sources of Foods Contamination
- ← Factors affecting the growth of Microorganisms
  - ← Nutrition
  - ← Oxygen
  - ← Temperature

- Moisture Requirement- The Concept of Water Activity
- Osmotic Pressure
- Hydrogen Iron Concentration –Ph
- Light

- Control and Destruction of Microorganisms

Unit 4

- Introduction
- Factors Responsible for Food Spoilage
- Chemical Changes due to Spoilage
- Spoilage of Different Foods
  - Spoilage of Meat
  - Spoilage of Poultry and Poultry Products
  - Spoilage of Fish and Other Sea Foods
  - Spoilage of Fruit and Vegetables
  - Spoilage of Cereals and Cereal Products
  - Spoilage of Milk and Milk Products
  - Spoilage of Soft Drinks, Fruit Juices, and Fruit Preserves
  - Miscellaneous Products

Unit 5

Introduction

Food Borne Diseases

0 Types of Food Borne Diseases

Food Borne Intoxications

0 Staphylococcal Poisoning
1 Bacillus Cereus Poisoning
2 Botulism

Food Borne Infections

0 Salmonellosis

1 Shigellosis (Bacillary Dysentery)

2 Vibrio Parahaemolyticus Gastroenteritis

3 Enter Pathogenic Escherichia Coli Diarrhoea

4 Hepatitis A

5 Shellfish Poisoning

Food Borne Toxic Infections

0 Clostridium Perfringens Gastroenteritis
1 Enterotoxigenic Escherichia Coli Gastroenteritis
2 Cholera
3 Listeriosis
4 Yersinia Enterocolitica Gastroenteritis
5 Campylobacter JejuniDiarrhoea

Mycotoxins

0 Aflatoxicosis
1 DeoxynivalenolMycotoxicosis
2 Ergotism

Food Borne Diseases due to Naturally Occurring Toxicants

0 Lathyrism
1 Veno-Occlusive Diseases (Vod)
2 Epidemic Dropsy

Reporting and Investigations of Food Borne Diseases

Unit 6

Introduction

Food Contamination

Naturally Occurring Toxicants

0 Toxicants in Animal Foods
1 Toxicants in Plant Foods

2 Anti-Nutritional Factors in Foods

Environmental Contaminants

0 Biological Contaminants
1 Pesticide Residues
2 Veterinary Drug Residues
3 Heavy Metals

Miscellaneous Contaminants

Unit 7

Introduction

Food Adulteration

Food Commonly Adulterated

Common Adulterants

7.4.1. Classification of Adulterants

0 Harmful effects of Adulterants

1 Methods for Detection of some Adulterants

Unit : 8

Introduction

Risk Analysis : The New Paradigm in Food Safety Assurance

Risk Assessment

8.31.Risk Assessment of Chemical Agent

8.3.2.Risk Assessment of Biological Hazard

Risk Management

0 Elements of Risk Management

1 General Principle of Risk Management

Risk Communication

0 .Role and Responsibilities for Risk Communication

8.5.2. Principle of Risk Communication

Unit: 9

Introduction

HACCP-An Effective Food Safety Assurance System

Need for HACCP

Benefits of HACCP

Principle of HACCP

Guidelines for Application of HACCP Principles

9.6.1.Premilinary Tasks in Development of HACCP Plan

9.6. 2.Applying the HACCP Principles

0 The HACCP Status in India

0 HACCP Case Studies

Unit :10

1 Introduction

2 Food Standards and Regulations in India

3 The Prevention of Food Adulteration Act 1954

4 Compulsory National Legislations

5 Voluntary Based Product Certifications

Regulations Relate to Gm Foods

International Organizations and Agreements in the area of Food

Standardization and Quality Control.

References:

Frazierw. C. and Westhoff D. C. Food Microbiology, 4th ed., 1988 New York.

Pelezar, M. (1988) Microbiolqgy V ed., McGraw Hill, N. Y.

James, M. Jay. Modern Food Microbiology 4th ed., CBS Publishers, New Delhi.

Frobisher M. et. AI. (1974) Fundamentals of Microbiology -9th ed., W. Savenders Co.

Baanwart,G.J.(1987) Basic Food Microbiology CBS Publishers, New Delhi

PAPER IV - ADVANCE NUTRITION

Unit**1.** Understanding nutrition Unit

2.Human energy requirements Unit

3. Carbohydrates

Unit 4. Proteins

Unit 5. Lipids

Unit 6. Water

Unit 7.Fat soluble vitamins: vitamin A, D, E & K

Unit 8.Water soluble vitamins: B complex vitamins and vitamin C

Unit 9.Minerals (macro minerals): calcium, phosphorus, magnesium, sodium, potassium, chloride

Unit 10.Minerals (micro minerals): iron, zinc, copper, selenium, chromium, manganese, iodine and fluorine

Unit 11.Food components other than essential nutrients

Unit 1.Understanding Nutrition

1.1 Introduction

1.2 Nutrition Science: Basic concepts

1.3 History of Nutrition

Identification of food factors and discovery of water soluble vitamins

Discovery of other essential nutrients

Expanding frontiers of nutrition

The Indian Nutrition Scenario

1.4 Nutritional Requirements

Definition of concepts in relation to human nutritional requirements

Basic terminology in relation to nutritional requirements

1.5 Methods for studying the nutrition Requirements

Population survey of dietary intakes of nutrients

Growth studies

Depletion and repletion studies

Nutrient balance studies

Use of isotopically labeled nutrients: Nutrient turnover

Obligatory losses of nutrients

1.6 National and international recommendations on Nutrient Requirements

Recommendations for Indian by the Indian council of Medical Research

FAO / WHO expert committee recommendations

Dietary references intakes of USA and Canada

Goals of National and international requirements estimates and RDAs

Dietary Guidelines

Unit 2. Human Energy Requirements

2.1 Introduction

Energy: Some Basic Concepts

Definition and components of energy requirement 2.4

Factors affecting energy expenditure and requirement

0 Factors affecting the BMR
1 Factors affecting the thermic effect of food
2 Factors affecting the energy expended in physical activity

2.5 Methods of estimation of energy expenditure and requirements

Direct calorimetry

Indirect calorimetry

0 Double labeled water (DLW) Technique

1 Heart Rate Monitoring (HRM) Method

2 Factorial estimation of total energy expenditure

2.6 Energy Requirements and dietary energy recommendations

3 Energy requirements of infants (from Birth to 12 months)

4 Energy requirement for children and adolescents

5 Energy requirement of adults

6 Energy requirement during pregnancy

7 Energy requirement during lactation

Energy imbalance: An overview

Unit 3.Carbohydrates

3.1 Introduction

3.2 Classification of carbohydrates

Classification on the basis of degree of polymerization (DP)

Classification based on digestive fate of carbohydrates

3.3 Functions

3.4 Digestion and absorption

3.5 Metabolic utilization of carbohydrates

3.6 Regulation of blood glucose concentration

3.7 Dietary fibre

Components of dietary fibre

Properties of fibre

Effects of dietary fibre

3.7.4 Potential health benefits of dietary fibre

0 Recommended intake of fibre

3.8 Resistant starch

1 Factors influencing RS content of foods

2 Potential health benefits

Fructo Oligosaccharides (FOS)

Glycemic index (GI)

0 Factors affecting GI of foods

1 GI in chronic diseases

Carbohydrate requirement

0 Modification of carbohydrate intake for specific disorder

Unit 4.**Proteins**

4.1Introduction

Proteins – An overview

0 Classification

1 Food sources

2 Digestion, absorption and transport

0 Digestion

1 Absorption

2 Transport of amino acids

Functions

Methods of determination of proteins and amino acid content in foods

Improvement of quality of protein in the diet

Methods of estimating and assessing protein requirments at different stages of life cycle

Nutritional requirements and recommended allowances for proteins and amino acids

Protein deficiency

Unit 5. Lipids

5.1 Introduction

5.2 Fats: Some basic facts

5.3 Types of fats and its metabolism

Classification of fats and fatty acids

Digestions of fats

Absorption of fats

Transport and storage of fats in the body 5.4

Functions of fat and oils

5.5 Nutritional requirements of fats and oils

Adults

Pregnancy and lactation

Infancy

Young and older children

Choice of cooking medium in the context of n-3 and n-6 fatty acid ration in Indian diets

5.6 Excessive fat intake

Changing trends in dietary intake

Eating out

Diseases: Association and preventive measures

Unit 6. Water

6.1 Introduction

6.2 Water: An essential but overlooked nutrient

6.2.1 Functions of water in the body

6.3 Water distribution and compartments of body water

Compartments of body water

Forces influencing water distribution

6.4 Water Balance

6.4.1Water intake
6.4. 2Water output (Losses of body water) 6.4.3.Regulation of water balance

6.5 Requirements of water

6.6 Disturbances in fluid balance

Dehydration

Edema

Unit 7. Fat Soluble Vitamins: Vitamin A, D, E & K

7.1 Introduction Physiological role, Bioavailability and requirements, food sources deficiency and toxicity

7.2 Interaction with other nutrients

Unit 8. Water Soluble Vitamins: B complex Vitamins and Vitamin C

8.1 Introduction

8.2 Physiological role, Bioavailability and requirements, food sources, deficiency and toxicity

8.3 Interaction with other nutrients

Unit 9. Minerals (Macro Minerals): Calcium, Phosphorus, Magnesium, Sodium, Potassium, Chloride

9.1 Introduction

9.2 Physiological role, Bioavailability and requirements, food sources, deficiency and toxicity

9.3 Interaction with other nutrients

Unit 10 Minerals (Micro Minerals): Iron, Zinc, Copper, Selenium, Chromium, manganese, iodine and fluorine

Introduction

Physiological role, Bioavailability and requirements, food sources, deficiency and toxicity

Interaction with other nutrients

Unit 11. Food components other than essential nutrients

Introduction

0 Functional foods

1 Classification

Bioactive substances from plant food

Non-glycerides in edible oils

0 Probiotics and prebiotics

1 Definition and characteristics

2 Probiotics: Dietary sources and their mode of action / effects

3 Prebiotics: Dietary sources and their mode of action / health effects

Polyphenols

0 Definition and classification

1 Bioavailability of polyphenols

2 Influence of polyphenols on macronutrients and minerals

3 Health benefits of polyphenols

Phytoestrogens

0 Dietary sources and chemical forms

1 Physiological effects

Other dietary factors with anti nutritional effects

0 Protease inhibitors

1 Saponins

2 Amylase inhibitors

3 Lectins or hemagglutinins

4 Phytates

Health benefits of other dietary factors with anti-nutritional effects

References:

0 Briggs, G. M. &Doirs K. Collaway: Bogery Nutrition And Physical Fitness (9th Ed.) Saunders, Philadelphia, 1979.
1 Chaney, M. S. Rose M.L. &Wischi J. C. Nutrition, Houghton Mifflim, Boston, 1979.
2 Guthrie H.: Introductory Nutrition (6th Ed.) Times Mirror/Mostry College Publishing, 1986.
3 Robinson, Lawler: Normal & Therapeutic Nutrition (17th Ed.) Macmillan Publishing Co. 1986.
4 Swaminathan S.: Advanced Textbook On Food & Nutrition Vol. 1 & N (2nd Ed. Revised _ Enlarged) Bapp Co. 1985.
5 Robinson. Basic Nutrition And Diet Therapy (8th Edition)
6 Shills And Young. Modern Nutrition In Health And Disease.
7 International Life Sciences Institute Present Knowledge in Nutrition – latest edition

Latest Edition is preferred

Journals:
Nutrition Reviews
Journal of Nutrition
American Journal of Clinical Nutrition
British Journal of Nutrition
European Journal of Clinical Nutrition
International Journal of Vitamin and Nutrition Research
International Journal of Food Science and Nutrition
Nutrition Research
Ann NutrMetab

PAPER V - PRINCIPLES OF FOOD SCIENCE

Unit**.1.**Evaluation of quality of foods

Unit**.**2.Changes in food during

cooking Unit3.Starch

Unit4.Grams, dhals and nuts

Unit5.Vegetables and fruits

Unit6.Milk and milk product

Unit**7**.Eggs

Unit8.Meat and poultry

Unit 9.Fish

Unit10. Sugar

Unit11.Fats and oil

Unit12.Spices &condiments

Unit13.Beverages

Unit14.Effect of processing on nutritive value of food

Unit15.Improving nutritive value of food through different

methods Unit16.Food preservation

Unit17.Food additives

Unit18.Food package

Unit 1.EVALUATION OF QUALITY OF FOODS:

1.1 Sensory Evaluation of foods

Factors affecting acceptability of foods; planning and conducting acceptability studies. Use of sensory organs in the evaluation of foods- visual, tactile, olfactory and gustatory.

Principles of objective evaluation; Selection of taste panel, types of tests needed.

Principles of Subjective evaluation; Methods for objective evaluation- recent studies; improvised methods for laboratory studies.

1.2 Physical & Objective methods

Physical characteristics like color appearance. Texture, density, volume, tenderness. viscosity and surface tension, moisture loss and weight. microscopic examination

Unit 2.CHANGES IN FOOD DURING COOKING:

Colloidal chemistry

.0.0 Preparation of colloids, gel formation. Stabilization of colloids.

Food emulsion,

.0.0 Emulsifier, stabilizer, preparation of mayonnaise

1 Browning reaction

0 Enzymatic, non-enzymatic reaction in foods

Unit 3 STARCH

2 Sources – uses, gelatinization of flours, starch as thickening agents. Gluten formation. Factors affecting it, retro gradation of starch

Bread making

0 Role of ingredients- methods of bread making, quick breads and leavening agents

Unit 4 .GRAMS, DHALS AND NUTS

Composition, method of processing and cooking effects of processing such as cooking, decortication

Germination and fermentation

Unit 5.VEGETABLES AND FRUITS

Structure, texture, pigments and acids in vegetable and fruits. Cellulose and hemicellulose. pectin substances, jams and jelly

Changes in cooking

Browning reactions – enzymatic and non-enzymatic browning.

Unit 6.MILK AND MILK PRODUCT

6.1. Composition and constituents of milk, physical and chemical properties

6.2. Coagulation of milk protein

6.3. Cream butter and cheese making

Unit 7.EGGS

7.1. Structure, composition and selection

7.2. Coagulation of egg protein

7.3. Factors affecting coagulation of egg protein, foam formation, factors affecting foam formation

7.4. Uses of egg in cookery-leavening agent, emulsification, coating agent, thickening agent

Unit 8. MEAT AND POULTRY

8.1. Structure, cuts of meat and constituents of meat
8.2. Post mortem changes
8.3. Methods of cooking meat
8.4. Tenderness and juiciness

Unit 9.FISH

9.1. Kinds of fish, constituents

9.2. Selection and cooking

Unit 10. SUGAR

Sources, uses, properties, crystallization of sugar, stages of sugar cookery

Sugar cookery

0 Amorphous and crystalline candies, fondant, fudge and caramels,

1 Indian sweet preparations

Unit 11.FATS AND OILS

Sources and extraction of edible fats and oils.

Characteristics of fats and oils.

Physical and chemical properties of oils and fats.

Changes during storage and cooking.

Uses of fats shortening value and flakiness

Unit 12.SPICES & CONDIMENTS

Classification, uses in cookery

Buying, storage and care

Flavouring extracts, Indian spices & herbs, household and medicinal value

Unit 13 .BEVERAGES

Classification, functions

0 Soups - classification, stocks, preparation, types and uses

1 Tea / Coffee – types, uses, preparation

Fruit juices – functions, preparation, how to prevent browning& bitterness

Chocolate& cocoa – manufacture, storage, uses and preparation

Different appetizers

Unit 14. EFFECT OF PROCESSING ON NUTRITIVE VALUE OF FOOD

14.1 Parboiling of rice and malting of grains, puffed and flake cereals

Unit 15. IMPROVING NUTRITIVE VALUE OF FOOD THROUGH DIFFERENT METHODS

15.1Germination, Fermentation, Combination of foods

Unit 16.FOOD PRESERVATION

16.1 Principles, food spoilage, causes, types of spoilage

Methods of preservation

0 Bacteriostatic, bactericidal

1 Temperature, low and high temperature

2 Preservatives

3 Osmotic pressure

4 Radiation

Unit 17.FOOD ADDITIVES

Definition

Needs for food additives

Different food additives

Additives and food safety, unintentional additives

Unit 18 FOOD PACKAGING

Introduction

Packaging : Concepts, Significance and Functions

Classification of Packaging Materials

Packaging Methods

Interactions between Packaging and Food – Toxicity Hazards

Labeling Requirements and Bar Coding

18.6.1Nutrition Labeling and Nutrition Claims

0 Coding of Food Product

Packaging Laws and Regulation

Reference:

Paul P.C. And Palmer H.H. (1972) : Food Theory And Application John Wiley And Sons, London

Griswold, R.M. (1979) : The Experimental Study Of Food, Houghton Mifflin Boston.

PeckhamG.C.and Freeland-Graves, J.H. (1979) : Foundation Of Food Preparation, 4th Edition Macmillan Publishing Co .Inc .New York

Bennion, Marion And O. Hughes (1986) : Introductory Foods, Macmillan, New york

Maryland R.E and Welsby D.A (1980), Basic Cookery, Fundamental Recipes and variations, William Heinemann Ltd. London

Charley M. J (I 982) : Food Science (2ndEd), John Wiley And Sons.

Finch C.F. (1984), Food Preparations, MacDonald and Evans Ltd. Plymouth.

McGee, H (1984): Food and Cooking, Charles Scribers and Sons, New York.

Achayya, K.T.:(1998) A Historical Dictionary Of Indian Foods, Oxford Publishing Co.

10. Belitz, H.D. and Grosch W., (1999): Food Chemistry, (2nded), Springer, New York

11. Girdharilal, G.S. Sidappa And G.L. Tandon (1998) : Preservation Of Fruits And Vegetables, New Delhi: Indian Council Of Agricultural Research.

12. *Mahindru*, *S.N.* (2002). *Food Additives Characteristics*, *Detection and Estimation*, *Tata McGraw-Hill Publishing Co*. *Ltd*. *New Delhi*.

13. B. Sivasankar, (2002), Food Processing and Preservation, Prentice Hall of India Pvt. Limited., New Delhi

14. Srilakshmi B. (2006) : Food Science, New Age International (P) Ltd. Publishers, New Delhi.

15. Potter, N. and Hotchkiss, J.H. (2007) : Food Science, Fifth ed., CBS Publishers and Distributors, New Delhi.

16. N. ShakuntalaManay; M. ShadaksharaSwamy (2008) : Foods, Facts and Principles. Third Edition Tata McGraw – Hill Publishing Co. Ltd., New Delhi.

Website, e-learning resources:

www.fao.org – Food and agricultural organization

www.wfp.org - world food programme

www.foodsafetycouncil.org - International food safety council

www.cfsan.fda.gov – Center for food safety and applied nutrition

Journals

Food Technology Abstracts, Central Food Technological Research Institute Mysore.

Food Technology, Journal of The Institute Of Food Technology, Illinois, USA.

Food Digest, CFTRI Mysore.

Journal of Agriculture and Food Chemistry.

Cereal Science.

Indian Food Industry AFSTI, CFTRI, Mysore.

Journal of Food Science And Technology CFTRI, Mysore.

Indian Food Packer, All Indian Food Preserves Association, Delhi.

Journal of Dairy Science.

Advances in Food Research

PAPER VI - RESEARCH METHODOLOGY

Research Methods and Biostatistics

Unit 1 : Basic Concepts
Unit 2 : Formulation of Research Problem
Unit 3 : Design Strategies in Research -Descriptive Studies
Unit 4 : Design Strategies in Research-Analytic Studies I
Unit 5 : Design Strategies in Research -Analytic Studies Ii
Unit 6 : Project Proposal
Unit 7 : Data Collection
Unit 8 : Data Collection: Tools and Techniques-I
Unit 9 : Data Collection: Tools and Techniques-Ii
Unit 10 : Presentation and Summarization of Data-I
Unit 11 : Presentation and Summarization of Data-Ii
Unit 12 : Measures of Disease Frequency and Association
Unit 13 : Reference Values and Validity of Diagnostic Tests
Unit 14 : Hypothesis Testing -I

Unit 1

Introduction
Epidemiology-Concept, Definition, Purpose Aim, Developments . 1.3
Descriptive Variables for Health of the Community 1.4 Biostatistics
1.5 What is Research and Scientific Approach? Scope of Research in Nutrition & Research Process

Unit 2

2.1introduction

2.2selection of a Suitable Problem

Specifying objectives of Research Problem

Formulating Hypothesis, what is Hypothesis & forms of Hypothesis

The Design of Research

2.6 Sample Size Considerations

Unit 3

Introduction

Design Strategies in Epidemiological Research

Descriptive Studies-Correlational Studies, Case Study, Cross Sectional Study

Unit 4

Introduction

Analytical Studies

Observational Studies- Cohort ,Case Control, Analytical Cross Sectional Studies

Experimental /Interventional Studies-Issues in Design and Conduct of Trials.

Unit 5

Introduction

Descriptive Research- Main Steps. Correlational Studies- Basic Issues, Case Study Method

Observational Studies- Issues in the Design of Case Control Studies,
Issues in Design of Cohort Studies

Experimental Research-3 Characteristics, Steps of Experimental Research.

Designs of Experimental Study.

Unit 6

Introduction

Concept & Method of Sampling

Probability, Non Probability Sampling

Choice of Sampling Method

Characteristics of Good Sample

Unit 7

Introduction

Scales of data Measurement

Characteristics of Good Research Tool-Validity, Usability, Reliability

Types of tools & their uses – Questionnaires, Rating Scale, Attitude Scale & Tests.

Unit 8

8.1 Introduction

8.2 Types of tools & their uses- Interview , Observation & Documents.

Unit 9

Introduction

Concept of Data Collection

9.3 Methods of data collection -Asking Questions, observing behaviour, utilization of existing records and data

9.4 Ensuring the quality of data.

Unit 10

Introduction

Types of data: Quantitative and Qualitative

Processing of Quantitative Data

1.Data Processing

0 Coding of Data

0 Preparing a Master Chart

Tabulation and Organization of Quantitative Data

0 Frequency Distribution

1 Cumulative Frequency Distribution

2 Contingency Tables

Graphical Presentation of Quantitative Data

0 Representation of Frequency Distribution

1 Graphs for Nominal and Ordinal Data

2 Graphs for relation between two variables

Quantitative Data

0 Organization of Quantitative Data

Unit 11

1 Introduction

2 Reference Values: Basic Concept

3 Probability: A Measure of Uncertainty

Indicators: Measures of Mortality and Morbidity

.0.0 Indicators of Mortality

.0.1 Indicators of Morbidity

Measure for Validity of Diagnostic Tests Unit

12

0 Introduction

1 Analysis of Quantitative Data

0 Measures of Central Tendency

1 Measures of Variability

2 Measures of Relative Positions

3 Measures of Relationship

2 Analysis of Quantitative Data, Descriptive Quantitative Data , Statistical Inference from Proportions, Relative and Odds Ratio

Unit 13

Introduction

Classification of Statistical Tests

13.3 Parametric Tests

1. Sampling Distribution of Means-Large Samples, Confidence Intervals and Levels of Significance , Small Samples, Degree of Freedom

2. Application of Parametric Tests-Application of Z-Test, Two-Tailed and One-Tailed Tests, Application of T-Test, Application of F-Test, Factor Analysis

Non-Parametric Tests and Application of Chi-Square Tests

0 Application of Chi-Square Tests

. 2. Application of Median Tests

Unit 14: 14.1 Introduction

Introduction to Spss

Features of Spss for Windows

Get Yourself acquainted with Spss

Menu Commands and Sub-Commands

Basic Steps in Data Analysis

Defining, Editing, and Entering Data

0 Data File Management

Function 14.8.1.Merging Data

Files 14.8.2.Aggregate Data

14.8.3.Split File

14.8.4.Select Cases

Running a Preliminary Analysis

0 Six Characteristics of a Dataset

14.9.2.Data Transformation

1 Graphical Presentation of Data

Understanding Relationship Between Variable : Data Analysis

14.10.1.Parametric Test

14.10.2.Non-Parametric Tests

14.11.Spss Production Facility

14.12.Stastical Analysis System (SAS)

14.13.Nudist

Reference ***Research Methodology*** By C.R Kothari

SECOND YEAR

S.No.	**Subjects**
	Applied Nutrition
	Clinical Nutrition& Dietetics
3	Clinical Nutrition& Dietetics Practical
	Entrepreneurship and Food Service Management
	Public Nutrition
	Dissertation

RESIDENCY PROGRAMME Duration – 6 Months

II YEAR /SECOND YEAR

PAPER I –APPLIED NUTRITION

Unit1**.**Menu Planning

Unit2.Pregnancy and lactation

Unit3.Infants and preschool children

Unit 4.Older children and adolescents

Unit 5. Geriatric population

Unit 6.Sports nutrition

Unit 7.Nutritional requirements for special conditions

Unit 8. Nutritional regulation of gene expression-epigenetics &nutrigenomics

Unit 9.Immuno nutrition

Unit 10.Functional foods and nutraceuticals in health & disease

UNIT 1. MENU PLANNING

1.1 Introduction

1.2 Menu planning

1.2.1 Rationale for menu planning

1.3 Factors affecting food choice

Nutritional factors

Other factors

1.4 Exchange list vs food composition tables for menu

planning 1.4.1 Steps in the development of exchange list

1.5 Planning of Adults

Recommended Dietary Allowances

Planning for adults: Some menu plans and dietary guidelines

Planning a low cost menu

UNIT 2. PREGNANCY AND LACTATION

2.1 Introduction

2.2 Pregnancy and lactation – Critical stages in the

lifecycle 2.3 Physiological changes during pregnancy

Expansion in plasma volume and red cell mass

Hormonal profile in pregnancy

Organ functions

Placental transfer of nutrients

Maternal weight gain

2.4 Nutritional needs during pregnancy

2.5 Maternal nutrition and foetal outcome

Pre pregnancy weight and foetal outcome

Pre pregnancy height and foetal outcome

Body mass index

Weight gain during pregnancy and foetal outcome

Maternal dietary intake and foetal outcome

Non-nutritional factors: Antenatal care, age, heavy physical work and intra uterine infections

2.6 Nutritional assessment and guidance in prenatal care

2.7 Common concerns during pregnancy

High risk pregnancies

Management of high risk pregnancies 2.8

Lactation

Physiology of lactation

Human milk composition and infant growth and development

Malnutrition – Effects of milk and effects on mothers 2.9

Maternal nutrition during lactation

Nutrient requirements during lactation

Dietary Management

Other concerns during breastfeeding

UNIT 3 INFANTS AND PRESCHOOL CHILDREN

3.1 Introduction

3.2 Growth and development

3.2.1 Physiological changes

Growth monitoring

Health monitoring

3.3 Nutrient needs and recommended dietary allowances

3.4 Diet and feeding patterns

Feeding 0-6 months infant

Feeding 6-12 months infant

Feeding preschoolers

3.5 Problems of infants and preschoolers nutrition

UNIT 4. OLDER CHILDREN AND ADOLESCENTS

4.1 Introduction

4.2 Older children and adolescents

Changes in physical development and body composition

Sexual maturity

Psycho-social change

4.3 Nutrient needs and recommended dietary intakes

4.4 Diet and dietary patterns

4.5 Problems of older children and adolescent nutrition

UNIT 5. GERIATRIC POPULATION

Introduction

Definition of old age

Nutrition and ageing

Physiological changes associated with ageing

Changing body composition and techniques for measuring body composition

0 Changing body composition

1 Techniques for measuring body composition

Nutritional requirements and dietary modifications in the diet of the elderly

Guidelines for planning balanced diets for elderly

UNIT 6. SPORTS NUTRITION

6.1 Introduction

6.2 Evolution and growth of sports nutrition as a discipline

6.3 Anthropometric and physiological measurement

Various techniques for measuring body composition

Work capacity

6.4 Physical fitness

Parameters of fitness

Fitness tests

6.5 Nutritional demands of sports and dietary recommendations

UNIT 7. NUTRITIONAL REQUIREMENTS FOR SPECIAL CONDITIONS

7.1 Introduction

7.2 Calamity and emergency management

7.3 Information required for management of emergencies

Nutrient requirements during emergencies

Major nutritional deficiency diseases in emergencies

Monitoring assessment and surveillance of nutritional status and relief measures in emergencies

7.4 Nutritional requirements for extreme environments

General adaptive mechanisms to environmental extremes and role of nutrition in successful acclimatization

Health Hazards associated with high altitude

Nutritional requirements in high altitude

Nutritional requirements in cold and polar environment

Nutritional requirements in hot environments

Nutritional requirements for space missions

7.5 Nutritional considerations in brief for the following:
Military, naval personnel
Emergencies such as drought, famine, floods etc.

UNIT 8. NUTRITIONAL REGULATION OF GENE EXPRESSION-EPIGENETICS & NUTRIGENOMICS

8.1 Introduction

8.2 Gene Expression – An overview

8.3 Role of specific nutrients in controlling gene expression

Proteins

Lipids

Fuel molecules and lipogenesis

Minerals

Vitamins

UNIT 9. IMMUNO NUTRITION

Role of specific nutrients in immune suppression

Role of nutrients in Immune promotion

UNIT 10. FUNCTIONAL FOODS AND NUTRACEUTICALS IN HEALTH & DISEASE

10.1 History

Definition
Classification
Physiological effects, effects on human health and potential applications in risk reduction of diseases

Reference:

0 Briggs, G. M. &Doirs K. Collaway: Bogery Nutrition And Physical Fitness (9th Ed.) Saunders, Philadelphia, 1979.
1 Chaney, M. S. Rose M.L. &Wischi J. C. Nutrition, Houghton Mifflim, Boston, 1979.
2 Guthrie H.: Introductory Nutrition (6th Ed.) Times Mirror/Mostry College Publishing, 1986.
3 Robinson, Lawler: Normal & Therapeutic Nutrition (17th Ed.) Macmillan Publishing Co. 1986.
4 Swaminathan S.: Advanced Textbook On Food & Nutrition Vol. 1 & N (2nd Ed. Revised _ Enlarged) Bapp Co. 1985.
5 Robinson. Basic Nutrition And Diet Therapy (8th Edition)
6 Shills And Young. Modern Nutrition In Health And Disease.
0 Krause' s Food and Nutrition Therapy 2010, 12th Edition
1 Whitney and Rolfes 2002 Understanding Nutrition

Chandra, R.K. (ed) (1992): Nutrition and Immunology. ARTS Biomedical. St. John's Newfoundland.
0 International Life Sciences Institute Present Knowledge in Nutrition – latest edition
1 Wildman, R.E.C. ed. (2000) Handbook of Nutraceuticals and Functional Foods, CRCPress, Boca Raton.
1 Gibson Principles of Nutrition Assessment Oxford Press
2 Baeurle, P.A. (ed) (1994) Inducible Gene Expression. Part I: Environmental Stresses and Nutrients. Boston: Birkhauser
3 Indian Council of Medical Research. Nutritive Value of Indian Foods – Latest Publication.
0 Indian Council of Medical Research. Recommended Dietary Intakes for Indians – Latest Recommendations.
.0.0 World Reviews of Nutrition and Dietetics.
.0.1 WHO Technical Report Series

Latest Editions of the above is preferred

Journals:

Nutrition Reviews
Journal of Nutrition
American Journal of Clinical Nutrition
British Journal of Nutrition
European Journal of Clinical Nutrition
International Journal of Vitamin and Nutrition Research
International Journal of Food Science and Nutrition
Nutrition Research
Ann NutrMetab

PAPER II -CLINICAL NUTRITION & DIETETICS

UNIT 1.Medical nutrition therapy and nutritional care in

disease UNIT 2. Nutritional intervention - Diet Modifications

UNIT 3 .Nutrition education and dietetic counseling

UNIT 4. Interactions between drugs, food nutrients and nutritional status

UNIT 5. Nutrition management in critical care

UNIT 6. Nutrition management in infection and fevers

UNIT 7. Nutritional management in physiological stress

UNIT 8. Nutrition management Gastro Intestinal Disorders

UNIT 9. Nutrition management in diseases of the liver, pancreas and biliary system

UNIT 10.Nutrition management of metabolic disease : i) Diabetes & Hypoglycemia

UNIT 11.Nutrition management of metabolic disease-ii: Gout and Inborn Errors of Metabolism

UNIT 12.Nutritional management in weight imbalance

UNIT 13.Nutrition management in coronary heart disease

(CHD) UNIT 14.Nutrition management renal disease

UNIT 15.Nutrition management in cancer

UNIT 16.Nutrition management in diseases of nervous system, and musculo skeletal system

UNIT 17 .Nutrition management in allergy

UNIT -1 MEDICAL NUTRITION THERAPY AND NUTRITIONAL CARE IN DISEASE

Definition
Dietitian as part of the Medical Team and Outreach Services
Nutritional Screening
1.4. The Nutritional Care Process:

1.4. 1.Nutritional Assessment
1.4. 2. Nutritional diagnosis
1.4. 3 .Nutritional Intervention
1.4. 4 Monitoring & Evaluation
1.4. 5. Documentation

UNIT -2 NUTRITIONAL INTERVENTION - DIET MODIFICATIONS

Adequate normal diet as a basis for therapeutic diets
Diet Prescription
Modification of Normal Diet
Nomenclature of Diet Adequacy of Standard Hospital Diets
Psychological factors in feeding the sick person

UNIT 3.NUTRITION EDUCATION AND DIETETIC COUNSELING

Dietitian as part of the Medical Team and Outreach Services.
Clinical Information - Medical History and Patient Profile
Techniques of obtaining relevant information, Retrospective information, Dietary Diagnosis, Assessing food and nutrient intakes, Lifestyles, Physical activity, Stress, Nutritional Status. Correlating Relevant Information and identifying areas of need.

0 The Care Process - Setting goals and objectives short term and long term, Counselling and Patient Education, Dietary Prescription.
1 Motivating Patients.
2 Working with -
Hospitalized patients (adults, pediatric, elderly, and handicapped), adjusting and adopting to individual needs.

3.5.2. Outpatients (adults, pediatric, elderly, handicapped), patients' education, techniques and modes.

Follow up, Monitoring and Evaluation of outcome, Home visits

Maintaining records, Reporting findings, Applying findings, Resources and Aids for education and counselling

Education for individual patients, Use of regional language, linguistics in communication process, counselling and education.

UNIT 4. INTERACTIONS BETWEEN DRUGS, FOOD NUTRIENTS AND NUTRITIONAL STATUS

Effect of drugs on Food and Intake, Nutrient Absorption, Metabolism, and Requirements.

Drugs affecting intake of food and nutrients

- 0 Absorption
- 1 Metabolism and excretion
- 2 Nutritional status

Summary of action of common drugs

Effect of food, nutrients and nutritional status on absorption and metabolism of drugs

UNIT 5. NUTRITION MANAGEMENT IN CRITICAL CARE

Nutritional screening and nutritional status assessment of the critically ill.

Nutritional requirements according to condition

Nutritional support systems: Enteral and parenteral nutrition support

- 0 Enteral Nutrition
  - 0 Site
  - 1 Size-tube
  - 2 Feeds-Type
  - 3 Complications
- 1 Parenteral nutrition
  - .0.0 Type
  - .0.1 Composition
  - .0.2 Complications

UNIT 6.NUTRITION MANAGEMENT IN INFECTION AND FEVERS

Defense mechanism
Metabolic changes during infection
Classification and etiology of fever/infection
Fever: Typhoid
Chronic disease
- 0 Tuberculosis
- 1 HIV & AIDS

UNIT 7. NUTRITIONAL MANAGEMENT IN PHYSIOLOGICAL STRESS

Normal cellular processes, injury and response of cells to injurious agents, cellular adaptations
Stress and Physiologic Effects.
Nutrition in wound healing
Surgery: Pre and post-surgical dietary management
Burns
- 0 Classification
- 1 Complication
- 2 Dietary management

Trauma: Dietary management
Sepsis: Dietary management with or without MODS

UNIT 8. NUTRITION MANAGEMENT G I DISEASES

Pathophysiology Of GI Tract Diseases - Anatomic, Physiologic and Functional Changes, Impact On Nutritional Status
Diseases of Esophagus and Stomach

- 0 Esophagitis
- 1 Dyspepsia
- 2 GERD
- 3 Peptic Ulcer
- 4 Gastritis
- 5 Gastrectomy -Dumping Syndrome

Intestinal Diseases
- 0 Flatulence
- 1 Diarrhoea
- 2 Constipation, Hemorrhoids, Diverticular disease

3 Deuodinal Ulcer
4 Inflammatory Bowel Disease,- Crohn's disease Ulcerative Colitis
5 Irritable bowel syndrome
6 Colostomy
7 Ileostomy

Malabsorption Syndrome
0 Celiac Sprue, Tropical Sprue
1 Steatorrhoea
2 Intestinal Brush border deficiencies (Acquired Disaccharide Intolerance)
3 Protein Losing Enteropathy

UNIT 9. NUTRITION MANAGEMENT IN DISEASES OF THE LIVER, PANCREAS AND BILIARY SYSTEM

Pathophysiology of Liver Diseases- Progression Of Liver Disease Metabolic And Nutritional Implications, Role Of Specific Nutrients And Alcohol

Nutritional care in Liver disease in the context of results of specific Liver Function Tests.

Viral Hepatitis, Cirrhosis of Liver, Hepatic Encephalopathy, Wilson's disease.

Liver Transplant

Diseases of Gall Bladder and Pancreas.- Pathophysiologic Changes, Metabolic And Nutritional Implications
0 Biliary Dyskinesia
1 Cholelithiasis,
2 Cholecystitis,
3 Cholecystectomy
4 Pancreatitis
5 Zollinger- Ellison Syndrome.

UNIT 10. NUTRITION MANAGEMENT OF METABOLIC DISEASE-I : DIABETES & HYPOGLYCEMIA

10..1. Prevalence & Classification
10..2. Etiology
10..3. Physiological symptoms and disturbances
10..4. Diagnosis & tests used
10..5. Complications

10..6. Management of Diabetes Mellitus

Nutritional Therapy

0 Diet Plan-Food exchange list, Glycemic Index, CHO counting
1 Meal planning with and without Insulin, during sickness
2 Sweeteners and Sugar Substitutes

Drugs and Insulin

Exercise

Hypoglycemia -classification, symptoms, fasting state hypoglycemia, Postprandial or reactive hypoglycemia, Early alimentary and late reactive hypoglycemia, Idiopathic hypoglycemia

0 Dietary treatment in reactive hypoglycemia

UNIT 11. NUTRITION MANAGEMENT OF METABOLIC DISEASE- II: GOUT AND INBORN ERRORS OF METABOLISM

Gout

0 Role of protein & purine
1 Etiology
2 Symptoms & complication,
3 Management
11.1.4.2. Diet
11.1.4.2. Drug

Inborn errors of metabolism

0 PKU
1 MSUD
2 Tyrosinemia
3 Homocystinuria
4 Glycogen storage Disorder
5 Galactosemia
6 Glutaricaciduria
7 Other Types

UNIT12. NUTRITIONAL MANAGEMENT IN WEIGHT IMBALANCE

12.1. Regulation of food intake and pathogenesis of obesity and malnutrition and starvation.

Weight Imbalance-Prevalence and Classification

Guidelines for Calculating Desirable body weight

Control of appetite and food intake - Neural control, hormonal control, insulin, estrogen and other peptides and hormones.

Obesity

0 Etiology
1 Energy balance
2 Theories, Physiology of the obese state
3 Health risks
4 Management

0 Diet and lifestyle modification
1 Evaluation of some common diets-Atkins
2 Pharmacological Management
3 Surgical Management
4 Preventive aspects

Underweight

0 Etiology
1 Diet management

Nutrition management in eating disorders

0 Anorexia Nervosa

Bulimia

UNIT 13. NUTRITION MANAGEMENT IN CORONARY HEART DISEASE (CHD)

Pathogenesis, role of nutrients in prevention - metabolic and nutritional implications, dyslipidemias.

Coronary Heart Disease (CHD)

0 Prevalence
1 Etiology & risk factors
2 Diagnostic tests
3 Nutrition management

Common disorders of CHD and Nutrition management

0 Dyslipidemias
1 Atherosclerosis
2 Hypertension- DASH diet

Ischemic heart disease –Angina, Myocardial Infarction

Congestive Heart failure

Rheumatic Heart Disease

UNIT 14. NUTRITION MANAGEMENT RENAL DISEASE

Diseases of the renal system - etiology and pathogenesis - changes in function with progression of diseases, metabolic and nutritional implications

Clinical and metabolic manifestations

Diagnostic test

Types

0 Acute and Chronic Nephritis

1 Nephrotic syndrome

Renal failure-acute and chronic renal failure

0 Acute and Chronic Nephritis

1 ESRD

Nephrolithiasis –Types and management

UNIT 15. NUTRITION MANAGEMENT IN CANCER

0 Cancer - Carcinogenesis - pathogenesis and progression of cancer, role of nutrients, foodstuffs and food additives in cancer. therapies and their clinical and metabolic implications.

Types

Symptoms

Diagnosis

Cancer therapies and treatment - side effects and nutritional implications

Dietary management

UNIT 16. NUTRITION MANAGEMENT IN DISEASES OF NERVOUS SYSTEM, AND MUSCULO SKELETAL SYSTEM

Dysphagia

Epilepsy

Hyperkinetic Behaviour Syndrome

16.3.1.Etiology, dietary treatment in above conditions

Arthritis, Osteoporosis

UNIT17. NUTRITION MANAGEMENT IN ALLERGY

Definitions, symptoms, mechanism of food allergy

Diagnosis - History, Food record

Biochemical and Immuno testing (Brief)

Elimination diets

Food selection

Food Allergy in infancy - Milk sensitive enteropathy; Colic, Intolerance to breast milk

Prevention of Food Allergy.

References:*

Anderson L., M. V. Dibble, P. R. Turkki, H. S. Mitchell and H. J. Rynbergen Nutrition in Health and Disease, 17th ed., J. B. Lippincott Co., Philadelphia, 1982.

Antia F. P.: Clinical Dietetics and Nutrition, 3rd ed., Oxford University, Press, Delhi, Reprinted in 1989.

Hui, Y. H.: Human Nutrition and Diet Therapy, Wadsworth Health ScL Divs. 1983.

Karran, S. J. and K. G. M. M. Alberti (ed): Practical Nutritional Support, John Wiley and Sons. Inc. N. Y. 1980.

Kraus M. V. and L. K. Madan: Food, Nutrition and Therapy, W. B. Saunders Company, London, 12th Edition 2010.

Lois, J and C. M. Peterson (ed): Nutrition and Diabetes, Alan R. Liss, Inc. N. Y., 1985.

Passemore R. and M.A. Eastwood: Human Nutrition and Dietetics, 8th ed. ELBS, Churchill Livingston, 1986.

Robinson, C. H, M. R. Lawlwr, W. L. Chenoweth and A. E. Garwick: Normal and Therapeutic Nutrition, 17th ed;, Mac Millan Pub. Co.

Suitor, Coo Woo and Moo F.. Hunter: Nutrition, Principles and Application in Health Promotion, J.. Boo Lippincott Co., Philadelphia, 1980.. 10.

Whitney, E. N. and C. B..Cataldo: Understanding Normal and Clinical Nutrition, West Pub. S1. Paul, 1983.

11. Willims, S.. R.: Nutrition and Diet Therapy, 4th ed., The C. V. Mosby Co., S1. Louis, 1981.

12. Willims S. R.: Essentials of Nutrition and Diet Therapy, 4th ed., Mosby College Pub. S. Louis, 1986.

13. Thomas, B.: Manual of Dietetic Practice, 1996.

14. Shills And Young. Modern Nutrition In Health And Disease
15. L. MatareseGottschlich Contemporary Nutrition Support Practice, Saunders 1998
16. ASPEN; Nutrition Support, Dietetics

*Latest editions preferred

Journals and Other Reference Series

Nutrition Update Series
World Review of Nutrition and Dietetics
Journal of the American Dietetic Association
American Journal of Clinical Nutrition
British Journal of Nutrition
European Journal of Clinical Nutrition
Nutrition Reviews

PAPER – III

CLINICAL NUTRITION & DIETETICS PRACTICAL

Session 1: Introduction

Practical1: Preparation of a Ready – Reckoner for calculating portion volume, conversion of cooked to raw equivalent and nutrient content of various foods.

Practical 2: Planning using the Exchange List and the Food Composition Table and ready reckoner for healthy individual-– Vegetarian, Non-Vegetarian.

Practical 3: Standardization common staple-rice,chapathi,idli,dosa, porridge

Practical 4Plan and prepare weaning foods

Practical 5: Plan and prepare nutrient rich recipe -High protein Iron rich recipe

Session 2: Nutrition Assessment

Practical 1: Assessing Nutrition status using ABCD parameters. Learn to use the available resources for assessment and to include for pediatric ,pregnant, geriatric and adult man and woman for assessment

Practical 2: Using different Malnutrition assessment tools-SGA,MUST etc

Session 3:Modified diet- Liquid

Practical 1: Planning and preparation of liquid diet

Practical 2: Preparation of formulas for enteral feeding-Home based, combination feeds, supplement feeds.

Practical 3. Planning enteral feed plan for hyper catabolic condition and adult and pediatric patient

Practical 4.Market survey of commercial nutritional supplements and nutritional support

Session 4: Nutrition Management in Weight management,Pre & post Bariatric Surgery

Practical 1. Assessing requirements and planning diet for obese and underweight individual

Practical 2. Preparing nutrient dense -high calorie and high protein recipes

Preparing high fiber low calorie recipes

Session 5: Nutrition Management of Gastro Intestinal Disease

Practical 1 Assessing and Planning diets for the following conditions-
Gastro intestinal Disorders-IBD, IBS, Celiac Disease, Lactose intolerance

Practical 2 Prepare low residue diet, low fat diet

Practical 3 Plan and prepare diet for those who have fat and protein malabsorption

Practical 4. Market survey for commercial feeds for infants with lactose intolerance and using the same plan a pediatric diet a 7 month old child

Session 6: Nutrition Management of Metabolic disease-Diabetes

Practical 1. Prepare food exchange list

Practical 2. Assessing and planning diet for patients with Type I and II diabetes with & without complications and on different modalities of treatment

Practical 3.Prepare sweets using artificial sweeteners and meal exchange

Session 7: Nutrition Management of Diseases of Liver and Pancreas

Practical 1: Planning diet for compensated and decompensated liver failure condition

Practical 2: Preparing high carbohydrate and nil fat recipe

Practical 3: Preparing protein free/nil protein recipe/drink

Session 8: Nutrition Management of Cardio Vascular Disease

Practical 1: Planning diet for Acute Myocardial Infarction
and Hypercholesterolemia condition

Practical 2: Planning diet for individual with Hypertension .Prepare snacks with salt substitute

Session 9. Nutrition Management of Renal Disease-Pediatric & adult patients

Practical 1: Planning diet for adult renal failure patient on conservative management

Practical 2: Planning diet for Patients on HD & PD

Practical 3: Planning diets- Low calcium, low oxalate and low purine diet

Practical 4: Planning diet for post transplant renal patient

Session 10 Nutrition Management in post Burns , Cancer and HIV

Practical 1: Assessment and planning diet for post burn condition

Practical 2: Assessment and planning diet for HIV with & without comorbidities. Preparing ready to eat snacks

Practical 3:Assess factors contributing for poor nutritional status in cancer patients and plan diet based on the treatment

Session 11: Nutrition Management in Diseases of Nervous System & IBM

Practical 1: Planning Ketogenic diet Preparing a very high fat and very low carbohydrate snack

Practical 2: Planning diet for GSD type-1

Note: Work out one case under each session for planning nutritional care

RECORDING PRACTICAL WORK

The practical manual for the course is actually a workbook. It contains not only the background information and concepts necessary for you to conduct the exercises, but it also serves as a practical file or workbook. You are expected to write your observations, calculations, results, inference, conclusions etc. related to a particular activity in the record itself.

CLINICAL NUTRITION& DIETETICS RECORD

Complete Record Pertaining to Clinical Nutrition & Dietetics Practical

PAPER – IV

ENTREPRENEURSHIP AND FOOD SERVICE MANAGEMENT

Unit 1 : History and Development of Food Service
System Unit 2 : Planning a Food Service Unit
Unit 3 : Setting up a Food Service Unit
Unit 4 : Entrepreneurship and Food Service Management
Unit 5 : Menu Planning: Focal Point of all Activities in Food Service Establishment
Unit 6 : Food Purchasing and Storage
Unit 7 : Quantity Food Production -Planning and Control
Unit 8 : Quantity Food Production -Kitchen Production
Unit 9 : Food Management: Records and Controls Unit
10 : Delivery and Service- Goals and Issues
Unit 11 : Delivery and Service: Styles
Unit 12 : Delivery and Service in Different Systems
Unit 13 : Administrative Leadership
Unit 14 : Staff Planning and Management
Unit 15 : Personnel Functions: Work Productivity
Unit 16 : Plant and Equipment Maintenance Unit
17 : Plant - Sanitation and Safety
Unit 18 : Issues in Food Safety
Unit-19- Issues in Food and Worker Safety and Security

Entrepreneurship and Food Service Management

Unit 1

Food Service Establishments

Structure

History and Development

Factors affecting Development

Recent Trends

Types of Food Service Establishments 1.3.1

Commercial Establishments

1.3.2 Non-Commercial Establishments

Approaches to Food Service Management

Traditional Approach

Classical Approach

Scientific Approach

Management by Objectives

Systems Approach

Quantitative Approach

Behavioral and Human Relations Approach

Contingency Approach

Just in Time

1.4.10 Total Quality Management Approach

1.5 Managing and Organization

Processes involved

Principles of Management

Functions of Management

Unit -2- Planning a Food Service Unit

Introduction

The Management Process

Planning

Steps in Planning

Types of Plan

2.4. Preparing a Planning Guide or Prospectus

Application for a License

Rules regarding Grading of Hotels and Restaurants 2.6

Systems approach in Food Service

Unit-3-Setting up a Food Service Unit

3.1 Introduction

3.2 Layout and Design: Definition

3.2.1 Factors Influencing Layout Design

Planning Team

Planning of a Layout : Various Phases

Gathering Information of Development of a Prospectus

Determining Work Centers

Equipment

Developing Overall Plan

Architectural Features

Evaluation of Plans

Energy and Time Management

Financial Status Analysis

Unit-4- Entrepreneurship and Food Service Management

Introduction

A Conceptual Perspective of Entrepreneurship

4.2.1 Defining Entrepreneurship

4.2.2 Who is an Entrepreneur?

4.2.3 Characteristics of Successful Entrepreneurs

.1 The Creative Process

4.3.2 Business Requirements for Food Products

What and Entrepreneur Needs to Consider

Marketing

Developing the Business Plan

Determine the Resources Needed

Entrepreneurship Development and Training

Approaches to Entrepreneurship Development

The Selective Method

The Shotgun Approach

The Multiplier Method

Intervention as an Approach

4.6 Merchandising Skills Specially for Entrepreneurs

know your Client

Responding to Request

Marketing your Business

Pros and Cons of Yellow Pages Advertising

Client Feedback

Competition

Unit- 5- Food Management: Menu Planning –Focal Point of all Activities in Food Service Establishments

Introduction

The Importance of Menu and Menu Planning in Food Service Organization

5.2.1 Definition and Functions of a Menu

5.2.2 The Need for Menu Planning

5.2.3 Knowledge and Skills Required for Planning Menu

The Types of Menu and its Applications

Types of Menu

Uses of Menus

5.4 Steps in Menu Planning and its Evaluation

Construction of Menu

How to Plan a Menu?

Characteristics of a Good Menu

Display a Menu

5.4.5 Evaluation of Menu

Unit-6-Food Management: Purchase and Storage

Introduction

Purchasing: A Food Management Activity

The Market and the Buyer

The Buyer

The Vendor of the Supplier 6.4

Mode of Purchasing

Centralized Purchasing

Group Purchasing 6.5.

Methods of Purchasing

Informal or Open Market Buying

Formal or Competitive Bid Buying

Other Types of Purchasing Methods 6.6

Identifying needs and amounts to buy

Minimum Stock Level

Maximum Stock Level

Quantity of Foods to be bought 6.7

Receiving and inspecting Deliveries 6.8

Storage Space

Dry Storage

Low Temperature Storage 6.9

Store Room Management

Unit-7-Food Management : Quality Food Production-Planning and Control

Introduction

Principles of Food Productions

Food Production Systems Management

7.3.1 Menu

7.3.2 Ingredient Control

7.3.3 Production forecasting

7.3.4 Production Scheduling

Production Control

Use of Standardized Recipes

Developing a Programme for Recipe Standardization 7.5

Safeguard in Food Production

Quality Control in Food Preparation and Cooking

Controlling Microbiological Quality of Food

Unit-8-Quantity Food Production: Kitchen Production

Introduction

General procedures used in Institutional and Commercial Food Production

8.2.1 Collecting Ingredients

8.2.2 Selection of Food

8.2.3 Weighing and Measuring 8.2.4

Preliminary Treatment of Food

8.2.5 Food Production to Achieve Consumer Satisfaction

Cookery Process and their Application to Quantity Production

Moist Heat Method

Dry Heat Method

Combination Method 8.4

Types of Equipments

Cooking Equipments

Mechanical Processing Equipment

8.4.3 Non-Cooking: Refrigeration Equipment

Unit-9-Food Management Records and Controls

Introduction

Records and Controls: Basic Concept

Records necessary for a Catering Unit

Budget

Types of Budget

Purchase Records

Receiving Records

Storage Records

Production Records

Service Records

Income and Expenditure Records

Reviewing Actual Performance Reports

9.4.1 Daily Food Cost Report

9.4.2 Cumulative Food Cost Report 9.4.3

Daily Cumulative Food Cost Report 9.4.4

Profit and Loss Statement

Cost Control

Factors affecting Cost Control

Determining Selling Price of Food

Checklist for Cost Control

Unit -10- Food Management: Delivery and Service-Goals and Issues

0 Introduction

Food Service Systems

A Food Service Systems Model and its Significance

Components of a Food Service System

Significance of the Food Service System Model 10.4.

Methods of Delivery Service System

Centralized Delivery System

Decentralized Delivery System

Centralized Vs. Decentralized

10.5 Choice of Delivery Systems and Services attached to Io

Choice of Delivery /Service Systems

Types of Services

10.6 Uses of Disposables in the Service area

Unit -11- Food Management: Delivery and Service Styles

Introduction

Different Types of Service in Food Service Establishments

11.2.1 Table and Counter Service

11.2.2 Self Service

11.2.3 Tray Service

Types of Service in a Restaurant

Silver Service

Plate Service

Cafeteria Service

Buffet Service

Specialized Forms of Service

Hospital Tray Service

Floor/Room Service

Airline Tray Service

Rail Service

Home Delivery

Catering and Banquet

Lounge Service

Unit -12-Food Management: Types of Food Service Systems

Introduction

Introduction to Food Service Systems

Types of Service Systems

Conventional

Commissary

Ready Prepared

Assembly/Serve

12.4 Distribution and Serve in Food Service System

Conventional Food Service System

Commissary Food Service System

Ready Prepared Food Service System

Assembly/Serve Food Service System

12.2 Conduct and Appearance of Service Unit Personnel

Unit-13-Personnel Management: Leadership

Introduction

Leadership

13.2.1 Definition

13.2.2 Components of Leadership

13.2.3 Approaches to Leadership

Who are Leaders?

Qualities

Attitude and Behavior

Values

Tasks of Leaders 13.4

Leadership Styles

Effective Leadership

Communication-The Key to Effective Leadership

Applications to Food Service Management

Unit-14- Personnel Management: Staff Planning and Management

Introduction

Staff Planning and Management 14.2.1

Approaches to Staff Management 14.2.2

Issues in Planning and Management 14.2.3

Steps in Planning

14.2.4 Staff Scheduling

Employment Process

Determining Staff Requirements

Establishment Policies for Recruitment

Outlining Procedures

Staff Recruitment and Selections

14.4.1 Recruitment

14.4.2 Selection

Staff Placement

Documenting Contract

Induction

14.6 Staff Training

Need for Training

Areas of Training

Training Process

Evaluation and Appraisal

14.7 Laws Governing Staff Planning and Management

Employee Laws

Trade Union Contracts and Negotiations

Unit-15-Personnel Function-Work Productivity

Introduction

Meaning and Definition of Productivity

Understanding Formal Relationships and Duties

15.3.1 Vertical Division of Labour

15.3.2 Horizontal Division of Labour

15.3.3 Line and Staff Division of

Labour 15.3.4 Departmentalization

15.3.5 Organization Chart

15.3.6 Coordination

Design of Jobs

Job Analysis

Job Descriptions

Job Titles

Job Enrichment 15.5

Work Design

15.6 Work Measurement in Food Service Operations

15.7 Productivity Improvement

Productivity Measures

Quality Circles

Unit-16-Plant and Equipment Maintenance

Introduction

Plant and Equipment in Food Services

Definition

Classification

Types of Plant and Equipment

16.3.1 Plant

16.3.2 Equipment

Maintenance of Plant and Equipment

16.4.1 General Case and Maintenance

16.4.2 Cleaning Systems

16.4.3 Planning for Maintenance

Safety Concerns

16.5.1 Safety Measures in Food Service Operations

Checks and Inspections

16.6.1 Procedures

16.6.2 Schedules

Equipment Suppliers

Unit-17-Plant Sanitation and Safety

Introduction

Sanitation and Safety

17.2.1 Definitions

17.2.2 Sanitation in Food Services

17.2.3 Sanitation and Public Health

17.2.4 Plant Sanitation and Safety

Consideration Necessary for and Efficient Cleaning Programme 17.3.1

Three Methods to Wash, Rinse and Sanitize Food Contact Surfaces

Post Cleaning Care and Cleaning of Premises and Surroundings

The-3-E's of Safety

Safety Engineering

Safety Education

Safety Enforcement

17.6 Standards, Policies and Schedules

Standards

Policies

Schedules

Unit-18-Issues in Food Safety

18.1 Introduction

18.2 Microbiology and Food Safety

18.2.1 Microorganisms in Foods

18.2.2 Growth of Bacteria and the Factors that affect the Growth of Microorganisms

18.2.3 Control of Microbial Growth in

Foods 18.3 Food Borne illness

Types of Food Borne illnesses

Control of Food Borne illnesses 18.4

Modes of Disease Transmission

Routes of Disease Transmission

Source of Contamination

18.5 Conditions that could lead to Food Spoilage

Categorization of Food on the Basis of their Shelf Life or Perish ability and Conditions that could lead to Food Spoilage

Signs of Spoilage in Fresh, Dry and Preserved Foods

18.6 Importance of Pest Control

Classification of Pesticides

Precautions to be taken while handling Pesticides 18.7

Hygienic Food Handling

Procedures in Food Preparation which affect the Microbial Count

Cooked Food and Microbial Contamination

Unit-19-Issue in Worker Safety and Security

Introduction

Personal Hygiene and Sanitary Practices

19.2.1 Health of Staff

19.2.2 Sanitary Practices

Sanitation Training and Education for Food Service Workers

19.3.1 Sanitation Training and Education

19.3.2 Who should be trained?

19.3.3 What a Training Program me should include? 19.3.4 Employment Practice

Hazard Analysis and Critical Control Point (HACCP)

19.5.1 Why accidents should be prevented?

19.5.2 How accidents take place? 19.5.3 Types of accidents

19.5.4 Precautions to Prevent Accidents

Sanitation Regulations and Standards

19.6.1 Control of Food Quality, Adulteration and Misbranding

References :

Livingston, G.E. (1979). Food Service Systems-Analysis, Design and Implementation -Academic Press.

Powers, T. F. And Powers, T. M. (1984). Food Service Operations Planning and Control. John Wiley & Sons.

Buchanan, R. D; Armstrong, R. A; Merchant, P; Cleveland, E; Crabrec, S; Varge, E. A And Kozeluh, L. W. (1975). The Anatomy of Food Service Design. Cahners Books. Cahners Publ. Co. Inc.

Wood, C; Kluge, E. 0; Annssem, P. E; Robinson, S; Golden, P; Cini, F. J; Eaton, W. V. (1978). The Anatomy of Food Service Design. C. B. I. Publishing Co Inc.

Boella, M. J. (1983). Personnel Management in the Hotel and Catering Industry. Hutchinson, London.

Drucker, P. S. (1975). Management. Allied Publishers. New Delhi.

Hitchcock, M. J. (1980). Food Service Systems Administration Mac Millan. New York.

West, B. B. And Wood, L. (1979). Food Service in Institutions. John Wiley, New York.

Sethi, M; Malhan, S. (1997). Catering Management; an Integrated Approach. New Age International.

Kinton, R; Ceserani, V. (1992). The Theory of Catering. Elbs Publishers.

Kotschevar, L. H. and Terrel, M. E. (1997). Food Service Planning: Layout and Equipment. John Wiley.

Minor, L. J., Cichy, R. F. (1984). Food Service Systems Management. Connecticut AviPubl

Kazarian, E. A. (1989). Food Service Facilities Planning 3rd Ed. New York. Van Nostrand and Reinhold.

Roday, Sunetra. Food Hygiene and Sanitation.

PAPER V - PUBLIC NUTRITION

UNIT-1.Concept and scope of community nutrition.

UNIT-2.Nutrition and national development UNIT-

3.Nutrition and national development

UNIT 4.Nutritional status

UNIT 5.Nutritional problems in india

UNIT 6 .Strategies to overcome malnutrition

UNIT 7.Nutrition intervention programs

UNIT 8.Role of national and international organization to combat malnutrition

UNIT 9.Nutrition education

UNIT 10.Hazards to community health and nutritional status

UNIT-1.CONCEPT AND SCOPE OF COMMUNITY NUTRITION.

UNIT-2.NUTRITION AND NATIONAL DEVELOPMENT

Relation of nutrition to national development economic development, Industrial development and agricultural development

UNIT-3.FOOD AVAILABILITY AND FACTORS AFFECTING FOOD AVAILABILITY ANDINTAKE.

Agricultural production, post-harvest handling (storage & treatment), marketing and distribution
Industrialization
Population
Economic, regional and socio-cultural factors.
Strategies for augmenting food production
Control of Food losses- Agencies to control food losses
Food security and adequacy of diets.

UNIT- 4.NUTRITIONAL STATUS

4.1. Determinants of nutritional status of individual and

populations

Nutrition and Non-nutritional indicators

- Socio-cultural, Biologic, Environmental, Economic

Assessment of nutritional status of individuals

- Meaning, need, objectives and importance, methods

UNIT-5.NUTRITIONAL PROBLEMS IN INDIA

Common nutritional problems – Ecology, prevalence ,clinical manifestation, consequences treatment of malnutrition

Malnutrition and infection

UNIT- 6STRATEGIES TO OVERCOME MALNUTRITION

Measures to overcome malnutrition in India

National nutrition policy and action plan

Nutrition education.

Agricultural planning role of food technology,

Environmental sanitation and health

Nutrition intervention programs

Food fortification and enrichment

UNIT 7.NUTRITION INTERVENTION PROGRAMS

7.1. Objectives and operation

Different programs

- Pre-school feeding programs, SLP, SNP, ANP and other programs. Organized by the governmental and non-governmental agencies

UNIT 8. ROLE OF NATIONAL AND INTERNATIONALORGANIZATION TO COMBAT MALNUTRITION

International organizations concerned with food and nutrition FAO, WHO, UNICEF, CARE, AFPRO, CWS, CRS, World Bank and others.

National organizations concerned with food and nutrition – NIN,CFTRI, ICMR, ICAR, CHEB,NIPCCD,DFRL,NGOs

UNIT 9 NUTRITION EDUCATION

Meaning, methods and importance of nutrition education
Training workers in nutrition education programs
Principles of planning, executing and evaluating nutrition education programs

UNIT 10. HAZARDS TO COMMUNITY HEALTH ANDNUTRITIONAL STATUS

Adulteration in food
Pollution of water, air
Toxins present in food

References:

Achaya, K.T. (Ed) (1984): Interfaces between agriculture Nutrition and Food Science, The United Nations University.

Gopalan, T. and Sheshadri, S. (1987): Nutrition – Monitoring and Assessment Oxford University Press. N. Delhi

Gibson,R.S.1990. Principles of Nutritional Assessment. Oxford University Press.New Delhi

Gopalan, C. and Kaur, S.(Eds) (1993): Towards Better Nutrition, Problems and Policies, Nutrition Foundation of India.

- National Nutrition Policy (1993): Dept. of WCD, Govt. of India.
- National Policy of Action on Nutrition (1995): Food & Nutrition Board, Dept. of WCD, Govt. of india.

Beaton, G.H. and Bengoa, J.M. (Eds) (1996): Nutrition in Preventive Medicine, WHO.

Bamji, M.S., Rao, P.N., Reddy, V. (Eds) (1996): Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi

Jelliffe. D.B. (1996), The assessment of nutritional status on the community – WHO Monograph Series – No.53. Geneva

Nutrition Education for the Public (1997): FAO Food and Nutrition Paper, 62, FAO.

Susheela, A.K. (1997), Drinking water quality surveillance and Prevention of diseases :Participation of Health Department Personnel in the safe drinking water mission activitiesand benefits thereof. In the proceedings of the National Workshop on water qualitymonitoring and surveillance in rural areas Rajiv. Gandhi National Drinking Water Mission,August 1997.

- WHO (1998): Education for Health – A Manual on Health education in Primary Health care, WHO.

Micronutrient Initiative (1998) Food Fortification: to end Micronutrient Malnutrition.

The Micronutrient Initiative, Ottawa, CanadaWadhwa,A ;Sharma,S (2003):Nutrition in the community, A Textbook, Elite publishing House Pvt. Ltd. .New Delhi

Park, K. (2004): Park's textbook of preventive and social medicine, 20th Edition, M/s.BanarasidasBhanot, Jabalpur.

Seghal,SRaghuvanshi R (2007):Textbook of community nutrition, Indian council of agricultural research, New Delhi i.

Roger Hughes,(2011) Practical Public Health Nutrition, Wiley-Blackwell Wiley

Documents and Reports published by the International Vitamin A Consultative Group

Documents and Reports of the International Nutritional Anemia Consultative Group SCN News, UN ACC/SCN Subcommittee on Nutrition.

National Family Health Survey reports

PUBLIC NUTRITION FIELD VISIT

1. Community Oriented Experience in selected village/community on any Vulnerable group

   Assessing Nutritional status of any 1 of the vulnerable groups(minimum 10 subjects- if pregnant/lactating mother)

   Visit to centers of ICDS CENTRE/BALWADI

2. Observations regarding the above to be entered in the LOG BOOK

LOG BOOK Format **is given in Appendix-A**

ASSESSMENT PATTERN

50% of marks in the University Theory Examinations

50% of marks in the subject where Internal evaluation alone is conducted

50% of marks in aggregate in Theory, Practical I.A. & Oral taken together

A) **Internal assessment of practical component**

Unlike the theory component, the practical will have 50% weightage from internal assessment. The internal assessment of the practical will be done by the respective teaching faculty located at the hospital. There are no formal question papers to assess the component. Passing in internal assessment of the practical is a prerequisite for appearing in the term-end examination. A student will have to secure at least 50% marks in practical assessment to be declared as pass in internal assessment component. If the student fails to secure pass marks, he/she will have to repeat all the practical activities of related paper.

B) **Term-End Practical Examination**

For term- end practical examination, there will be one internal and one external examiner. The internal examiner will be from the same programme study centre and the external examiner may be from the university or other medical institution (in the area of clinical nutrition/dietetics)in the city. The examiners will be decided by head of the department of nutrition in consultation with the university.

RESIDENCY TRAINING PROGRAMME

At the end of the 2nd Year theory and Practical Examinations- 6 Months Residency Training Program is compulsory.

DISSERTATION

Dissertation and Residency Training-

The dissertation shall be carried out under the supervision of the guide appointed to each learner by the programme in charge/coordinator at the respective programme study centre. After completing the dissertation (thesis), the *report* is to be submitted to the University for Evaluation. Students will have to appear for a viva-voce to defend their thesis and on successful completion of the course the M.Sc.,Clinical nutrition degree shall be awarded.

Duration of Residency Training for six months, in the Dietetic Department of a recognized hospital/institution, for the award of M.Sc.Clinical Nutrition degree is compulsory. The Residency Training report will be prepared and submitted by the learner for evaluation at the University.

Log Book For Residency Training Program

As per Appendix B

DISSERTATION

1)Consult the Programme Incharge for Assignment of Dissertation Guide/Counselor: The programme in charge shall make arrangements to provide suitable counselor/guides to students (on one to one basis) for undertaking the dissertation i.e. research work. Student may also identify their guide on their own from the programme study center or an expert from outside (with relevant research and subject background) whom they would want to have as a guide for their Dissertation. Under such circumstances, consult the programme incharge for allotment. In case of an external counselor/guide, the student would make the necessary arrangements to provide the bio-data of the expert to the programme in charge who would ensure the qualifications/experience/expertise of the guide meets the requirement of the programme (an supervisor/guide/counselor must have a doctoral degree in the area of nutrition, dietetics, health or the relevant area Or Masters degree in Nutrition and Dietetics, in case of a Master Degree the supervisor must have relevant experience for a specified time of minimum10 years in clinical nutrition)

Consult with Dissertation Guide/Counselor: Once the dissertation guide is assigned, the student shall consult the counselor for possible research areas for the dissertation.

Select an Area of Study and Relevant Topic: Identify a research area and the specific topic for research and define the problem or point of interest to be addressed. Discuss the proposed topic with this guide/advisor and refine as necessary.

Review Literature: Review the literature available related to the topic of the dissertation and consult with the counselor/guide concerning the chosen topic including the method of approach and ways to evaluate the results.

Prepare and Submit the Dissertation Proposal: Prepare a Dissertation proposal and submit the same to the counselor by the given deadline as per

University guidelines with information to the programme in charge. The student will be notified of what changes are necessary before final approval will be granted by the counselor.

6) Conduct the Study: Only after receiving the dissertation approval (from the guide the student may proceed to develop the dissertation, conduct it and begin writing.

Communicate Regularly with Dissertation Counselor/Guide: Share the experiences, report on the data collected, report the difficulties/problems encountered to the counselor. Discuss the data analysis and other issues. Give them copies of your chapters as they are completed for review and comment.

Submit First Draft: Submit the entire first draft to the counselor for review and feedback. Please be sure that the draft is in proper style and format, and has been carefully proofread for spelling, grammar, punctuation and format. Make the necessary changes as suggested.

Submit the final Manuscript: Submit the bound copy of the word-processed, printed dissertation to the programme incharge for necessary action.

10**) Number of copies submitted:** 4 copies of dissertation shall be submitted 2 months prior to the commencement of the examination on the prescribed date to the Controller of Examination of this University.

Appendix-A

Format : For Public Nutrition Visit activity LOG BOOk

Page:-1

Name of Student
Academic Year

Name of the Institute/Study center:

Page-2 onwards

I .Community Oriented Program
Area visited:
Date of visit & details:
Study Group for Nutrition survey selected: Study conducted: Enclose detailed study (typed)

Supervisor:
Signed with date

II.Visit to Centers

1.ICDS CENTRE

Place
Date

Record: Observations & activities Activities of center+ records maintained etc

Signed with date
ICDS centre staff

2.BALWADI CENTRE

Place
Date
Children: Numbers,gender,Age,NS,
Activities of center+ records maintained etc

Record: Observations & activities

Signed with date
BALWADI centre staff

Finally should be checked and signed by
Student
Supervisor

Appendix-B

Part -1 Format: For Public Nutrition Visit activity **LOG BOOK**

Part-II **Format of Log Book for Residency Training Program**

Part-I

Format: For Public Nutrition Visit activity **LOG BOOK**

Page:-1

Name of Student:

Academic Year:

Name of the Institute/Study center:

Certificate

This is to certify that this log book is the bonafide work of

_____

_____
_

during the period _____

Director of Study center/Program Coordinator

I .Community Oriented Program

Area visited:

Date of visit & details:

Study Group for Nutrition survey selected:

Study conducted: Enclose detailed study (typed)

Supervisor:
Signed with date

II.Visit to Centers

1.ICDS CENTRE

Place
Date

Record: Observations & activities
Activities of center+ records maintained etc

Signed with date
ICDS center staff

2.BALWADI CENTRE

Place
Date of Visit:

Record: Observations & activities
Record and assess (gender, Age) Nutrition Status of children
Activities of center+ records maintained etc

Signed with date
BALWADI center staff

Finally should be checked and signed by
Student
Supervisor
Director of Study center
Part II

Format of Log Book for Residency Training Program

M.Sc CLINICAL NUTRITION INTERN'S LOGBOOK

Name of Student Intern:……..

Academic Year :……

Name of the Institute/Study center:……

Dear Graduate,

This Logbook was designed for use as a documentation tool that traces your activities, acquired competencies as well as graded evaluations through the Internship period

The log book is vital evidence in deciding on both your suitability and eligibility to be awarded with the M.Sc. graduation document, and will need to be kept safely and returned in its original form to the Program coordinator.

Program Plan

The program consists of 6 months of supervised practice hours in clinical, community, and food service management.
Each week is generally divided into Six 8-hour days.
Student should complete all rotations. Given in syllabus

Certificate

This is to certify that this log book is the bonafide work of

_____

_____

during the period _____

Director of Study center/Program Coordinator

Placement Details

Name of Hospital	**Placement Period:**
	From to
	From to
	From to

Activity log of Placement& rotations

POSTING INFORMATION:

Area Of Posting _____

Posting Period: _____ To _____

Name of Department: _____

Name of the supervisor:_____

SUMMARY OF KEY POSTING ACTIVITIES

Weekly Timetable	**Summary For Each Posting**
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	

Clinical Duties:

a) No. of outpatient sessions/week :

_____

0 No. of Ward rounds sessions/week:

_____

No of Nutrition Screening performed/week:

_____

0 No of Nutrition Assessment performed/week:

_____

e) No of Diet Planning and counseling Sessions done under supervision

_____

Food Service related activities: Areas

Store
Production
Distribution
Management

Formal departmental educational activities/week:

Lectures: _____

Journal club meetings

Audit meetings

Research meetings

Others

Cases presented

Workshop/camps

Mini Project:

- Subject related to clinical nutrition/Dietetics to fulfill IDA RD Board eligibility
- Typed & bound copy should be submitted –two copies

Cases for Nutrition Care to be completed: Minimum 100

That covers the cases under different rotations

- Diabetic 30
- Critical care 10
- Pediatric 10
- Surgical 20
- Medical 30

Format given for NC case

Completed case study for one case for all the category listed in the Residency training should be completed and after correction should submit in bound copy- **three numbers**

Note: Attendance should be maintained in the respective posting rotations' register

Signed by the supervisor

Appendix-C

CASE STUDY FORMAT

Patient ID-: Age: Gender: M/F

Date of admission___ Hospital No: _____Ward_____ Bed No_____ Unit_____

CC: (Chief Complaint)

What the pt was complaining of on admission to the hospital (or arrival at the outpatient clinical), in the patient's own words, not in medical terms.

HPI: (History of the Present Illness)

Describe the course of events occurring prior to the patient's admission, which caused him/her to seek medical care. This should be presented in chronological order with the earliest events first and those immediately preceding admission last.

PMH:(Past Medical History)

Discuss medications which the patient is taking at home; known diseases including disease duration; prior hospitalizations; previous surgeries (including the reason for the procedure).

FH: (Family History)

Diseases of grandparents, parents, siblings and children.

DD (Demography Data): Education, occupation, income, place of residence, language, Life style- exercise, recreational activities, smoking, alcohol

PE: (Physical Exam)

Include pertinent physical findings such as (but not limited to): hydration - edema, ascites, dehydration, overhydration; motor limitations, especially of hands; impairment of sight, hearing or speech; blood pressure, pulse, respiration and temperature, etc.

ASSESSMENT:

Problem list/diagnoses.

HOSPITAL COURSE or Patient Treatment Course:

Discuss in chronological order the events occurring during the course of the patient's hospitalization. The following information should be included: treatment plans (medical and nutritional), abnormal laboratory values, medications (type of drug, dosage, indications for use and any drug-nutrient interactions. Also indicate for what condition each drug was prescribed.), surgeries, complications, etc. Also, include final diagnoses and the prognosis. This is a summary section and not a day-by-day account of what happened to the patient.

There may be multiple dates depending on hospital course and length of stay. Some case study patients will not be in the hospital in this case give a chronological history of what happened based on the information available. You may not have enough information to complete each section, if that is the case indicate not applicable.

Use the following format:

Date (include summary of the following at each interval of nutrition assessment and follow-up)

Diagnosis (be sure to include any changes)

Medications (current for date)

Labs (may include multiple results from last nutrition assessment up to current date)

Diet or nutrition order (current or history from last nutrition assessment)

Medical treatment plan (from point of last nutrition assessment to current date)

Brief nutrition assessment (as above)

Medical Nutrition Therapy plan (as above)

THEORETICAL DISCUSSION OF DISEASE PROCESSES:

Include discussion of all disease processes.

Cover the pathophysiology of the disease, pertinent laboratory findings (serum chemistry, hematology, urinalysis, etc.) and compare to patient's values; common diagnostic test/procedures used, with a brief description of what each test evaluates; usual medical/ surgical/ dietary treatment and commonly prescribed drugs, including drug classification and indications for use.

In these discussions, be sure to indicate how the patient's hospitalization compares to the theoretical course of the disease, diagnostic tests and treatments.

FINAL NUTRITIONAL CARE PLAN:

Include the following information: sex, age, height, weight (actual, usual, ideal, %IBW, %UBW, recent weight changes and causes, if known; intentional or unintentional, %weight lost or gained). Is patient obese, normal weight or underweight?

Visceral protein status: serum albumin and total lymphocyte count.

(PN :use desirable instead of Ideal with reference to weight ; %DBW instead of %IBW)

Nutritional diagnoses:

Include PES statement (Problem, Evidence, signs/symptoms)

DIET HISTORY:

Assess the following:

Changes in dietary habits due to current medical problems

Chewing/swallowing abilities

Loss of teeth/dentures

Changes in taste/smell

Change in appetite

Presence of nausea/vomiting

Presence of constipation/diarrhea

Food allergies/intolerances

Food aversions

Food likes/dislikes

Previous instruction on therapeutic diet/comprehension/compliance

Voluntary attempts at dietary changes

Use of dietary supplements

Routine exercise

Physical handicaps/assistance feeding

EVALUATION OF LABORATORY FINDINGS:

Discuss lab findings and clinical significance they may have on the patients diagnosis, condition or outcome. Address final labs or how they have changed from beginning to end of case study.

REVIEW OF MEDICATIONS AND FOOD/NUTRIENT INTERACTIONS:

Discuss side effects of medications that the patient may be experiencing and strategies to minimize or correct problems

EVALUATION OF PHYSICAL OR CLINICAL FINDINGS:

Presence of physical or clinical findings that could be affecting diagnosis, condition, nutrition status or outcome as well as tolerance to current diet orders (includes p.o., EN or PN).

ENERGY REQUIREMENTS:

Use the method of the facility to which you are assigned. Show all calculations.

PROTEIN REQUIREMENTS:

Describe how these were determined.

DIET ORDER:

If diabetic or renal exchanges, tube feeding or TPN are used, calculate total kcals and kcals from CHO, protein and fat. Also, compute grams of CHO, protein, fat and if necessary, milligrams of Na^+ and K^+ and ccs of fluid.

In addition, discuss patient's tolerance to the diet in terms of appetite, % meal ingested, presence of nausea, vomiting or diarrhea. If the patienttis receiving a tube feeding, include an I& O record, residual volumes, nausea, vomiting, stool frequency and consistency. If patient is receiving TPN, indicate I& O record, serum glucose, urine sugar and acetone, and liver enzymes.

DIET THERAPY:

Discuss the goals of dietary treatment. Based on these goals, the calculated energy and protein requirements, diet order and the patient's medical condition, is the diet order appropriate? Integrate all the information and support your position! Answering only "yes" or "no" is inadequate.

Further, if the order is not appropriate, what would you recommend and why?

NUTRITIONAL GOALS:

Develop short- term and long-term goals for the management of the patient's diet. For each goal, there should be at least one objective detailing how the goal will be achieved. List the most important goals first.

(In short Residency program log book has to include details of cases studied as per the format provided during the residency program in the various departments countersigned by the Heads of each department / supervising Dietician, Different Nutrition assessment formats, formulas regularly used in nutrition assessment ,biochemical parameters with their interpretation relevant to nutritional management, Drug and nutrient reactions related the cases studied, Diabetic and renal exchange list ,Food sources of Vitamin & Minerals, Conversion Formulas of common nutrients (mgs to mmols, ug to IU))

BIBILIOGRAPHY:

Use acceptable journal abbreviations. References should be cited in numerical order as they occur in the text. If the same reference is used later in the text, use the original number with which it was designated. Do not assign another number.

SYLLABUS

Epidemiology, Biostatistics and Medical Ethics

UNIT I: Epidemiology

Introduction: Historical aspects and evolution of epidemiology, definitions and concepts in Epidemiology.
Approaches in epidemiology: Descriptive and analytical epidemiology, disease burden, natural history of diseases and measures of risk and death.
Study design and sampling: Sample size estimation and introduction to study design in epidemiological investigations.

UNIT II: Biostatistics

Fundamentals of biostatistics: Introduction, types of data, tabular and graphical presentation of data. Measures of location, dispersion and correlation: Measures of central tendency. Mean, mode, median, GM, HM, quartiles Measures of dispersion—ra nge, standard deviation, variance, coefficient of variation.
Probability and statistical inference: Concept and probability distribution. Normal distribution— density curves, applications and statistical tables. Concept of significance tests, parametric and nonparametric tests, standard error and confidence intervals.
Inferential statistics: Probability and distributions – Poisson, Binomial a nd Normal distribution – Chi-square test – Hypothesis test - Student's t-tes t – Correlation and Regression – ANOVA.

UNIT III: Medical Ethics

Bioethics and Medical ethics: Historical perspectives & Introduction to Bioethics, Nuremberg Code, Declaration of Helsinki, Principle of essentiality, informed consent, confidentiality, minimisation of risk, accountability and responsibility. Ethics of clinical trials: Drug trials, vaccine trials, Clinical trials with medical devices/surgical procedures/radioactive materials, Research in transplantation and stem cell therapy. Regulatory framework and guidelines for conduction of human research: Review processes, Institutional ethical committees, composition of committees, review procedures, WHO, UNESCO and ICMR guidelines.

References :

Epidemiology: An Introduction. Kenneth J. J. Rothman. Latest edition / Pub. Date: May 2002. Publisher: Oxford University Press.
Epidemiology. Leon Gordis. Latest edition / Pub. Date: November 2004. Publisher: Elsevier Health Sciences.
Diseases and Human Evolution. Ethne Barnes. Latest edition / Latest edition / Pub. Date: March 2005. Publisher: University of New Mexico Press.

3 Epidemiology: Beyond the Basics. F. Javier Nieto, Moyses Szklo. Latest edition / Pub. Date: November 2003. Publisher: Jones & Bartlett Publishers, Inc.
4 Basic and Clinical Biostatistics. Beth Dawson, Robert G. Trapp, Robert Trapp. Latest edition / Pub. Date: March 2004.
5 Discovering Statistics Using SPSS. Andy Field. Latest edition / Pub. Date: April 2005. Publisher: SAGE Publications.
7.Arora PN & Malhon PK (1996). Biostatistics Imalaya Publishing House, Mumbai.
1 Sokal & Rohif (1973). Introduction to Biostatistics, Toppan Co. Japan.
2 Stanton A & Clantz, Primer of Biostatistics — T he McGraw Hill Inc., New York.
10.Government of India. Good Clinical Practices for Clinical Research in India. New Delhi: 2001
5891 Indian Council of Medical Research. Ethical Guidelines for Biomedical Research on Human Subjects. New Delhi: 2000
12. United Nations Educational, Scientific and Cultural Organisation (UNESCO). Universal Declaration on Bioethics and Human Rights. Paris; 2005

****

1
1
0