

# B.Sc. Nutrition, Food Service Management and Dietetics: Syllabus (CBCS)

## THIRUVALLUVAR UNIVERSITY

### BACHELOR OF SCIENCE

#### B.Sc. NUTRITION, FOOD SERVICE MANAGEMENT AND DIETETICS

#### DEGREE COURSE

#### CBCS PATTERN

(With effect from 2017-2018)

#### The Course of Study and the Scheme of Examinations

S.NO	Part	Study Components		Ins. hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
<b>SEMESTER I</b>							<b>CIA</b>	<b>Uni. Exam</b>	<b>Total</b>
1	I	Language	Paper-1	6	4	Tamil/Other Languages	25	75	100
2	II	English	Paper-1	6	4	English	25	75	100
3	III	Core Theory	Paper-1	6	6	Microbiology	25	75	100
4	III	Core Practical	Practical	3	0	Microbiology	0	0	0
5	III	ALLIED -1	Paper-1	4	4	Chemistry I	25	75	100
6	III	Allied Practical	Practical	3	0	Chemistry	0	0	0
7	IV	Environ. Studies		2	2	Environmental Studies	25	75	100
				<b>30</b>	<b>20</b>		<b>125</b>	<b>375</b>	<b>500</b>
<b>SEMESTER II</b>							<b>CIA</b>	<b>Uni. Exam</b>	<b>Total</b>
8	I	Language	Paper-2	6	4	Tamil/Other Languages	25	75	100
9	II	English	Paper-2	4	4	English	25	75	100
10	III	Core Theory	Paper-2	6	5	Human Physiology	25	75	100
11	III	Core Practical	Practical-1	3	3	A. Microbiology B. Human Physiology	25	75	100
12	III	ALLIED-1	Paper-2	4	4	Chemistry II	25	75	100
13	III	Allied Practical	Practical-1	3	2	Chemistry Practical	25	75	100

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14	IV	Value Education		2	2	Value Education	25	75	100
15	IV	Soft Skill		2	1	Soft Skill	25	75	100
				<b>30</b>	<b>25</b>		<b>200</b>	<b>600</b>	<b>800</b>
<b>SEMESTER III</b>							<b>CIA</b>	<b>Uni. Exam</b>	<b>Total</b>
16	I	Language	Paper-3	6	4	Tamil/Other Languages	25	75	100
17	II	English	Paper-3	6	4	English	25	75	100
18	III	Core Theory	Paper-3	3	3	Food Science	25	75	100
19	III	Core Practical	Practical	3	0	Food Science	0	0	0
20	III	ALLIED-2	Paper-3	4	4	Nutritional Biochemistry	25	75	100
21	III	Allied Practical	Practical	3	0	Nutritional Biochemistry	0	0	0
22	IV	Skill based Subject	Paper-1	3	3	Bakery	25	75	100
23	IV	Non-major elective	Paper-1	2	2	Health and fitness	25	75	100
				<b>30</b>	<b>20</b>		<b>150</b>	<b>450</b>	<b>600</b>
<b>SEMESTER IV</b>							<b>CIA</b>	<b>Uni. Exam</b>	<b>Total</b>
24	I	Language	Paper-4	6	4	Tamil/Other Languages	25	75	100
25	II	English	Paper-4	6	4	English	25	75	100
26	III	Core Theory	Paper-4	3	3	Human Nutrition	25	75	100
27	III	Core Practical	Practical -2	3	3	A. Food Science B. Human Nutrition	25	75	100
28	III	ALLIED-2	Paper-4	4	4	Food Preservation	25	75	100
29	III	Allied Practical-2	Practical-2	3	2	A. Nutritional Biochemistry B. Food Preservation	25	75	100
30	IV	Skill based Subject	Paper-2	3	3	Food Product Development and Marketing Strategy	25	75	100

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31	IV	Non-major elective	Paper-2	2	2	Nutrition for the Family	25	75	100
				<b>30</b>	<b>25</b>		<b>200</b>	<b>600</b>	<b>800</b>
<b>SEMESTER V</b>							<b>CIA</b>	<b>Uni. Exam</b>	<b>Total</b>
32	III	Core Theory	Paper-5	6	5	Dietetics – I	25	75	100
33	III	Core Theory	Paper-6	6	5	Nutrition Through Life Cycle	25	75	100
34	III	Core Theory	Paper-7	6	5	Community Nutrition	25	75	100
35	III	Core Practical	Practical	3	0	Nutrition through Life Cycle	0	0	0
36	III	Core Practical	Practical	3	0	Dietetics – I	0	0	0
37	III	Elective	Paper-1	3	3	Hospital Food Service Administration	25	75	100
38	IV	Skill based Subject	Paper-3	3	3	Internship	25	75	100
				<b>30</b>	<b>21</b>		<b>125</b>	<b>375</b>	<b>500</b>
<b>SEMESTER VI</b>							<b>CIA</b>	<b>Uni. Exam</b>	<b>Total</b>
39	III	Core Theory	Paper-8	5	5	Dietetics – II	25	75	100
40	III	Core Theory	Paper-9	5	4	Food Service Management	25	75	100
41	III	Core Theory	Paper-10	5	4	Human Development and Counselling	25	75	100
42	III	Core Practical	Practical-3	3	3	A. Nutrition through Life Cycle B. Dietetics – I	25	75	100
43	III	Core Practical	Practical-4	3	3	A. Food Service Management B. Dietetics – II	25	75	100
44	III	Elective	Paper-2	3	3	Food Standards and Quality Control	25	75	100
45	III	Elective	Paper-3	3	3	Nutraceuticals and Nutrigenomics	25	75	100
46	IV	Skill based	Paper-4	3	3	Perspectives of Home Science	25	75	100

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		Subject							
47	V	Extension Activities		0	1		100	0	100
				<b>30</b>	<b>29</b>		<b>300</b>	<b>600</b>	<b>900</b>

Part	Subject	Papers	Credit	Total credits	Marks	Total marks
Part I	Languages	4	4	16	100	400
Part II	English	4	4	16	100	400
Part III	Allied (Odd Sem)	2	4	8	100	200
	Allied (Even Sem)	2	4	8	100	200
	Allied -Prac(Even Sem)	2	2	4	100	200
	Electives	3	3	9	100	300
	Core	10	(3-7)	45	100	1000
	Core Practical	4	3	12	100	400
Part IV	Env. Science	1	2	2	100	100
	Soft skill)	1	1	1	100	100
	Value Education	1	2	2	100	100
	Lang. & Others/NME	2	2	4	100	200
	Skill Based	4	3	12	100	400
Part V	Extension	1	1	1	100	100
	<b>Total</b>	<b>41</b>		<b>140</b>		<b>4100</b>

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UNDER CBCS PATTERN**

**(With effect from 2017 - 2018)**

**SEMESTER I**

**PAPER – 1**

**MICROBIOLOGY**

**OBJECTIVES**

To enable the students to:

1. Gain knowledge on the role of micro-organisms in health and disease.
2. To understand the role of micro-organisms in spoilage of various foods.
3. To gain knowledge of micro-organisms in relation to food and food preservation.

**UNIT-I**

- Introduction to Microbiology and its relevance to everyday life.
- General Characteristics of Bacteria, Viruses, Yeast, Molds, Protozoa, Algae.
  - a. Bacteria: Bacterial cell, Morphology, Reproduction and function
  - b. Viruses: Morphology, Classification, Phages - Life cycle, functions.
  - c. Yeast: Morphology - Cell structure multiplication (Budding), functions.
  - d. Molds: Morphology, classification, reproduction of molds.
  - e. Algae: Morphology - Structure and reproduction.
  - f. Protozoa: Morphology, reproduction, motility and classification.
  - g. Economic importance of Molds, Yeast and Bacteria.

**UNIT-II - PRINCIPLES OF FOOD PRESERVATION**

- Use of high and low temperature. Canning of fruits and vegetables.
- Preservation of drying, use of chemicals in food preservation. Part played by antibiotics in the preservation of fleshy foods.

#### **DESTRUCTION OF MICRO-ORGANISM**

- Sterilization:
  - (i) Application of Dry heat, burning, flaming and hot air oven.
  - (ii) Application of moist heat, boiling, pasteurization -Advantages involved in pasteurization, methods – holder, flash. Steam sterilizers and autoclave.
  - (iii) Sterilization with the use of filters.

#### **UNIT-III - MICRO ORGANISM IN HUMAN WELFARE**

- Importance of microbes in food biotechnology, genetically engineered organisms, probiotics and single cell proteins.
- Fermentation: Aerobic and Anaerobic respiration. Products of Fermentation- Brief knowledge on the preparation of Bread, Malt beverages, Wine, Distil liquor, Vinegar, Fermented Vegetables and Dairy products.

#### **UNIT-IV - CONTAMINATION AND SPOILAGE OF FOODS**

- Principles of food spoilage by microbiological, physical and biological factors - Causes of spoilage – Classification of foods based on spoilage – factors affecting – kinds and numbers of micro-organism in food; Growth and chemical changes caused by microorganisms.
- Contamination, preservation and spoilage of cereal and cereal products, baked products, Fruits and vegetables and their products, Fleshy foods, Milk and Milk products, Egg and Egg Products, and Fats and oils.

#### **UNIT-V - MICROBIOLOGY OF FOOD POISONING, FOOD INFECTIONS AND FOOD BORNE DISEASES**

- Microbial food poisoning by Staphylococci, Salmonella and clostridium botulinum (Botulism). Measures to prevent microbial food poisoning.
- Public health hazards due to contaminated foods - Food borne Infections and Food intoxication symptoms, mode of transmission and methods of prevention of Dysentery diarrhea, Typhoid, Cholera.

**REFERENCES**

1. Adams, MR and Moss, MO (2005) Food Microbiology, New Age International (P) Ltd., New Delhi.
2. Jay M.J (2005) Modern Food Microbiology, Fourth Edition, CBS Publishers and Distributors, New Delhi.
3. Tamine, A (2005) Probiotic Dairy Products, Blackwell Publishing, USA.
4. Cappuccino G.J and Sherman, N (2008) Microbiology – A Laboratory Manual, Pearson Education Publishers, USA,.
5. Ramesh, K.V (2007) Food Microbiology, MJP Publishers, Chennai.
6. Frazier, W.C, Food Microbiology, McGraw Hill Publications, New York, 4th Edition, 1998.
7. Pelczar, H.J. And Rober. D, Microbiology, McGraw Hill Publication, New York, 10th Edition, 1998.

**ALLIED  
PAPER - 1  
CHEMISTRY I**

**OBJECTIVE:**

- Basic knowledge on Metallurgy, Cycloalkanes, Polarising Effects, Stereochemistry, Chemical Kinetics, Catalysis, Photochemistry, VSEPR Theory, Fuels, Osmosis, Nuclear Chemistry, Petroleum Chemistry, Chemistry of Naphthalene, Conductors and Applications wherever necessary are to be taught for I- Semester.

**UNIT – I**

- 1.1 General Metallurgy - Extraction of Metals - Minerals and Ores- Difference between Minerals and Ores – Minerals of Iron, Aluminum and Copper - Ore Dressing or Concentration of Ores - Types of Ore Dressing- Froth Floatation process, Gravity separation and Magnetic separation.
- 1.2 Calcination, Smelting, Roasting, Flux, Slag - Definition - Reduction methods - Goldschmidt Aluminothermic process and Carbon Reduction method - Refining of Metals - Electrolytic, Van Arkel and Zone Refining.
- 1.3 Ores of Titanium and Cobalt - Extraction of Titanium and Cobalt.

**UNIT – II**

- 2.1 Cycloalkanes - Preparation – Wurtz reaction and Dieckmann's condensation - Properties of Cycloalkanes – Substitution and Ring opening reactions.
- 2.2 Polarisation - Inductive effect, Mesomeric effect and Steric effect (Acid and Base Strength).



- 2.3 Stereoisomerism – Types - Cause of Optical Activity – Enantiomers - Diastereomers - Meso form - Optical Activity of Lactic acid and Tartaric acid - Racemisation and Resolution – Definition and Methods - Geometrical isomerism – Definition and example - Maleic and Fumaric acid – Differences.

### **UNIT – III**

- 3.1 Chemical Kinetics – Rate of a reaction – Definition of Order and Molecularity – Distinction between Order and Molecularity - Derivation of First order rate equation - Half Life Period of first order reaction.
- 3.2 Catalysis - Catalyst - Autocatalyst - Enzyme catalyst - Promoters - Catalytic poisons – Active Centre - Differences between Homogeneous and Heterogeneous Catalysis - Industrial Applications of Catalysts.
- 3.3 Photochemistry – Grothus-Draper’s law – Stark-Einstein’s law - Quantum yield – Photosynthesis - Phosphorescence – Fluorescence.

### **UNIT – IV**

- 4.1 VSEPR Theory – Hybridisation and Shapes of simple molecules  $\text{BF}_3$ ,  $\text{PCl}_5$ ,  $\text{SF}_6$  and  $\text{XeF}_6$ .
- 4.2 Fuels – Classification of Fuels - Calorific value of Fuels – Water gas, Carbureted Water gas and Producer gas – Composition and Uses - Non-Conventional fuels - Need of Solar Energy - Applications - Biofuels – Oil gas, Natural gas and LPG – Uses.
- 4.3 Osmosis - Osmotic pressure - Reverse osmosis – Definition - Desalination of Sea water.

**UNIT – V**

- 5.1 Nuclear Chemistry – Atomic number, Mass number - Isotopes, Isobars and Isotones – Definition and Examples - Definition of Half life period - Nuclear Binding Energy, Mass Defect and N/P ratio - Nuclear Fission and Nuclear Fusion (Elementary idea) - Applications of Radioisotopes in Medicine, Agriculture and Industries – Carbon Dating.
- 5.2 Crude Oil - Petroleum - Petroleum Refining - Cracking - Applications of Cracking – Naphthalene – Preparation – Haworth’s method – Properties – Oxidation, Reduction and Uses of Naphthalene - Structure of Naphthalene (Structural elucidation not necessary).
- 5.3 Conductors, Insulators, Semiconductors, N- and P- Type Semiconductors – Definitions and Examples.

**SEMESTER II**

**PAPER - 2**

**HUMAN PHYSIOLOGY**

**OBJECTIVES**

1. To enable the students to understand the structure and basic physiology of various organs of the body.
2. To obtain better understanding of the principles of Nutrition through the study of physiology.

**UNIT-I: CELL-TISSUES**

- Introduction to the cell – Structure and function of a typical cell, cell division – Mitosis and Meiosis.
- Tissues - classification, structure and function of epithelial, muscular, connective and nervous tissues.

**UNIT-II: BLOOD, HEART AND CIRCULATION**

- Blood: Blood composition and function, plasma proteins, distribution functions. Cell components - RBC - Structure, function, normal count; WBC - classification, function, normal values. Blood coagulation, Erythropoiesis, blood grouping. ABO system and RH system
- Heart and circulation: Structure of the heart and blood vessels, origin and conduction of heart beat, cardiac cycle, ECG, blood pressure – definition and factors affecting it.

**UNIT-III: RESPIRATORY AND EXCRETORY SYSTEM**

- Respiratory system: Structure of pharynx, larynx, trachea, bronchi, lung and lung cavities. Physiology of respiration- Mechanism of respiration, gaseous exchange in the lungs.
- Excretory system: Structure and function of kidney and Nephron, urine formation, micturition.

**UNIT-IV: DIGESTIVE SYSTEM & NERVOUS SYSTEM**

- Structure and function – Secretory Digestive and absorptive functions. Role of Liver, Pancreas and Gall bladder.
- Neuron structure and functions, Structure of Brain and Spinal cord

- Autonomic nervous system – sympathetic and parasympathetic.

**UNIT-V: ENDOCRINE AND REPRODUCTIVE SYSTEM**

- General structure of male and female reproductive organs, puberty, menstrual cycle.
- Functions and Disorders of Endocrine Glands – Pituitary, Thyroid, Parathyroid, Adrenal and Islets of Langerhans.

**REFERENCES**

1. Gary.A Thibodeau and Kelvin. T.Patlon, Anthony's Text Book of Anatomy And Physiology, Seventeenth edition, Mosby Publications, Indiana Print, 2004.
2. Anne Waugh and Allison Grant Ross and Wilson Anatomy And Physiology In Health and Illness Elsevier Publication, Ninth Edition, 2005.
3. Guyton, A.C, Text Book of Medical Physiology, 4th Edition, W.B. Saunders Co. Philadelphia, 1996.

**CORE PRACTICAL I**

**A. MICROBIOLOGY**

1. Microscope and its use.
2. Examination of Yeast, molds, Protozoa and Bacteria.
3. Examination of wet methods and hanging drop preparations.
4. Examination of stained organisms, Simple Staining and gram method of staining.

**B. HUMAN PHYSIOLOGY**

1. Microscopic study of
  - a. Tissues - Epithelial, connective, muscular and nervous tissue
  - b. Endocrine Glands – Thyroid, Pituitary, Adrenal and Pancreas.
2. Study of anatomy of Heart, Brain, Kidney and digestive system using readymade models.
3. Demonstration of determination of blood count.
4. Determination of Blood Grouping.
5. Estimation of Hemoglobin.

**ALLIED - 1  
PAPER - 2  
CHEMISTRY II**

**OBJECTIVE:**

- Basic knowledge on Coordination Chemistry, Industrial Chemistry, Carbohydrates, Amino acids, Proteins, Electrochemistry, Paints and Pigments, dyes, Vitamins, Medicinal Chemistry, Corrosion and Applications wherever necessary are to be taught for II- semester.

**UNIT – I**

- 1.1 Coordination Chemistry - Nomenclature of Coordination Compounds - Ligands, Central Metal Ion and Complex Ion – Definition and Examples – Coordination Number - Werner’s Theory of Coordination Compounds - Chelates - Functions and Structure of Haemoglobin and Chlorophyll.
- 1.2 Industrial Chemistry - Fertilisers and Manures – Biofertilisers - Organic Manures and their importance - Role of NPK in plants - Preparation and Uses of Urea, Ammonium Nitrate, Potassium Nitrite and Super Phosphate of Lime.
- 1.3 Contents in Match Sticks and Match Box - Industrial making of Safety Matches – Preparation and Uses of Chloroform, DDT, Gammexane and Freons.

**UNIT – II**

- 2.1 Carbohydrates - Definition and Examples - Classification – Oxidation and Reduction Reactions of Glucose - Structure of Glucose (Structural elucidation not necessary) - Uses of Starch - Uses of Cellulose Nitrate and Cellulose Acetate.
- 2.2 Amino Acids – Definition and Examples - Classification of Amino Acids -

Preparation - Gabriel Phthalimide Synthesis – Properties – zwitterion and Isoelectric point - Structure of Glycine.

- 2.3 Proteins – Definition - Classification of Proteins based on Physical properties and Biological functions - Primary and Secondary Structure of Proteins (Elementary Treatment only) – Composition of RNA and DNA and their Biological role - Tanning of Leather - Alum (Aluminum chloride tanning ) - Vegetable tanning – Chrome Tanning.

### **UNIT – III**

- 3.1 Electrochemistry - Electrolytes – Definition and Examples – Classification - Specific and Equivalent Conductance - their determination – Variation of Specific and Equivalent conductance with Dilution – Ostwald’s Dilution Law and its Limitations.
- 3.2 Kohlrausch’s Law - Determination of Dissociation Constant of weak Electrolytes using Conductance measurement - Conductometric titrations.
- 3.3 pH – Definition and pH determination by indicator method - Buffer solutions - Buffer action - Importance of buffers in the living systems.

### **UNIT – IV**

- 4.1 Paints - Components of Paint – Requisites of a Good Paint - Pigments – Classification of Pigments on the basis of Colour – Examples - Dyes – Definition – Chromophores and Auxochromes – Examples - Colour and Dyes - Classification based on Constitution and Application – Examples.

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- 4.2 Vitamins – Definition – Classification – Water Soluble and Fat Soluble – Occurrence - Biological Activities and Deficiency Diseases caused by Vitamin A, B, C, D, E and K - Hormones – Definition and Examples – Biological Functions of Insulin and Adrenaline.
- 4.3 Chromatography - Principles and Applications of Column and Paper chromatography-  $R_f$  value.

### **UNIT – V**

- 5.1 Drugs - Sulpha Drugs – Preparation and Uses of Sulphapyridine and Sulphadiazine - Mode of Action of Sulpha Drugs - Antibiotics - Uses of Penicillin, Chloramphenicol and Streptomycin - Drug Abuse and Their Implication - Alcohol – LSD.
- 5.2 Anaesthetics - General and Local Anaesthetics - Antiseptics - Examples and their Applications - Definition and One Example each for Analgesics, Antipyretics, Tranquilizers, Sedatives - Causes, Symptoms and Treatment of Diabetes, Cancer and AIDS.
- 5.3 Electrochemical Corrosion and its Prevention – Electroplating – Applications.



**ALLIED CHEMISTRY  
PRACTICAL**

**VOLUMETRIC ANALYSIS**

1. Estimation of HCl – Standard sulphuric acid.
2. Estimation of Borax - Standard Sodium Carbonate.
3. Estimation of NaOH – Standard Oxalic Acid.
4. Estimation of  $\text{FeSO}_4$  – Standard FAS.
5. Estimation of Oxalic acid – Standard  $\text{FeSO}_4$ .
6. Estimation of FAS – Standard Oxalic Acid.
7. Estimation of Oxalic acid – Standard Oxalic Acid.
8. Estimation of  $\text{Fe}^{2+}$  using Diphenylamine / N- Phenyl Anthranilic acid as indicator.

**ORGANIC ANALYSIS**

Systematic Analysis of Organic Compounds containing One Functional Group and Characterisation by Confirmatory Tests.

Reactions of Aromatic Aldehyde, Carbohydrates, Mono and Dicarboxylic acids, Phenol, Aromatic Primary Amine, Amide and Diamide.

**REFERENCE BOOKS**

- ❖ Inorganic Chemistry - P. L. Soni - Sultan Chand (2006).
- ❖ Inorganic Chemistry - B. R.. Puri, L. R. Sharma and K. C. Kallia – Milestone Publications (2013).
- ❖ Selected Topics in Inorganic Chemistry - W. U. Malik, G. D. Tuli and R. D. Madan - S. Chand Publications (2008).
- ❖ Text Book of Inorganic Chemistry – R. Gopalan, Universities Press – 2012.
- ❖ Text Book of Organic Chemistry - P. L. Soni - Sultan Chand & Sons - 2007.
- ❖ Advanced Organic Chemistry - Bahl and Arun Bahl - Sultan Chand and Co. Ltd – 2012.

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- ❖ Organic Reaction Mechanisms - Gurdeep Chatwal- Himalaya Publishing House.
- ❖ A Text Book of Organic Chemistry K. S. Tewari, N. K. Vishol, S. N. Mehrotra- Vikas Publishing House – 2011.
- ❖ Principles of Physical Chemistry - B. R. Puri, Sharma and Madan S. Pathania, Vishal Publishing Company – 2013.
- ❖ Text Book of Physical Chemistry - P. L. Soni, O. P. Dharmarha and U. N. Dash - Sultan Chand & Co – 2006.
- ❖ Understanding chemistry – C. N. R. Rao, Universities Press – 2011.

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**SEMESTER III**

**PAPER - 3**

**FOOD SCIENCE**

**OBJECTIVES**

**To enable students to:**

1. Obtain knowledge of different food groups and their nutritive value, Understand the scientific principles underlying food preparation
2. Develop skill and techniques in food preparation with conservation of nutrients and palatability using cooking methods generally employed.

**UNIT-I**

Definition, Classification , Functions of foods- Functions of food in relation to health - classification of foods based on nutrients., Need For Grouping Foods, Application Of Food Groups in Planning Adequate Diets, Food Pyramid, Food groups - Basic Four, Basic Five, Basic Seven and Basic Nine.

**UNIT-II**

Preliminary preparation of foods prior to cooking with special reference to conservation of nutrients and palatability, different methods of cooking on acceptability and nutritive value of foods. Dry methods - frying, broiling, parching, and baking. Moist methods - boiling, stewing, cooking under pressure. Solar cooking, Micro-wave cooking - advantages and disadvantages.

**UNIT-III: EXPERIMENTAL STUDY OF FOODS**

Cereal and Cereal products - Microscopic structure of various starch granules - Nutritive value of Rice, Wheat and locally available millets. Effect of cooking on the nutritive value of cereals. Gelatinisation, Dextrinization and gluten formation.

Pulses and nuts - Composition, Nutritive value of grams, dhals - some common nuts - meat substitutes - soya products. Effect of soaking, germination, cooking on pulses, toxic constituents of pulses. Textured Vegetable Protein (TVP).

Vegetables and Fruits - Classification, composition and Nutritive value - methods to minimize the loss of nutrients, types of pigments, effects of acid on color, texture, flavor. Browning reaction and changes during cooking.

**UNIT-IV: ANIMAL FOODS**

Milk and milk products - Composition and Nutritive value, Principles of milk cookery, Milk protein, coagulation, problems in milk cookery. Effect of cooking and processing on milk.

Meat - Nutritive value, methods of cooking - Post mortem changes in meat, factors affecting tenderness - organ meat.

Fish - Classification, Nutritive value - selection, Methods of cooking

Poultry - Nutritive value, economic aspects. Principles and methods of cooking poultry.

Eggs - Structure, composition, Nutritive value, selection - principles of egg cookery - uses of eggs in cookery, methods of cooking eggs.

**UNIT-V**

Fats and Oils - Types - saturated, MUFA, PUFA, Hydrogenation - Invisible fats - uses of fat in cookery - factors affecting absorption of fats - smoking point - Rancidity.

Spices and Condiments - Importance, composition and classification. Uses in Indian cookery.

Sugar and Sugar Products - Jaggery - uses in Indian cookery - Stages in sugar, Indian Sweets.

Beverages - Classification, Nutritive value and uses - coffee, tea, cocoa.

**REFERENCES**

1. Srilakshmi. B; Food Science, 6th edition, New Age International (P) Limited Publishers, 2015.
2. Shakunthala Manay. N; Shadakshara Swamy.M; Foods Facts and Principles, 3rd edition, New Age International (P) Limited Publishers, 2014.
3. Lillian Hoagland Meyer, Food chemistry, CBS Publishers and Distributors, 2004.
4. Arindam Ramaswamy, Elements of Food Science, Oxford Book Company, 2010.
5. Norman. N Potter, Joseph H. Hotchkiss, Food Science, 5th edition, CBS Publishers and Distributors, 1996.
6. Sivasankar. B; Food Processing and Preservation, PHI Learning Private Limited, 2011.

**ALLIED - 2**

**PAPER - 3**

**NUTRITIONAL BIOCHEMISTRY**

**UNIT-I**

Introduction to biochemistry and relation to nutrition, carbohydrates- structural classification, metabolism of glucose- Glycolysis, krebs cycle, gluconeogenesis, glycogenesis, glycogenolysis, blood glucose maintenance and its regulation.

**UNIT-II**

Proteins– classification based on amino acid, primary, secondary and tertiary structure of proteins, hydrolysis of proteins, denaturation, precipitation and coagulation, deamination, transamination, decarboxylation- urea cycle and metabolic disorders of urea cycle

**UNIT-III**

Lipids – chemical composition of fats, metabolism -beta oxidation of fatty acids & bio-synthesis of fatty acids - ketone bodies, Ketogenesis and ketosis, cholesterol-biosynthesis.

**UNIT-IV**

Nucleic acids and protein biosynthesis, nucleotides, Nucleosides, nucleic acids-structure and functions.

**UNIT-V**

Enzymes- classification, factors affecting enzyme activity, mechanism of enzyme action, enzyme inhibition, coenzymes and prosthetic group, isoenzymes, diagnostic value of clinical enzymes.

Elementary knowledge on inborn errors of metabolism with reference to carbohydrate – Fructosuria, Pentosuria, Galactosemia and Glycogen storage disease. Protein – albinism, phenylketonuria, alkaptonuria, maple syrup urine disease, hartnup disease. Lipids – Gaucher's disease, Niemann- pick disease, Tay- sach's disease, Fabry's disease, Refsum's disease, Krabbe's disease.

**REFERENCES**

1. Lehninger, A.L, Biochemistry, worth publishers INC, New York, 2000.
2. Ambiga Shanmugam, Fundamentals of biochemistry for Medical students, Karthik printers, 2002.
3. Nutritional Biochemistry, 2nd edition Tom Bridt, Academic press 2006.
4. Powar and Chatwal, Biochemistry, Himalaya publishing house, 2000.
5. Ranganatha Rao, K, Text book of Biochemistry, Prentice Hall of India, New Delhi, (2000). .
6. Sathyanarayanan, U.,Chakrapani, U., textbook of biochemistry, 3<sup>rd</sup> edition, books and allied (p) ltd kolkata, 2010.
7. Lehinger's principle of Biochemistry (2000), Nelson and Cox.
8. Harper's Biochemistry - Rober K. Murray, Daryl K.Grammer, McGrawHill, Lange Medical Books
9. Biochemistry - Dr. Ambica shanmugam, published by author 2006.
10. Illustrated biochemistry-lippincott's,5<sup>th</sup> edition

**SKILL BASED SUBJECT I**

**PAPER – 1**

**BAKERY**

**OBJECTIVES**

This course will enable the students to

1. Understand basic concepts of baking.
2. Acquaint with the role of various major and minor ingredients in bakery products.
3. Familiarize with baking process and operation.
4. Learn the quality parameter of bakery products.

**UNIT I**

Introduction of bakery–definition, principles, types of baked and confectionary products. Major and minor equipment – required to start a small bakery unit. Major and minor ingredient in baking

- a) Major ingredients – flour, fat, sugar and leavening agent – types, role in bakery
- b) Minor ingredients – milk, water, salt – types, role in bakery

**UNIT II**

**BREAD**

- a) Principles involved in the yeast products preparation, methods – straight dough method, salt delayed method, no dough time method, sponge and dough method, ferment and dough method.
- b) Processing – flying fermentation, bulk fermentation, knock back, dividing and rounding, intermediate proofing, molding and panning, final proofing, baking, depanning, cooling, slicing, packaging.
- c) Faults and remedies in baked bread, types of bread improvers.

**UNIT III**

**CAKE**

- a) Principles involved in the preparation of cake, sponge cake – types (fatless sponge, Genoese sponge, plain sponge, gel sponge).
- b) Methods – sugar batter method, flour batter method, blending method, boiling method, sugar water method, all-in process method (slow speed, medium speed, fast speed), foaming method.
- c) Faults and remedies in baked cakes.

**UNIT IV**

**BISCUITS AND COOKIES**

- a) Principles involved in cookies preparation, methods for mixing cookies – single or one stage method, creaming or sugar batter method, blending or rub in method, foaming method, flour batter method.
- b) Types – sheeted types, piped types, bar types, dropped types, rolled types
  - i. Different between biscuits and cookies
  - ii. Faults and remedies in baked biscuits and cookies

**UNIT V**

**ICING** –Types and Preparation Methods Butter cream – royal icing - almonds paste (or) marzipan – fondant icing – gum paste (or) pastillage – American frosting – water icing (or) glaze icing.

**PASTRIES** and preparation Methods Pastries – types, short crust pastry – puff pastry – flaky pastry – phlo (or) filo pastry – choux pastry – pain de sucre – faults and their causes in making pastry .

**REFERENCES**

1. Wayne Gisslen, The Professional Baking, Sixth Edition, Publishers John Wiley & Sons (2012).
2. Pat Sinclair, Basic Baking, Publisher Agate (2006).
3. John Kingslee, Professional Text to Bakery and Confectionary, First Edition, New Age International (P) Limited Publishers (2006).
4. Yogambal Ashokkumar Theory of Bakery and Confectionery, Fifth Edition, PHI Learning Private Limited, New Delhi(2009).



**NON-MAJOR ELECTIVE I**

**PAPER - 1**

**HEALTH AND FITNESS**

**UNIT I**

**HEALTH** - Definition of health and wellness – Factors affecting health and wellness. Physiological, psychological and social health.

**UNIT II**

**FITNESS** - Definition, parameters of fitness, cardiovascular endurance, muscular strength, muscular endurance, physical fitness tests- for flexibility.

**UNIT III**

**YOGA AND FITNESS** - principles of yoga therapy, social skills and living value based education. Yogic concepts in various diseases like diabetes, CVD, digestion and immune system.

**UNIT IV**

**WARM UP EXERCISES & BASIC ASANAS** - Simplified physical exercises and body stretching practices. Basic asanas, suryanamaskar, breathing exercise- pranayama

**UNIT V**

**SPECIAL NUTRITION** - Basic knowledge on sports nutrition, special nutritional needs for sea voyage, military and space [basic only]

**REFERENCES**

1. Werner W. K Hoejer (1989), Life time Physical Fitness and Wellness, Morton Publishing Company, Colorado.
2. Mishra, S. C (2005) Physiology in Sports. Sports Publication, New Delhi
3. Greenberg, S. J and Pargman, D (1989) Physical Fitness – A Wellness Approach Prentice Hall International (UK) Limited, London
4. Swaminathan T, (2008) Essentials of Food and Nutrition Bangalore Printing Publishing Co.
5. McArdle, W. D, Frank I. Katch, F. I and Victor L. Katch (1996) Exercise Nutrition: Energy Nutrition and Human Performance. William & Wilkin Publishing USA.
6. Mahan, K and Stump, E. S (1996) Krause Food and Nutrition and Diet Therapy W.B Saunders Company, USA.

**SEMESTER IV**

**PAPER - 4**

**HUMAN NUTRITION**

**OBJECTIVES**

1. To introduce the students to the principle of Human Nutrition.
2. To gain skill in qualitative tests and quantitative estimation of nutrients.

**UNIT-I**

1. Introduction to Nutrition - Development of Nutrition as a Science - Definition of Nutrition.
2. Carbohydrates – Definition, composition, classification, Sources, requirements, Digestion and absorption. Dietary fibre - definition soluble and insoluble fibres, sources of fibre, components, physiological effects of dietary fibre, Role of fibre in human nutrition, sources and requirements. Water - water balance, water compartment, regulation and disorders of water balance.

**UNIT-II**

1. Energy units - Calories, Joules, determination of energy value of foods, using Bomb calorimeter, gross calorific values, Physiological energy, value of foods, relation between oxygen used and calorific value, determination of direct calorimetry.
2. Relation between Respiratory quotient and energy output - Specific dynamic action of food, indirect calorimetry - Basal metabolism - definition, determination - benedict Roth basal Metabolism Apparatus - factors affecting BMR - determination of energy metabolism during work - energy requirements for various types of activities, factorial methods for calculation of the daily energy requirements of an adult for varying degrees of physical activity - recommended allowances for calories, energy requirements of adults expressed in terms of Reference man and Reference woman - ICMR committee percent calories supplied by carbohydrates, fats and proteins in average Indian diets - Energy requirements for different age groups.

**UNIT-III**

1. Lipids – Definition, Classification, Composition, sources, requirements, functions. Essential Fatty Acids (EFA) – definition, functions, sources and effects of deficiency. Characteristics of animal and vegetable fats, sterols - cholesterol - function, food sources, phospholipids - function, ketone bodies - fat requirements - food sources, dietary lipids and their relation to the causation of Atherosclerosis and Ischaemic heart disease.

2. Protein – Definition, classification, Composition, sources, requirements and functions of protein. Amino acids - Indispensable and dispensable amino acids - special function of amino acids - protein deficiency - Evaluation of protein quality - PER, BV, NPU, NPR, chemical score, mutual and amino acid supplementation of proteins.

#### **UNIT-IV**

1. Fat soluble vitamins - Vitamin A, D, E and K – functions, deficiency, sources, requirements and hyper-vitaminosis.
2. Water soluble vitamins - ascorbic acid, thiamine, riboflavin, Niacin, folic acid, Vit B-12, pyridoxine, Biotin and Pantothenic acid - Functions, deficiency, sources and requirements.

#### **UNIT-V**

1. Macro, Micro and Trace elements - calcium, sodium, potassium, phosphorous, Iron, copper, fluorine, zinc and Iodine – classification, distribution in the body, functions, sources, requirements and deficiency.
2. Selenium and Vitamin E relationship.
3. Chromium and glucose tolerance factor.

#### **REFERENCES**

1. Michael. J. Gibney et al; clinical nutrition Blackwell science , 2005.
2. Shubhangini. A. Joshi; Nutrition and Dietetics III edition, McGraw Hill Education (India) private limited
3. Srilakshmi.B; Nutrition Science, 15th edition, New Age International (P) Limited, Publishers, 2016.
4. Swaminathan. M; Advanced Text-Book on Food and Nutrition, Volume I 2nd edition. The Bangalore Printing and Publishing Co., LTD, Reprint 2015.
5. Sunetra Roday; Food Science and Nutrition, 2nd edition, Oxford University Press, 2013
6. Carol Byrd – Bredbenner; Wardlaw’s perspectives in Nutrition, 9th edition MCGraw – Hill International Edition 2013

**CORE PRACTICAL II**

**A. FOOD SCIENCE**

1. Cookery Practical's;
2. Grouping of foods - Discussion on nutritive value
3. Technique in measurement of food stuff - use of standard measuring cups and spoons.
4. Different recipes from cereals, pulses, vegetables, fruits, fleshy foods, egg, milk and milk products.
5. Beverages - preparation of stimulating, nourishing and refreshing beverages
6. Fats and oils - preparation of shallow and deep fried foods.
7. Sugar cookery - preparing recipes at different stages of sugar cookery.

**II EXPERIMENTAL FOODS PRACTICAL**

1. Cereals

Microscopic study of different starches

- a. Methods of combining starch and boiling water
  - b. Study of effects of moist heat on starch
  - c. Preparation of white sauces and soups
  - d. Gluten formation
2. Pulses - Effect of hard and soft water, alkali and acid. Cooking time of grams and dhals.
  3. Vegetables - Effect of acids, alkali, covering, steaming and pressure cooking on the different pigments and acceptability of vegetables.
  4. Fruits - Study of different methods of preventing enzymatic browning of cut fruits, pectin content of fruits.
  5. Eggs - Coagulation of egg protein - factors. Egg white foam - effect of beating, sugar, acid and temperature.
  6. Milk cookery - Coagulation of milk protein, paneer, cooking of vegetables in milk
  7. Fats and oils - comparison of smoking temperature of some fats and oils.
  8. Sugar and Jaggery - Different stages of crystallization of sugar.
  9. General visit to food Industry and Factories.

**B. HUMAN NUTRITION**

1. Qualitative tests for sugars - glucose, fructose, lactose, maltose and glucose.
2. Qualitative estimation of reducing sugar
3. Qualitative tests for proteins(Lowry's method).
4. Qualitative tests for minerals.
5. Quantitative estimation of calcium
6. Quantitative estimation of phosphorous.
7. Quantitative estimation of vitamin C.
8. Demonstration Experiments.
  - a. Estimation of total nitrogen in foods (Micro or Macrokjeldahl method)
  - b. Lipid extraction
  - c. Demonstration of Iodine value
  - d. Estimation of Iron
  - e. Qualitative tests for vitamin A
  - f. Quantitative estimation of Carotene

**ALLIED - 2**

**PAPER - 4**

**FOOD PRESERVATION**

**OBJECTIVES**

To enable the students to

1. Understand the principles of preservation.
2. Understand the type of spoilages and the various methods of preventing spoilage.
3. Learn about the methods of preservation.

**UNIT-I**

**PRINCIPLES OF FOOD PRESERVATION**

Importance and principles of food preservation, Need for preservation, types of spoilage, role of micro organism in food spoilage, prevention of food spoilage, shelf life of food products, Factors affecting shelf life.

**UNIT-II**

**PRESERVATION BY HIGH OSMOTIC PRESSURE**

High concentration of sugar, Procedure for fruit jelly and jam, fruit preserves, failure to jelly and jam to set.

**HIGH CONCENTRATION OF SALT**

Pickling and Curing of meat.

**FERMENTATION**

Types, advantages and factors affecting fermentation.

**UNIT-III**

**PRESERVATION BY USE OF HIGH TEMPERATURE**

Factors affecting heat resistance, canning procedures, spoilage of canned foods, heat sterilization, pasteurization.

**PRESERVATION BY USE OF LOW TEMPERATURE:-**

Refrigeration – Advantages, factors to be considered, common spoilage.

**FREEZING**

Difference between refrigeration and freezing, methods of freezing, steps involved in freezing, common food spoilage. Basic concepts about hurdle technology and membrane technology.

**UNIT-IV**

**PRESERVATION BY USING CHEMICALS**

Definition, classification, mode of action, mechanism.

**FOOD IRRADIATION**

Properties and safety of irradiation, advantages, mechanism permitted doses.

**UNIT-V**

**DRYING AND DEHYDRATION**

Home drying, methods of dehydration, factors in the control of drying, treatment of foods before drying, procedures after drying, intermediate moisture foods, merits and demerits, factors affecting drying.

**REFERENCES**

1. Srilakshmi. B; Food Science, 6th edition, New Age International (P) Limited Publishers, 2015.
2. Shakunthala Manay. N; Shadakshara Swamy.M; Foods Facts and Principles, 3<sup>rd</sup> edition, New Age International (P) Limited Publishers, 2014.
3. Lillian Hoagland Meyer, Food chemistry, CBS Publishers and Distributors, 2004.
4. Subbulakshmi. G and Shobha. A.U; Food processing and preservation, New Age International (P) Limited Publishers, 2014.
5. Norman. N Potter, Joseph H. Hotchkiss, Food Science, 5th edition, CBS Publishers and Distributors, 1996.
6. Sivasankar. B; Food Processing and Preservation, PHI Learning Private Limited, 2011.

**ALLIED PRACTICAL**

**A. NUTRITIONAL BIOCHEMISTRY**

1. Identification of carbohydrates (Qualitative Tests)
2. Identification of proteins (Qualitative Tests)
3. Estimation of glucose in urine by Benedict's methods
4. Blood glucose estimation.

**B. FOOD PRESERVATION**

1. Preservation of food items by the use of high and low temperatures.
2. Traditional methods of food preservation a) Drying b) Salting c) Changes during drying
3. Preservation of foods by the use of class I and class II Preservatives
4. Use of sorbic acid and sulphurdioxide as an antimicrobial preservatives.
5. Visit to Preservation Unit.



**SKILL BASED SUBJECT II**

**PAPER – 2**

**FOOD PRODUCT DEVELOPMENT AND MARKETING STRATEGY**

**OBJECTIVES**

To enable the students to

- Develop new marketable, nutritionally and economically viable food products
- Develop entrepreneurship skills for setting up small scale food industries
- Understand packaging of different food products

**Unit I - FOOD CONSUMPTION PATTERN**

Trends in Food Consumption pattern. Economical, Psychological and Sociological Dimensions of Food Consumption patterns. Trends in Social Change as a Base for New Product Development

**Unit II - INTRODUCTION TO FOOD PROCESSING AND PRODUCT DEVELOPMENT**

Food Components, Types of Food Processing, Status of Food Processing Industry in India and Scope of Growth in Future ,Principles and Purpose of New Product Development, Product Design and Specifications.

**Unit III - RECIPE DEVELOPMENT**

Traditional Foods, Weaning Foods, Convenience Foods, RTE, RTS, Extruded foods, IMF Foods, Speciality Products, Health foods, Nutritional Supplements, Functional Foods, Nutraceuticals and Designer Foods, Sports Foods, Foods for Defence Services, Space foods.

**Unit IV - TESTING, EVALUATION AND PACKAGING OF PRODUCTS**

Standardization, Portion size, Portion Control, Quantity Cooking, Shelf Life Evaluation- Sensory and Microbial Testing of Processed Foods, Nutrient Analysis. Suitable Packaging Materials for Different Foods, SWOT Analysis

**Unit V - FINANCIAL MANAGEMENT AND MARKETING OF FOOD PRODUCTS**

Institutional Support (Training and Finance) for Entrepreneurship Development. Financial Institutions (Central and State Government) banks/Funding Agencies, Financial Accounting Procedures, Book Keeping, Market Research, Marketing Strategies, Cost

## **B.Sc. Nutrition, Food Service Management and Dietetics: Syllabus (CBCS)**

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Calculation , Advertising Methods, Product sales, Product License, Legal specifications, Consumer Behaviour and Food Acceptance.

### **REFERENCES**

1. Sudhir Gupta (2007) Handbook of Packaging Technology, Engineers India Research Institute, New Delhi
2. Khanaka, S.S., Entrepreneurial Development, S. Chand and Company Ltd, New Delhi, 2006.
3. Suja, R. Nair(2004) Consumer Behaviour and Marketing Research, 1<sup>st</sup> Edition, Himalaya Publishers.
4. Hmacfie,(2007) Consumer led Food Product Development, Weedhead Publishing Ltd., UK
5. Fuller, Gordon, W( 2005) New Food Product Development, 2<sup>nd</sup> Edition, CRC Press, Boca Raton, Florida.
6. Schaffner .D,J, Schroder , W.R.(2000)Food Marketing and International Perspectives, Web/McGraw Hill Publication

**NON-MAJOR ELECTIVE  
PAPER - 2  
NUTRITION FOR THE FAMILY**

**OBJECTIVES**

To enable the non major students

1. Understand the basic concepts of nutrition.
2. Understand the nutritional demands in various stages of life cycle.
3. Acquire skills in planning adequate meals in different stages of life cycle.

**UNIT I**

Food groups- basic five, nutritional classification of foods - energy yielding, body building and protective foods - Basic principles of Meal planning – balanced diet-meaning, food guide pyramid.

**UNIT II**

Nutritional needs during Pregnancy and Lactation– dietary guidelines; general dietary problems, Common Nutritional related problems and complications. Nutrition during Lactation - Dietary guidelines for lactating women, Composition of Breast Milk.

**UNIT III**

Nutrition during Infancy and Preschool age - dietary guidelines for infants, advantages of breast feeding, disadvantages of bottle feeding; Weaning foods (definition) and types of supplementary food. Nutritional needs of Pre-school children, factors to be considered while planning meals for pre-school children. Food habits of Pre School Children.

**UNIT IV**

Nutrition for School children and Adolescence - dietary guidelines, factors considered in planning packed lunch. School lunch feeding problems. Nutrition during Adolescence – general dietary guidelines; Dietary Problems (Eating Disorders)

**UNIT V**

Nutritional needs of Adults and Old Age - dietary guidelines for adults. Nutrition during Old age - physiological changes in ageing, psycho-social factors affecting food intake. Nutrition modification in Diet.

**REFERENCES**

1. Mahan,L.K &Arlin.M.T, “Krause’s Food,Nutrition and Diet Therapy”, 11th Edition, W.B. Saunder Company, London, (2000).
2. Seleststein. S. & Sharlin.J, “Life Cycle Nutrition”, Jones & Bartlett publications,(2008).
3. Begum. M. R, “A Textbook of Food, Nutrition & Dietetics”, 3rd edition, Sterling publications Pvt. Ltd., (2008).
4. Srilakshmi. B, “Nutrition Science”, 5th edition, New Age International Pvt.Ltd., (2008).
5. Mudambi S.R and Rajagopal M.V, “Fundamentals of foods and Nutrition”, 3rd edition, New Age International Pvt. Ltd., (1997).
6. Pasricha.S, “Some Therapeutic Diets”, 5th edition, National Institute of Nutrition,(2004).
7. ICMR-Nutritive value of Indian Foods, National Institute of Nutrition, Hyderabad, (1989).
8. Mudambi. S.R, Rao. S.M, & Rajagopal.M.V, “Food Science”, New Age International Pvt. Ltd. Publishers, New Delhi, (2007).

**SEMESTER V**

**PAPER – 5**

**DIETETICS-I**

**OBJECTIVES**

To enable students:

1. To obtain knowledge on the role of diet in disease conditions.
2. To gain experience in planning, preparing and serving therapeutic diets.

**UNIT – I**

**DIET THERAPY :** - Definition, purpose and principles of a therapeutic diet, factors to be considered in the modification of normal diet into therapeutic diets. Types of hospital diet – Clear fluid, full fluid, soft, light, bland and regular diet. Special feeding methods – tube feeding, parenteral nutrition.

**DIETITIAN:** – Role of dietitian in managing hospital dietary.

**UNIT – II**

**DIABETES MELLITUS:-** Prevalence, Types – Type-I, Type-II, Malnutrition Related Diabetes Mellitus, Gestational Diabetes Mellitus, Etiology, symptoms, nutritional requirements and dietary management of Diabetes Mellitus – (Glycemic Index, Food exchange list) and complications.

**UNIT – III**

**CARDIOVASCULAR DISEASE:-** Prevalence, Pathogenesis, Symptoms, risk factors and modification of diet in cardiovascular disease – Atherosclerosis, Hypertension and Hypercholesterolemia .

**UNIT – IV**

**DIET IN INFECTIONS AND FEVERS:-** Host defense mechanisms causes and general dietary conditions of fevers – Symptoms and signs of Typhoid, Influenza, Malaria, Tuberculosis and pneumonia.

**UNIT – V**

**DISEASES OF THE GASTRO INTESTINAL TRACT:-** Causes, Symptoms and Dietary management of Gastritis, Peptic ulcer, diarrhea, constipation, Ulcerative colitis, diverticulosis, Irritable Bowel Syndrome, malabsorption syndrome – Crohns Disease, Sprue/ Tropical Sprue, hemorrhoids, ulcerative colitis.

**REFERENCES**

1. Michael. J. Gibney etal; Clinical Nutrition Black well Science, 2005.
2. Shubhangini. A. Joshi; Nutrition and Dietetics, 3rd edition, McGraw Hill Education (India) Private Limited.
3. Srilakshmi . B; Nutrition Science, 15th edition, New Age International (p) Limited, publishers, 2016.
4. Swaminathan. M; Advanced Text-Book on Food and Nutrition, Volume I and 11 2nd Edition, The Bangalore printing and publishing co., LTD, Reprint 2015.
5. Sunetra Roday; Food Science and Nutrition, 2nd edition, Oxford University press, 2013.
6. Carol Byrd – Bredbenner; Wardlaw’s perspectives in Nutrition, 9th edition McGraw – Hill International Edition, 2013.

**JOURNALS**

1. Journal of American Dietetics Association, American Dietetic Association, U.S.A.
2. Indian Journal of Nutrition and Dietetics – Avinashilingam Institute for Home Science and Higher Education Coimbatore.

**PAPER – 6**

**NUTRITION THROUGH LIFE CYCLE**

**OBJECTIVES**

To understand the role of Nutrition in all stages of life.

**UNIT-I: RECOMMENDED ALLOWANCES**

RDA for Indian basis for requirement, computation of allowance based on energy expenditure, components of energy expenditure. General concepts about growth and development through different stages of life.

**UNIT-II - NUTRITION IN INFANCY, PRESCHOOL AND SCHOOL GOING AGE :**

- a. **Infancy** - Rate of growth, weight as the indicator, Nutrition allowances for the infants. Breast feeding. Weaning foods suitable for infants. Premature infant and their feeding, infant formulas. Lactose intolerance.
- b. **Preschool** - Growth and development of preschool children, Food habits and nutrient intake of preschool children. Dietary allowances and supplementary foods. Malnutrition in pre school children. Feeding programmes for pre school children.
- c. **School going age** - Physical development, Nutritional status of school children, school lunch program, factors to be considered in planning a menu, food habits and nutritional requirement, packed lunch.

**UNIT-III - NUTRITION DURING ADOLESCENCE AND ADULTS:**

- a. **Adolescence:** Changes of growth characteristics of adolescents. Nutritional needs and nutritional problems of the adolescents (eating disorders).
- b. **Adults:** Nutrition for adults. Basis for requirement. Nutrition and work efficiency.

**UNIT-IV - NUTRITION IN PREGNANCY**

ICMR Nutrient allowances, Dietary guidelines. Common nutrition related problem of pregnancy, food plan for pregnant women. Lactation- physiology, hormonal control and reflex action, efficiency of milk production, composition of breast milk and problems encountered during breast feeding. Current scenario in the field of Nutrition in pregnancy and Lactation.

**UNIT-V - GERIATRIC NUTRITION**

Nutrition allowances - Dietary Guidelines - Nutrition and work efficiency modifications in diet. Physiological changes in aging – psycho-social and economical factors affecting eating behavior. Effects of ageing on nutritional health.

**REFERENCES**

1. Mahtab S.Bamji, Prasad Rao, N.Vinodini Reddy; Textbook of Human Nutrition, Second Edition Oxford and IBH Publishing Co. Pvt .Ltd, 2003.
2. Judith E. Brown., Nutrition Now, 2nd edition, West / Wadsworth west / Wadsworth, An International Thomson publishing company, 1998.
3. Nutrient Requirement and Recommend Dietary Allowances for Indians by Indian council of Medical research, National Institute of nutrition, Hyderabad.
4. Gordon. M. Wardlaw et.al; Contemporary Nutrition, 2nd edition, Publishing by Mosby, 2004.
5. William's; Nix; Basic Nutirtion and Diet therapy, 14th edition, Publishing by Mosby, 2013.
6. Srilakshmi. B; Dietetics, 7th edition,New Age International (P) Limited Publishers, 2014.
7. Nutrition – A Life Cycle Approach – Ravinder Chada, Tulkit Mathur - 2004



**PAPER – 7**

**COMMUNITY NUTRITION**

**OBJECTIVES:**

**To enable the students to:**

1. Understand the malnutrition problems and its prevalence in India
2. Gain knowledge on the national effort in combating malnutrition
3. Appreciate the national and International contributor towards national improvement in alleviating nutrition problems.

**UNIT-I**

Nutrition and Health in National Development. Concept of Community, Types of Community, Factors affecting the health of community. Malnutrition - Etiology , symptoms, Prevalence of malnutrition, factors contributing to malnutrition - Under nutrition and Over nutrition, balance between food and population growth.

**UNIT-II**

Nutritional problems confronting our country - PEM - Prevalence, classification - Kwashiorkor and Marasmus - etiology, symptoms, pathological changes, biochemical changes, Anaemia - Prevalence, etiology, symptoms, prophylaxis programmes.

IDD - Etiology, Prevalence, symptoms, prophylaxis Fluorosis - Etiology, prevalence, symptoms, prophylaxis.

Vitamin A deficiency - Etiology, prevalence, symptoms, prophylaxis.

**UNIT-III**

Methods of assessment of Nutritional status – sampling techniques – identification of risk group. Direct assessment – anthropometry, biochemical estimation, clinical, and diet survey. Indirect assessment - Food balance sheet, Agricultural data, Ecological parameter and vital statistics, use of growth chart.

**UNIT-IV**

Nutrition policy and programmes – National Nutrition policy – need for nutrition policy, policy strategies and their implementation - ICDS, Noon Meal Programme, FAO, WHO, UNICEF, CARE, ICMR, ICAR, CSIR, NIN, CFTRI, National Nutrition Policy, National Nutrition surveillance system, National Anaemia prevention, Prevention of Night Blindness, National Iodine prophylaxis programme, NGO.

**UNIT-V**

Strategies to combat Nutritional problems – fortification, enrichment, supplementation and Immunization programmes. Nutrition Education - Meaning, Scope, Methods - Planning, conduct of evaluation of Nutrition education Programme.

**REFERENCES**

1. Agarwal A.N, Indian Economy, Problems of development and planning, Publications, 1981.
2. Park J.E. and park K. Text book of preventive and social medicine, Publications, 1994.
3. B. Srilakshmi, Nutrition Science New Age International (CP) Ltd, New Delhi, 2002.
4. Mahtab, S. Bamji, N. Pralhad rao, Vinodini Reddy, Text book of Human Nutrition, Oxford and IBIT Publishing co Pvt. Ltd, New Delhi, reprint 1999.
5. Shukla,P.K., Nutritional problems of India,1982.
6. Dietary guidelines for Indians, ICMR, NIN, Hyderabad 2010.
7. Bamji, M.S, Prahalad Rao N, Reddy V, Textbook of Human Nutrition II Edition, Oxford and PBH publishing Co. Pvt. Ltd, New Delhi 2004.
8. Jelliffe, D.B: Assessment of Nutritional Status of the community. World Health Organization.

**ELECTIVE**

**PAPER – 1**

**HOSPITAL FOOD SERVICE ADMINISTRATION**

**OBJECTIVES:**

To enable students to

1. Gain knowledge in hospital functions and administration
2. Acquire skills in maintaining medical records
3. Understand the management of resources in hospitals

**UNIT I**

Hospital based health care and its changing scenario, Effects of globalization on health care, concepts of corporate hospitals in developing countries, infrastructure and lay out of an ideal corporate hospital, functioning of modern, hospital and changing needs of patients, hospitality in hospital care

**UNIT II**

Patient Care Services Patient Admission / discharge, cafeteria and dietary services, front office services, housekeeping services, blood bank, diagnostic services, lab, physiotherapy, pharmacy operation theatre, outpatient and inpatient ward –admission

**UNIT III**

Principles of Hospital management Managerial activities for effective hospital functioning duties and responsibilities of hospital managers, qualities of office managers, effective inter and intra departmental co-ordination, understanding functioning of corporate multi specialty hospital

**UNIT IV**

Marketing and Material management, Human resource management, managerial accounting and financial management, importance of material management, principles of material management, inventory management. Types of computer systems used for reservation systems, point of sale systems (POS) and property management systems.(PMS)

**UNIT V**

Hospitality in hospital care Management of dietary department, diet planning for hospital diets, purchasing, storage and quantity food production, patient compliance, food production, serving to patient- tray and trolley service, plate waste management, washing and garbage disposal.

**REFERENCES:**

1. Sudhir Andrews, Front Office Management and Operations, 2008, Tata Mc Graw – Hill Publishing Company Ltd.
2. Sakharka B M, Principles of Hospital Administration and Planning, 2009, 2nd Edition, Jaypee Brothers Medical Publishers (p) Ltd.
3. Sherry Glied and Peter Smith, The Oxford Handbook of Health Economics, 2011
4. Jan Abel Olsen, Principles in Health Economics and Policy, 2009, Oxford University Press.
5. Mohinder Chand, Managing Hospitality Operations, 2009, 1st Edition, Anmol Publications Pvt. Ltd. New Delhi.
6. Goel S.L, Health Care System and Hospital Administration, 2009, Vol.7, Deep and Deep Publications Pvt. Ltd.
7. Kalkar S.A, Hospital Information Systems, 2010, Published by Asoke K.Ghosh, PHI Learning Pvt. Ltd.
8. <http://eurpub.oxfordjournals.org/content>.

**SKILL BASED SUBJECT**

**PAPER – 3**

**INTERNSHIP**

**Internship:**

A phase of training where in a graduate is expected to conduct actual practice in a hospital industry for a period of 30 Days so as to acquire job oriented skills

**Assessment:**

Interns shall maintain a record book which shall be verified and certified by the training authority under whom he or she works during his/her internship period.

An objective evaluation of his/her knowledge, skills and attitude during training will be recorded by the center in-charge and monitored by faculty in-charge and marks shall be allotted accordingly.

Hospital authority	-	75
Internal Assessment & Viva Voce	-	25

**SEMESTER VI**

**PAPER – 8**

**DIETETICS -II**

**OBJECTIVES:**

To enable students to

1. Gain knowledge about principles of diet therapy and different therapeutic diets.
2. Develop aptitude for taking up dietetics as a profession

**UNIT I**

**DISEASES OF LIVER, GALL BLADDER AND PANCREAS** – Etiology, clinical symptoms and modification of diet in disease of Liver and Gall bladder.

a) Hepatitis , b) Cirrhosis, c)Hepatic Encephalopathy d)Cholecystitis e) Cholelithiasis f) Pancreatic Surgery – Causes and Dietary Management.

**UNIT II**

**OBESITY AND UNDERWEIGHT** – Etiology, Assessment of Obesity and modification of diet in Obesity and Underweight.

**UNIT III**

**KIDNEY DISEASES** - Etiological factors, Etiology and modification of diet in disease of the Kidney-Glomerulo Nephritis, Nephrosis ,Acute and Chronic Renal Failure ,Dialysis ,Urinary Calculi.

**UNIT IV**

**CANCER, HIV/AIDS** - Risk factors ,symptoms ,Nutritional problems of cancer therapy and modification of diet in cancer ,role of antioxidants in cancer. Stages of HIV Infections, Medical Nutritional Therapy.

**UNIT V**

**FOOD SENSITIVITY AND GENETIC DISORDERS**

**FOOD SENSITIVITY** - Types of reaction ,symptoms ,Diagnosis and treatment.

**GENETIC DISORDERS** - Symptoms and management of diet in phenylketonuria , Galactosemia , Fructosuria.

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**PAPER - 9**

**FOOD SERVICE MANAGEMENT**

**OBJECTIVES:**

1. To create an awareness on the organizational aspect and functioning of different types of food service institutions.
2. To develop managerial skills among the students.
3. To understand the space allocation and arrangement of food service units .

**UNIT- I**

- a) **FOOD SERVICE INDUSTRY:** Definition – types of catering- Hotel, Motel, Restaurant, Cafeteria and chain hotels.
- b) **WELFARE** – Hospital, School lunch, Residential establishment and Industrial catering.
- c) **TRANSPORT** – Air, Rail, Sea and Space, Miscellaneous – Contract and outdoor.

**UNIT – II: PHYSICAL PLANT AND FOOD PURCHASE**

- a) Layout of kitchens, types of kitchens – Planning of Receiving preparation, storage and service area with relevant too spacing.
- b) **FOOD PURCHASE-** Procedures and Factors involved in the selection of food.

**UNIT – III: QUANTITY FOOD SERVICE AND EQUIPMENTS**

- a) **QUANTITY FOOD SERVICE:** Definition, objectives, styles of service-waiter service, self – service, vending. Mechanics of waiter service.
- b) **EQUIPMENT:** Classification, factors involved in selection, use and care of major equipments, traditional and modern equipment.
- c) **Menu planning:** Origin of menu, importance of menu planning. Types of menu- table d’hote menu, a la carte,Dujour, theme, static, cycle. French classical menu. Use of menus, construction of menus,Menu Design, Factors affecting menu planning.

Standardisation of Recipes and portion control.

**UNIT – IV**

- a) **MANAGEMENT-** Definition, principles, Functions and tools of management, qualities of a good leader, styles of leadership.
- b) **RESOURCE MANAGEMENT** – Money, Time, Energy, Computer applications in menu planning.



**UNIT – V**

**PERSONNEL MANAGEMENT-** Recruitment, selection and induction. Financial management- Cost control- methods of food cost control, Book- keeping; advantages of the double entry system.

**SANITATION AND SAFETY –** Sanitation of Plant and Kitchen Hygiene, Personal Hygiene, First aid principles and practice, Health and Safety at work. Use of fire extinguishers.

**REFERENCES**

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**PAPER - 10**

**HUMAN DEVELOPMENT & COUNSELLING**

**OBJECTIVES:**

1. To understand development aspects (both normal and exceptional) from conception to old age as they can be guided effectively.
2. To have complete knowledge about the behavior pattern of the individual and various factors influencing them.

**UNIT-I**

1. The concept of development and growth - principles governing growth and development, developmental tasks of different stages.
2. Stages of Life span - conception, infancy, early childhood, late childhood, adolescence, adulthood, middle age and old age.

**UNIT-II**

1. Prenatal Development - Conception, test tube baby, Periods of prenatal development - signs of pregnancy.
2. Prenatal care - Management of normal pregnancy - hygiene, diet and medical supervision and hazards during pregnancy.
3. Labor - signs of labor, stages of labor - types of birth, multiple pregnancy.
4. Post-natal care, prevention of gynecological complications.
5. Adjustment of the newborn to temperature, breathing, feeding and elimination.

**UNIT-III**

1. Infancy (Birth to 2 years) - Development - physical and motor, social, emotional, cognitive and language, Minor ailments.
2. Effect of stimulation - care of infants, feeding, toilet training, bathing, clothing, sleeping and immunization, prevention of accidents, importance of mothering and emotional growth. Importance of psychological needs.

**UNIT- IV**

1. Early childhood (preschool stage 2 - 6 years) - Physical and motor development, emotional, social, cognitive and language development, creativity, importance of play, importance of family relationship, behavior problems - causes and treatment.
2. Importance of preschool education.
3. Late childhood (Elementary school period 6 - 12 years) - Developments - physical, social, emotional, cognitive and language. Sex Education.
4. Children with special needs - identification and rehabilitation.
- 5.

**UNIT-V**

1. Adolescence (12 - 18 years) Physical, emotional, intellectual and motor development, personal adjustment and maladjustment. Delinquency - causes, prevention and rehabilitation. Drug addiction and alcoholism - rehabilitation.
2. Adulthood (18 - 60 years) - Characteristics and developmental tasks. All aspects of development and vocational development.
3. Old age (60 years and above) - Physical and psychological changes, problems of the aged, family attitude towards the aged, place of the aged in Indian society.

**REFERENCES**

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**CORE PRACTICAL - III**

**DIETETICS-I & NUTRITION THROUGH LIFE CYCLE PRACTICAL**

**DIETETICS-I**

Planning and preparing of diets for the following conditions/ stages.

1. Clear fluid, full fluid and soft diet.
2. Diet in fever – Typhoid, tuberculosis.
3. Diet in atherosclerosis and hypertension.
4. Diet in ulcer, diarrhea and constipation.
5. Diet in diabetes mellitus with and without insulin.

**NUTRITION THROUGH LIFE CYCLE PRACTICAL**

1. Menu planning and food exchange list.
2. Nutritional and food requirements to meet the needs of the following.
  - a. Infant and Children
  - b. School children
  - c. Adolescent
  - d. Adult
  - e. Old people
3. Nutritional and food requirements to meet the special needs of
  - a. Expectant women.
  - b. Lactating women.

**CORE PRACTICAL –IV**

**A. FOOD SERVICE MANAGEMENT**

1. Visit to well-organized food service units

Hostel, hotel, restaurant, Industry, hospital Transport.

2. Table setting and service-appraising and drawing silver cutlery and crockery Folding of Napkins – Laying of table cloth, table mats – Arrangement of cover and table – appointment according to the menu – serving food at the table clearing of the table.
3. Standardization of any 3 selected quantity recipes and their preparation. Calculation of nutritive value, cost per serving – size of serving.
4. Quantity Cookery: Preparation of South Indian, North Indian and Western menu for 25 members.
5. Organizing, preparing and serving of one special meals for 50 members.

**B. DIETETICS - II**

Planning and preparing of diets for the following conditions / stages.

1. Diet in obesity and underweight.
2. Diet in hepatitis and cirrhosis of liver.
3. Diet in Nephritis and Nephrosis.
4. Diet in Cancer.
5. Dietary internship program for a month.

**ELECTIVE II**

**PAPER – 2**

**FOOD STANDARDS AND QUALITY CONTROL**

**OBJECTIVES**

To enable students

- To gain knowledge on food safety and food laws.
- To study about quality control and common food standards.

**UNIT-I**

Quality Control: Objectives, Importance, functions of quality control, stages of quality control in food industry.

Food Quality Assurance: Design of company quality assurance program, Microbiological concerns.

Managing quality in supply chain and marketing of food products.

**UNIT-II**

Government Regulations In Quality Control: FAO/WHO codex Alimentarius commission, PFA, AGMARK, BIS, FPO, fair average quality (FAQ) specification for food grains, ISO 9000 series.

HACCP: Background, current status, structured approach, principles, benefits and limitation.

Consumer Protection Act (CPA)

**UNIT-III**

Food Standards: Cereals and products - bread, biscuits, cakes products.

Food Packaging: Food packaging and labelling various methods. Recent trends in Packaging and labelling.

Fruits Products: Jam, juices, squashes, ketchup, sauce.

Oils and Fats: Coconut oil, groundnut oil, palm oil, sunflower oil, vanaspati.

Milk and Products: Skimmed milk powder, partly skimmed milk powder, condensed sweetened milk. Other products - coffee, tea, sugar, honey, toffees.

**UNIT-IV**

Food Safety: Meaning of food safety

Importance of Food: Quality and safety for developing countries.

Patent: Definition, requirements, patent law in India, administrator, need for

patent system, advantages, precautions to be taken by applicants, patent procedures, non-patentable.

Food Hazards: Physical, Chemical, Biological hazards associated with food types. Effect of processing and storage on microbial safety.

#### **UNIT-V**

Food Adulterator: Adulteration of food - common adulterants and tests detect common adulterants.

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**ELECTIVE**

**PAPER – 3**

**NUTRACEUTICALS AND NUTRIGENOMICS**

**OBJECTIVES**

To enable the students to

1. Gain knowledge on Nutraceutical and Nutrigenomics
2. Study the applications of Nutrigenomics in health and disease.

**UNIT I - NUTRACEUTICALS AND FUNCTIONAL FOODS**

Definition of functional and traditional foods, nutraceuticals, designer foods and pharma foods, history of functional foods, components of functional foods, foods containing nutraceuticals and classification of nutraceuticals – based on plant sources, mechanism of action and chemical nature

**UNIT II - ROLE OF DIETARY SUPPLEMENTS AND NUTRACEUTICALS IN HEALTH AND DISEASE**

Concept of dietary supplements, sources and functions of phytochemicals with suitable examples, FOSHU foods – concepts, regulatory aspects

**UNIT III - PROBIOTICS AND PREBIOTICS**

Human gastrointestinal tract and its microbiota, functions, concept of probiotic, prebiotics and symbiotics; applications of probiotics in human nutrition

**UNIT IV - NUTRIGENOMICS**

Definition of nutrigenomics, gene expression – transcription, translation, post translational modification, nutrition in the omics era- elementary concepts on epigenetics, transcriptomics, proteomics, metabolomics; genetic variation and nutritional implications

**UNIT V - NUTRITION AND GENE EXPRESSION AND NUTRIGENOMICS AND COMPLEX DISEASES**

Nutrient control of gene expression – amino acids, nucleotides, basic concepts of nutrigenomics and complex diseases – diabetes, cancer and obesity

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**SKILL BASED SUBJECT IV**  
**PAPER - 4**  
**PERSPECTIVES OF HOME SCIENCE**

**OBJECTIVES**

To enable the students to

- Understand the concept and scope of home science and its components.
- Enable the students to gain knowledge on different areas of home science
- Know the trends and job opportunities in home science

**UNIT I - MEANING AND COMPONENTS OF HOME SCIENCE**

Meaning of Home Science Education- Philosophy of Home and Family- Components of Home Science-Career Perspectives- Its Relation to other Disciplines- Science and Humanities

**The Home Science Association of India-** History and Objectives, Achievements of the Association- Representation in National Bodies

**UNIT II - INTERIOR DESIGN AND RESOURCE MANAGEMENT AND TEXTILE AND CLOTHING**

Concept of Interior Design-Importance of Good Taste, Components of an Artistic Interior- Resource Classification, Methods of Conserving Energy, Importance and Type of Goals, Values- Types, Value to be Imbibed by Youth.

Fiber-Classification: Nature. Synthetic, Yarn-Definition, Types- Ply, Cable, Novelty, Fabric: Construction Method- Weaving Basic Steps, Knitting and its Importance, Nonwovens and Types, Clothing: Origin, Clothing Theory, Selection of Clothing, Clothing Budget, Laundering and Storing-Cotton, Wool, Silk and Delicate Fabrics.

Basic concepts of Home management and steps – Basic Characteristics of Resources, Decision making, Work simplification.

**UNIT III – HOME SCIENCE EXTENSION EDUCATION**

Meaning , Definition, Objectives, Philosophy, Principles of Extension Education, Extension as the Third Dimension of Higher Education, Home Science Extension Service at Various Levels- Village, Block and District Level, Role of Home Science Extension in Rural And National Development- Welfare Programme- National, Social Assistance Programme (NSAP).

Member of Parliament Local Area Development Scheme (MPLADS), Member of Legislative Assembly Area Development Scheme (MLAADS), Rajiv Gandhi Rehabilitation Package (RGAP), Mahatma Gandhi National Rural Employment Scheme (MNRES)

#### **UNIT IV - HUMAN DEVELOPMENT**

Conception-Pre Natal Development, Pre and Post Natal Care, Growth and Development During Childhood and Adolescence, Characteristics of Adulthood, Characteristics and Problems of Elderly and Emerging Trends in Parenting.

#### **UNIT V - FOODS, NUTRITION, DIETETICS AND FOOD SERVICE MANAGEMENT**

Classification of Foods according to Function and Origin, Food Groups- Balanced Diet- Meaning and Importance of Balanced Diet, Meal Planning, Macro and Micro Nutrients of Foods- Introduction of Dietetics- Principles of Diet Therapy.

Aims, Objectives and Classification of Commercial and Non Commercial Food Service- Operations and Functioning of Commercial and Non Commercial Food Service, Indian Cuisines and their Features, Setting up a Cover and Simple Service.

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