

**SYLLABUS**  
**FOOD AND NUTRITION**  
**(P.G. std)**

**I. ADVANCED HUMAN PHYSIOLOGY**

**UNIT-1:**

**General Physiology and Blood**

Blood – Composition – functions cell – functions

**UNIT-2**

**Cardiovascular Physiology and Respiration:**

Cardiovascular regulatory mechanism and homeostasis circulating body fluid - ECG interpretation, Angioplasty, Echocardiogram.

**Respiration:**

Respiratory organs, Pulmonary function, vital capacity, gaseous transport in lungs and tissues. Respiratory regulation.

**UNIT-3:**

**Endocrine System and Gastrointestinal Physiology**

Pituitary, Thyroid, Pancreas, adrenal Medulla, adrenal cortex – Enzymes – Hormones – functions.

**Gastrointestinal Physiology :** Digestion, absorption, regulation and functions.

**UNIT:4**

**Renal Physiology and Reproductive System.**

Kidney – Renal Function

Skin – Function

Development of reproductive organs

Reproductive Function – Male, Female – organs – Development of foetus.

**UNIT:5**

**Nerve Muscle Physiology, Central Nervous system and Special Senses.**

Function – types – Immune system antigen – antibody reaction, lymphocyte – role – cell mediated immunity, innate & acquired immunity.

Special senses – Functions & Physiology.

**II. BIOCHEMISTRY**

**UNIT-1:**

**Carbohydrates:**

Classification, synthesis, structure, distribution & Characteristics Functions, digestion and absorption, metabolism.

**Energy:** BMR, direct & indirect calorimetry, energy pathways.

**UNIT-2**

**Lipids:** Composition, synthesis, Structure, Classification, Characteristics & Functions, digestion & absorption, Metabolism.

**UNIT-3**

Proteins and amino acids – Nucleic acids – Nucleotides, Composition, Synthesis, Structure, Classification, Functions, digestion & absorption, Metabolism genetic Code.

**UNIT-4**

**Vitamins, Minerals and Water**

Types – Water soluble, Fat Soluble absorption, Storage, Transportaion, Functions.

Requirement and dietary sources, Deficiency.

Water – Electrolytes – acid base balance – PH

## UNIT-5

Antioxidants, Enzymes and Coenzymes  
Hormones – Hemoglobin – Bilirubin  
Inborn Errors of metabolism  
Phenylketonuria – Tyrosinuria – Homocystinuria etc.

## **III. FOOD SAFETY AND FOOD MICROBIOLOGY**

### UNIT-1

Microbiology of foods – Micro organisms important in food Microbiology – moulds, yeasts, Bacteria, viruses, algae, Protozoa - Morphology Characteristics, Classification etc.  
Contamination of foods – from plants, fruits, animals, sewage, soil, water, air during handling and processing.

### UNIT-2

Principles of Food Preparation.  
Asepsis, removal of Microorganisms

Preservation: High temperature, Low temperature drying, by use of Food additives, radiation.

Sterilization:

- i) Application of dry heat, burning, flaming and hot air oven.
- ii) Application of Moist heat – boiling, Pasteurization, steam Sterilizer & autoclave.

Disinfection:

Methods of disinfection, natural, Physical and Chemical.

### UNIT-3:

- Contamination, Preservation and Spoilage of foods.
- Cereal grains and meals, flours, Bread, cakes etc.
  - Sugar & Sugar Products
  - Vegetables and fruits
  - Meat and Meat Products
  - Fish, Seafood, eggs, Poultry
  - Milk & Milk Products & Miscellaneous Foods,
  - Food fermentation.

### UNIT-4

Food borne illness – Bacterial  
Food borne Poisonings, injections, intoxicants – Non bacterial  
Mycotoxins, Viruses, Rickettsia, Food borne parasites, seafood toxicants, poisoning by chemicals.

### UNIT-5:

Food Sanitation and Hygiene  
Bacteriology of water, Waste disposal, HACCP,  
Health of Employees  
Control Agencies – international, Federal, State agencies, and other NGOs.  
Allergy & Hypersensitivity  
Allergy types like idiosyncrasies, allergy of infection  
Contact dermatitis and drug allergy.  
Hypersensitivity – Definition – anaphylaxis and serum sickness.

## **IV. Food facilities Layout and Equipment and Food Service Management.**

### UNIT-1

#### Planning of Food Services:

- a) Consideration of location, building interiors, financial restrictions and space limitations.  
Layout design depending on the type of Food service.
- b) Installation of equipment – Planning according to different Food Service.  
Noise Control – Ventilation – adequate water Supply.

#### Functional Equipment:

- a) Insulation materials, energy sources for operation of equipment.
- b) Design, selection, purchase, Principles of operation and care of major equipment, small equipment and tools in the food service institution.

### UNIT-2

- a) Kitchen Equipment
  - For food storage (Coolers, refrigeration, walk in freezers, etc)
  - Pre preparation Equipment
  - Cooking utensils like steam boilers
  - Food service equipments
  - Dishwashing Equipments
  - Cleaning equipment
- a) Financial Investment on physical facilities
- Maintenance & repairing equipment – AMC

### UNIT-3

- a) Review of different types of Institutional Food Service operation – Classification based on function – profit oriented & Service oriented.
- b) Planning and setting up a food service unit.
- c) Food Selecting purchasing, storage – Specification
- d) Meal planning – Menu selection, types of menu principles.

### UNIT-4

- a) Quantity Food production – Planning & control - Kitchen production
- b) Management and organization
- Leadership & its qualities, staff planning and Management.
- Hygiene and sanitation and safety
- Fuels types – advantages – disadvantages

### UNIT-5

Personnel functions – work Productivity  
Entrepreneurship and Food service management.

## **V. APPLIED STATISTICS AND RESEARCH METHODOLOGY**

### UNIT-1

- a) Fundamentals and diagrammatic graphic representation of data.  
Bar chart, pie diagram, Histogram, frequency polygon & curves, cumulative frequency curves – ogives etc.

#### Interpolation & Extrapolation

- b) Measures of Central tendency & variability – mean, median, mode.  
Measures of dispersion – Range, quartile deviation.  
Variance and standard deviation  
Relative measures of dispersion.  
Concepts of skewness and kurtosis

### UNIT-2:

- a) Probability concepts – rules and correlation methods.
- b) Association of attributes – meaning of correlation
- c) Tests of significance  
(Meaning and interpretation of coefficients)

Shell hypotesis – Calculation of 't' test - critical ratio – chi- Square. Testing hypothesis – proportion & means, Large samples – Small samples.  
F distribution – testing and analysis of variance

### UNIT-3

- a) Basic concepts of Research methodology  
Theory, hypothesis, purpose & techniques
- b) Methods & tools of Research
- c) collection of data.  
Quantitative & Qualitative study by different techniques

### UNIT-4

- a) Sampling – Pilot study – concept of sampling – Relationship between sample size and standard error.
- b) Sample designs – methods of sampling etc
- c) classification and tabulation of data.

### UNIT-5

- a) Experimental and Quasi experimental research – principles of experimental research variables.  
b) Research Ethics  
ICMR guidelines for human subjects and animals.

## **VI. Advanced Food Science**

### UNIT-1:

- a) Cereals and Pulses  
Structure, composition, processing, nutritive value of raw and cooked products.
- i) Rice and rice products, starch cookery.
- ii) Wheat & Wheat products.
- iii) Baked Products, other cereal food – corn oats, ragi.
- iv) Pulses – toxic constituents  
b) Sugar & Jaggery  
Types, nutritive value, properties – Manufacture Sugar cookery.

### UNIT-2

- a) Vegetables and fruits
- i) Composition – effect of cooking – on pigments, Polyphenols
- ii) Vegetables and fruit products - picking processing, preservation and Nutritive value analysys
- iii) Changes during cooking
- iv) Cooking methods
- b) Browning reactions in foods  
Enzymatic and non-enzymatic  
Enrichment & fortification - objectives & methods.

### UNIT-3

- a) Fleshy Foods  
Meat & meat products  
Egg & Poultry  
Fish & Seafood  
Selecting, processing, preservation, transportation Composition and nutritive value.  
Changes during cooking and methods of hastening cooking.

### UNIT-4

- Nuts and oilseeds, Fats and Oils, Milk and Milk products.
- Types, Composition, properties, processing
  - Toxin constituents and nutritive value
  - Changes during cooking & storage
  - Emulsions - role of fats in cookery

#### UNIT-5

Post Harvest technology:

- Bio fertilizers – its importance in enhancing nutritive value.
- General methods of food grains, Vegetables, fruits
- Food Microbiology
- Sources of contamination of foods.

### **VII. Community Nutrition**

#### UNIT-1

Nutrition and National Development

Human life cycle – RDA for Indians.

National organizations – state Nutrition councils

And Beauforeas concerned with food and nutrition.

Health Education Boards, Social Welfare Boards and NGOs.

#### UNIT-2:

Assessing the food and nutrition problems in the community – Dietary Survey, anthropometry, clinical Examinations, laboratory examinations.

International & Indian organizations concerned with foods and nutrition.

#### UNIT-3

Prevalence of malnutrition in India – Environmental and Socio – economic factors related to malnutrition, family size and composition.

Etiology of Malnutrition – dietary patterns, food losses, Food waste, customs, habits, prejudice ignorance nutrition and infections.

#### UNIT-4

Measures to overcome malnutrition

- Need for an integrated approach to solve the problems of nutrition
- The package program of immunization, nutrition and education
- Different feeding programs organized by the governments and NGOs specially for the vulnerable group like school children, pregnant women etc.

#### UNIT-5

Nutrition education for the Community- By different education programs & methods.

Principles of planning, executing and evaluating nutrition education programs.

National Nutritional policy and nutritional food distribution during calamities

Nutrition during special tasks, expeditions, emergency, space nutrition

Food Production and distribution

### **VIII. Nutrition through Life cycle**

#### UNIT-1

Role of nutrition – nutrients – nutritional needs importance of diet during life cycle.

Nutritional assessment – anthropometry biochemical, Clinical and dietary.

#### UNIT-2

- a) Meal planning and Balanced diets.
- b) Routine hospital diet – clear liquid, fullfluid diet, soft diet, Normal diet & Restricted diet etc.
- c) Enteral and parenteral nutrition

#### UNIT-3

Nutrition during pregnancy and lactation

- Maternal malnutrition, other than normal cause like smoking & drinking.
- Complication during pregnancy
- Dietary modification
- Importance of breast milk and advantages - its basic value
- Nutrient requirements

#### UNIT-4

- Nutrition for infants and pre school children.
- Malnutrition - Vitamin A deficiency – anaemia – protein calorie malnutrition, protein energy malnutrition.
  - Socio economic issues related to malnutrition
  - Lactose intolerance, allergies and other factors influencing the nutritional status of the children.
  - Immunization and nutrient requirements
- b) Nutrition for School age children and Adolescents.
- School children  
Iron deficiency anaemia, food patterns, prevention of nutrition and health problems, over weight, obesity, under weight, dental caries.
  - Adolescents, eating pattern, influence from peer groups, anorexia, bulimia, obesity  
Weight gain, adolescent pregnancy hazards.
  - Nutrient requirements.

#### UNIT-5

- a) Geriatric Nutrition
- Eating Problems, Physiological and Psychological aspects influencing nutritional intake.
  - Diseased elderly, and invalids nutrition.
  - RDA and food selection as per the individuals.
  -

### **IX. Clinical and Therapeutic Nutrition**

#### UNIT-1

Introduction to Diet Therapy & Therapeutic Nutrition  
Adaptations of Therapeutic diets.

#### UNIT-2

- a) Dietary Management in the diseases of GI tract (Stomach and Intestine)  
b) Diet in fevers and infection – types  
c) Diet in disturbances of liver, gall bladder and pancreas.

#### UNIT-3

- a) Diet in Diabetes Mellitus and cancer  
b) Dietary Management in Renal diseases.  
Types and etiology, Diagnosis, Treatment, dietary modification, Complications.

#### UNIT-4

- a) Dietary management in cardiovascular disease – hypertension, hyperlipidemia, ischemic heart disease, Atherosclerosis, congestive cardiac failure, Acute and Chronic heart disease.  
b) Diet in surgical conditions and Burns.

#### UNIT-5

- a) Malabsorption syndrome – Restricted diets – Lactose, Sucrose, gluten etc.  
b) Elimination diets – Diet in Allergy and Skin disorders.  
c) Weight Management.  
d) Sports Nutrition.
- b) Nutrition Education  
- Principles, methods, Individual Counselling, group counseling, Family counseling, Teaching aids.

### **X. Financial and Marketing Management**

#### UNIT-1

Financing of business – concepts, objectives & functions  
Capital budgeting, cash budgets, break even analysis, Management of working Capital,  
Financing of catering units.

## UNIT-2

Financial accounting  
Single & Double entry book keeping  
Management accounting, decision making.

## UNIT-3

Pricing Policies  
Importance of pricing, factors affecting, wholesale & retail pricing, Food and beverage costing and pricing.

### **BOOKS FOR REFERENCE**

1. Gupta S.P. (1972), 'Statistical Methods' Sultan Chand and sons.
2. Sreedar G.V. (1981), 'Statistical Methods' , Allied publishers Private Limited.
3. Guilfer J.P. (1965), 'Fundamental Statistics in Psychology and Education; Newyork, MCGrow Hill Book co.
4. Joshi, V.D. (1995), 'Physiology – preparation manual for undergraduates ; Churchill Livingstone, NewDelhi.
5. Chakrabarti etal, (1994), 'Human Physiology', The New Book stall Calcutta.
6. Sethi Mohini and Surjeet Malhan, (1987), 'Catering Management – An Integrated Approach' , Wiley Eastern Ltd.
7. Jain, S.P. and Narang, K.L.(1990), 'Cost Accounting' , Kalyani Publishers, New Delhi.
8. Shukla, P.K. (1982), Nutritional Problems of India – Prentice Hall of India Private Limited., New Delhi.
9. West B.B. etal (1977), Food Service In Institutions, John Wiley and Sons Inc, New York.
10. Verghese, B. (1994), Professional Food and Beverage Service Management, Macmillan India Limited, Bangalore.
11. Kathleen Mahan, L and Sylvia Escott – Stump (2002), Krause's Food, Nutrition and Diet Therapy, 11<sup>th</sup> Edition, Saunders Philadelphia..
12. Joshua A.K. (1971), Microbiology – India Printing Works, Madras.
13. Frazier W.C. Food Microbiology – Mc Graw Hill Book and Co; New York.
14. M. Swaminathan (2002), "Food and Nutrition" , BAPPCO, No.88, Mysore Road, Bangalore – 560 018.
15. Paul D.C. and Palmer H.H. (1972), Food Theory and Application, New York, Johnwiley and sons, Inc.