

**JAMAL MOHAMED COLLEGE (Autonomous), Tiruchirappalli-620 020**  
**PG Programme –Course Structure under CBCS**

(For the candidate admitted from the academic year 2017-2018 onwards)

01.03.2016

SEM	Course Code	Course	Course Title	Ins.Hrs / Week	Credit	Marks		Total
						CIA	ESE	
<b>I</b>	17PND1C1	Core– I	Advances in Food Science	6	5	25	75	100
	17PND1C2	Core – II	Human Nutrition	6	5	25	75	100
	17PND1C3	Core– III	Diet Therapy-I	6	4	25	75	100
	17PND1CP4	Core– IV	Food Analysis Practical	6	4	20	80	100
	17PND1CE1	Elective– I		6	4	25	75	100
	<b>TOTAL</b>				<b>30</b>	<b>22</b>		
<b>II</b>	17PND2C5	Core– V	Nutrition For Growth and Development	6	5	25	75	100
	17PND2C6	Core– VI	Nutritional Bio chemistry	6	5	25	75	100
	17PND2C7	Core– VII	Diet Therapy-II	6	4	25	75	100
	17PND2CP8	Core– VIII	Diet Therapy Practical	6	4	20	80	100
	17PND2CE2	Elective– II		6	4	25	75	100
	<b>TOTAL</b>				<b>30</b>	<b>22</b>		
<b>III</b>	17PND3C9I	Core– IX	Diet Therapy Internship	6	5	25	75	100
	17PND3C10	Core– X	Food Microbiology	6	5	25	75	100
	17PND3C11	Core– XI	Research Methodology and Statistics	6	4	25	75	100
	17PND3CP12	Core– XII	Nutritional Biochemistry and Food Microbiology Practical	6	4	20	80	100
	17PND3CE3	Elective– III		6	4	25	75	100
	17PND3EC1	Extra Credit Course - I	Paediatric and Geriatric Nutrition	-	5*	-	100	100*
<b>TOTAL</b>				<b>30</b>	<b>22</b>			<b>500</b>
<b>IV</b>	17PND4C13	Core– XIII	Institutional Food Management	6	5	25	75	100
	17PND4C14	Core– XIV	Community Nutrition and Public Health	6	5	25	75	100
	17PND4CP15	Core– XV	Application of Computer in Nutrition and Dietetics Practical	6	5	20	80	100
	17PND4PW	Project		12	9	-	200	200
	17PND4EC2	Extra Credit Course - II	Home Management	-	5*	-	100	100*
	<b>TOTAL</b>				<b>30</b>	<b>24</b>		
<b>GRAND TOTAL</b>					<b>90</b>			<b>2000</b>

**\*Not considered for grand total and CGPA**

Elective	
Elective - I	Applied Physiology
	Nutritional Needs for Special Children
Elective– II	Functional Foods and Nutraceuticals
	Nutritional Management and Safety for Food Service
Elective– III	Sports Nutrition
	Nutritional Counselling and Education

## SEMESTER-I: CORE - I

### ADVANCES IN FOOD SCIENCE

<b>Course Code</b> : 17PND1C1	<b>Max. Marks</b> : 100
<b>Hours/Week</b> : 6	<b>Internal Marks</b> : 25
<b>Credit</b> : 5	<b>External Marks</b> : 75

#### Objectives

To enable the students to

1. To obtain knowledge about food preservation.
2. To help the students to contribute proper utilization of foods and prevent wastes.
3. To understand the need for food packaging and the recent packaging materials and labelling.
4. To Learn and gain knowledge on food packaging and applications during transportation.

#### UNIT-I

18 hours

##### Cereal and Cereal Products:

- 1.1 **Rice** - Structure, composition, nutritive value and functional properties.  
**Processing:** Parboiling- hot soaking process, by-products –rice bran, processed products- rice flakes, rice puff, rice starch.
- 1.2 **Wheat**- Structure, composition, nutritive value and functional properties, milling, processed products-semolina, macroni and noodles.
- 1.3 **Corn** - Structure, composition, nutritive value and functional properties, milling, by products- bran, germ, powder, processed products-flour, syrup, flakes and pop corn. Millet processing- Ragi, Jowar, Bajra.
- 1.4 **Breakfast cereal:** Rice and Wheat- Ready-to-cooked cereals, ready-to-eat cereals.

#### UNIT-II

18 hours

##### Pulses and Oil Seeds:

- 2.1 **Pulses:** Composition, nutritive value and functional properties. Processing-Cleaning, grading, pitting, splitting and polishing, extrusion technology.
- 2.2 **Oilseed seeds:** Composition, nutritive value and functional properties. Oilseed pressing, solvent extraction, purification, degumming, refining, bleaching, deodorization, hydrogenation, plasticizing and tempering, **By-products** : oilcake. **Processed products:** Margarine, shortening, lard, sute.

#### UNIT-III

18 hours

##### Vegetables, fruits and dairy processing:

- 3.1 **Vegetables:** Composition, nutritive value and functional properties. Freezing of vegetables -potato, cauliflower, carrot.
- 3.2 **Fruits:** Composition, nutritive value and functional properties. Pre-processing of tomatoes –field processing, washing in lye, peeling, freeze peeling, peeling in calcium chloride solution. Dehydrated products-juice powders by foam mat drier. Preserved products-jam, Jellies, ketch-up's and sauces.
- 3.3 Preservation of fruits and vegetables - Canning, Freezing, Dehydration of Fruits and Vegetables in cabinet drier.

- 3.4 **Milk and milk products:** Composition, nutritive value and functional properties  
Clarification, separation, standardization, pasteurization, homogenation and packaging of milk. **Non fermented-** whey protein concentrates, skim milk, cream, khoa, ice-cream.  
**Fermented-** cheese processing. Milk powder by Spray Drier.

#### UNIT-IV

18 hours

##### **Meat, poultry, fish and egg processing:**

- 4.1 **Meat:** Composition, nutritive value and functional properties Ageing, tenderising, curing, Smoking, Freezing of meat. **Processed products:** Gelatin, sausages.
- 4.2 **Poultry:** Composition, nutritive value, slaughter, bleeding, scalding, defeathering, eviscerating, Chilling, Packaging, processed products: dehydrate form of poultry.
- 4.3 **Fish :** Composition, nutritive value, Dehydration, chilling and smoking, Processed products: Fish protein concentrates.
- 4.4 **Egg :** Structure, composition, nutritive value pasteurization, freezing and drying, processed products: egg substitutes, #Egg powder by spray drier#.

#### UNIT-V

18 hours

##### **Food packaging and Labelling:**

- 5.1 **Food Packaging:** Definition, functions of packaging materials for different foods, characteristics of packaging material. **Modern Packaging Materials and Forms:** Glass containers, metal cans, composite containers, aerosol containers, rigid plastic packages, semi rigid packaging, flexible packaging. **Biodegradable packaging material -** biopolymer based edible film. **Packaging Methods:** Vacuum packaging, Shrink Packaging, CA and MA packaging.
- 5.2 **Labelling and patent :** Standards, purpose, description types of labels, labelling regulation barcode, nutrition labelling, health claims, and mandatory labelling provision.  
**Patent:** Definition, requirements, patent law in India, administrator, need for patent system, advantages, precautions to be taken by the applicants, patent procedures, non-patentable.
- 5.3 **Recent methods in preservation:** Pulsed electric field processing, High pressure processing, Processing using ultrasound, Dielectric, Ohmic and Infrared heating, Hurdle technology.

#.....# **Self-Study portion**

#### TEXT BOOKS

1. B. Srilakshmi, "Food Science", New Age International Pvt. Ltd., Chennai (2006).
2. V. A. Vaclavik. & E. W. Christian, "Essentials of Food Science", 2nd edition, Springer, New Delhi (2003).
3. R. Roday, "Food Science & Nutrition", Oxford University Press (1999).
4. B. Sivasankar, "Food Processing & Preservation", Prentice hall of India Pvt.Ltd, New Delhi(2002).
5. Vijaya Khader, Text book of Food Science and Technology, Indian Council of Agricultural Research, New Delhi, (2001).
6. Potter, N.N, Food Science, AVI Publishing company, INC, Westport, Connecticut, (1996).

- UNIT I** Text Book 2 Chapter III  
Text Book 3 Chapter XIII
- UNIT II** Text Book 1 Chapter II & III  
Text Book 2 Chapter IV & XV  
Text Book 3 Chapter IV
- UNIT III** Text Book 1 Chapter VIII  
Text Book 2 Chapter VII  
Text Book 3 Chapter VIII  
Text Book 6 Chapter V
- UNIT IV** Text Book 2 Chapter XIV  
Text Book 3 Chapter VI
- UNIT V** Text Book 1 Chapter V, VI, VII & XII  
Text Book 2 Chapter IX, X & XI  
Text Book 4 Chapter XXIV  
Text Book 5 Chapter II

#### **REFERENCE BOOKS**

1. Manoranjan kalia, professor, Dept of Food Science and Nutrition, Himachal Pradesh Agricultural University, Palampur, Himachal Pradesh.
2. Sacharows.S. Handbook of packaging materials, AVI Publishers Co., Westport.
3. Croshy N.T. Food Packaging materials. Applied Science Pub., Ltd., London. 6. Paine F.A. The packaging media. Blackie and Sons Ltd., London

## SEMESTER-I: CORE - II

### HUMAN NUTRITION

**Course Code** : 17PND1C2  
**Hours/Week** : 6  
**Credit** : 5

**Max. Marks** : 100  
**Internal Marks** : 25  
**External Marks** : 75

#### Objectives

To enable the students to

1. Understand the role of macronutrients
2. The metabolism of macronutrients
3. Gain knowledge about different micro nutrient deficiencies
4. Obtain depth on the study of major nutrients

#### UNIT I

##### ENERGY

18 hours

##### 1.1 Energy

- a) Energy value of foods, SDA, Energy Production
- b) Factors affecting Thermogenesis, Energy utilization by cells
- c) Energy output –BMR, physical activity level, physical activity rate

##### 1.2 Carbohydrates

- a) Classification, Functions, Digestion, Absorption, Sources, RDA
- b) Dietary Fiber – Role of fibre in degenerative diseases, Colon Function, Blood Glucose Level and GI tract functions
- c) Sweeteners – Nutritive and Non-Nutritive

#### UNIT II

18 hours

##### 2.1 Proteins and Amino Acids

- a) Classification, Functions, Digestion, Sources
- b) Protein Quality Evaluation – DC, BV, NPU, NPR, PER and NDPER
- c) Nutritional Classification of Amino Acids, Amino acid balance, Imbalance and Toxicity, Essential and Non-essential amino acids
- d) Therapeutic applications of amino acid.

##### Lipids and Carbohydrates

##### 2.2 Lipids

- a) Classification, Functions, Digestion, Absorption, Sources, RDA
- b) Effects of Deficiency and Excess fat
- c) Role of Saturated fat, Cholesterol, Lipoprotein, Triglycerides and Essential Fatty Acids
- d) Role of n-3, n-6 fatty acid in Health and Diseases.

## UNIT III

18 hours

### 3.1 Macro Minerals

**Calcium** – # Distribution in the body, absorption, Storage, utilization, transport, excretion, balance, deficiency, toxicity #, Factors influences and hinders absorption of calcium, sources, RDA, calcium interaction with other nutrients.

**Phosphorus** – # Distribution, digestion, absorption, utilization, transport, storage, excretion, sources #, Factors influences and hinders absorption of phosphorus, calcium phosphorus ratio, deficiency and toxicity

**Iron** - Distribution, absorption, utilization, transport, storage, excretion, Factors influences and hinders absorption of iron, sources, RDA, deficiency and toxicity

### 3.2 Micro Minerals

Iodine, fluoride, magnesium, copper, Zinc, selenium, manganese, chromium, distribution in the human body, function, sources, RDA, deficiency, toxicity

## UNIT IV

18 hours

### 4.1 Fat Soluble Vitamins

**Vitamins A, D, E, K** : Functions, absorption, storage, excretion, Sources, RDA, Deficiency, toxicity, Interaction of fat soluble vitamins with other nutrients.

### 4.2 Water Soluble Vitamins

Thiamine, Riboflavin, Niacin, Biotin, pantothenic acid, pyridoxine and B12, folic acid  
Ascorbic acid : Function, absorption, excretion, sources, RDA, deficiency, toxicity,  
#Interaction of water soluble vitamins with other nutrients#

## UNIT V

18 hours

### Water and Electrolyte

#### 5.1 Water

Distribution and functions of water, water balance – Maintenance and Distribution – physiological variations in the intake and output of water – water retention and depletion – Requirements of water.

#### 5.2 Electrolyte

Electrolyte content of fluid compartments and functions of electrolyte – Sodium, Potassium and chloride, absorption, balance, factor affecting electrolyte balance and hydrogen ion balance.

#.....# self-study portion.

## TEXT BOOKS

1. A. Shubhagini Joshi, Nutrition and Dietetics (with Indian Care Studies), Tata Mc Graw Hill Education Private Limited(2010).
2. B. Srilakshmi, Nutrition Science, Third Edition, New Age International PVT Ltd (2008)

- UNIT I**      Text book – 1 Chapter – I, II  
                  Text book – 2 Chapter – VII
- UNIT II**      Text book –2 Chapter – IV, III
- UNIT III**     Text book –2 Chapter – IX, X, XI, XII
- UNIT IV**     Text book – 2 Chapter – XIII, XIV, XV, XVI, XVII, XVIII
- UNIT V**      Text book – 2 Chapter – XX

### **REFERENCE BOOKS**

1. C. Gopalan, Dietary guidelines for Indians, ICMR, National Institute of Nutrition, Hyderabad (2003).
2. M.V. Krause and M.A. Hunsher, Food Nutrition and Diet Therapy, Eleventh Edition, W.B. Saunders company, Philadelphia, London (2004).
3. L.K. Mahan. and S.E. Stump, Krause's Food Nutrition and Diet Therapy, W.B Saunders Company, USA.
4. S. Nix. William's Basic Nutrition and Diet Therapy, Mosby, India.

## SEMESTER-I: CORE - III

### DIET THERAPY- I

<b>Course Code</b> : 17PND1C3	<b>Max. Marks</b> : 100
<b>Hours/Week</b> : 6	<b>Internal Marks</b> : 25
<b>Credit</b> : 4	<b>External Marks</b> : 75

#### Objectives

To enable the students to

1. Understand the role of dietician in therapeutic feedings.
2. Gain knowledge about the principles of diet therapy and different therapeutic diets
3. Learn recent concepts in nutritional care for various disorders
4. Know the effects of food and drug interactions.

#### UNIT-I

18 hours

##### **Dietician and nutritional care:**

- 1.1 **Dietician** - definition, classification of dietician, code of ethics, Indian dietetic association-objectives, membership, chapters and registration boards.
- 1.2 **Nutritional assessment** - Biochemical assessment of hospitalized patient
- 1.3 **Nutritional care process** –Nutrition screening, nutrition diagnosis, nutrition intervention, monitoring and evaluation, schematic model of nutritional care process.

#### UNIT-II

##### **Therapeutic Diet**

18hours

- 2.1 **Therapeutic Diet**- Routine hospital diet- clear fluid, full fluid, soft and bland diet, special feeding methods-enteral feeding-oral feeding, tube feeding-gastrostomy and jejunostomy. Parenteral feeding-formula and complications. Dietary supplements- definition, requirements, types, forms and supplement pyramid.
- 2.2 **Nutritional care in Metabolic Disorder** - gout, phenylketonuria and lactose intolerance.
- 2.3 **Nutritional care in musculo-skeletal diseases** - muscular dystrophy, osteoarthritis and rheumatoid arthritis.

#### UNIT-III

18 hours

##### **Nutritional Care in Stress, burns, surgery and febrile conditions:**

##### 3.1 **Nutritional Care in Stress**

Definition, The biological effects of stress on various systems–vital, non-vital organs and immune system. Stress inducing food, anti - stress nutrients and foods, dietary management for stress.

##### 3.2 **Nutritional care in burns and surgery- pre and postoperative.**

- 3.3 **Nutritional care in febrile conditions:** Short term fever - typhoid and influenza, Intermittent – Malaria, Long term fever –AIDS.

## UNIT-IV

18 hours

### Nutritional Care in Cancer and diseases of Nervous System

- 4.1 **Cancer-** definition, aetiology, pathophysiology, risk factors, types, symptoms, dietary management.
- 4.2 **Nutritional effects of cancer therapy-** problems related to surgery, chemotherapy, radiation therapy. Nutritional requirements. #Role of food in the prevention of cancer#
- 4.3 **Diseases of Nervous system-** Pathophysiology and medical nutrition therapy in Alzheimer's diseases, epilepsy, migraine, multiple sclerosis and Parkinson's disease.

## UNIT-V

18 hours

### Food, nutrients and drug interactions:

- 5.1 **Effects of food on Drug therapy** – drug absorption, medication and enteral nutrition, inter actions, drug distribution, drug metabolism and drug excretion.
- 5.2 **Effects of drug on food and nutrition** – nutrient absorption, nutrient metabolism and Nutrient excretion.
- 5.3 **Effects of drugs on nutritional status** – oral, taste, smell, gastro – intestinal effects, appetite changes, organ system toxicity and glucose levels.

#.....# self -study portion.

### TEXT BOOKS

1. Srilakshmi B. (2011)., Dietetics, Seventh Edition, New Age International (P) Ltd. Publishers, Chennai.
2. Mahan L.K and Arlin M.T (2012), Food and the Nutrition care process, Thirteenth Edition, W.B.Saunders Company, London.
3. Joshi S. A (2008) , Nutrition and Dietetics, Second Edition, Tata Mc. Graw Hill Publication, New Delhi.

UNIT- I Text book –1 Chapter – XXIV

Text book – 2 Chapter – VIII,XI

Net reference-www.idaindia.com

UNIT- II Text book –1 Chapter – XII

Text book -2 Chapter –XXXX, XXXXIV

UNIT –III Text book – 2 Chapter –XXXIX

UNIT - IV Text book – 2 Chapter – XXXIX, XXXXI

UNIT –V Text book – 2 Chapter – IX

### REFERENCE BOOKS

1. Robinson(1990)., Normal and Therapeutic Nutrition, Seventeenth Edition, Oxford & LBM Publishing, Bombay.
2. Mahtab. S, Bamji Prasad Rao N and Vinodini Reddy(2003)., Textbook of Human Nutrition, Second Edition, Oxford and IBH Publishing Co., Pvt., Ltd
3. Shils M. E, Olson J. A, Shike M., & Ross A.C. (2006), Modern Nutrition in Health & Disease, Tenth Edition, Lippincott Williams and Wilkins.

## SEMESTER-I: CORE-IV

### FOOD ANALYSIS PRACTICAL

<b>Course Code</b> : 17PND1CP4	<b>Max. Marks</b> : 100
<b>Hours/Week</b> : 6	<b>Internal Marks</b> : 20
<b>Credit</b> : 4	<b>External Marks</b> : 80

1. Determination of Moisture content in the food sample
2. Determination of pH content in the fruit juice
3. Determination of Total Acidity content in the fruit juice
4. Estimation of Crude Fibre content in the food sample
5. Estimation of Total Carbohydrate content present in the food sample
6. Estimation of Protein content in the food sample by Lowry's method
  - a) Estimation of amino acid present in food sample by Paper Chromatography
7. Estimation of Fat content in the Food Sample by Soxhlet Apparatus
  - a) Estimation of Acid Number
  - b) Estimation of Iodine Number
  - c) Estimation of Peroxide Value
8. Ashing of food sample and preparation of Ash Solution for Mineral estimation
  - a) Estimation of calcium
  - b) Estimation of Iron
  - c) Estimation of Sodium
  - d) Estimation of Phosphorous
9. Estimation of Vitamins present in the food sample
  - a) Estimation of Carotene
  - b) Estimation of Ascorbic acid

#### REFERENCE BOOKS

1. S.Ranganna, HandBook of Analysis and Quality Control for Fruit and Vegetable Products, Tata McGraw-Hill Publishing Company Limited, New Delhi(2004).
2. S.Sadasivam, A. Manickam, biochemical methods, New Age International Publisher, New Delhi (2004).

## SEMESTER-I: ELECTIVE – I

### APPLIED PHYSIOLOGY

<b>Course Code</b>	<b>: 17PND1CE1</b>	<b>Max. Marks</b>	<b>: 100</b>
<b>Hours/Week</b>	<b>: 6</b>	<b>Internal Marks</b>	<b>: 25</b>
<b>Credit</b>	<b>: 4</b>	<b>External Marks</b>	<b>: 75</b>

#### Objectives

To enable the students to

1. Understand the physiological functions related to nutrition.
2. Understand the alterations in physiology in diseases.

#### UNIT –I

**18 hours**

##### **Blood and immunology**

- 1.1 Blood- composition and functions.
- 1.2 Blood cells- plasma proteins- origin and its functions. RBC- structure and functions, normal values, erythropoiesis, haemoglobin. WBC- structure and functions, types, Normal values and its abnormalities
- 1.3 Blood Platelets-structure and functions, reticulo endothelial system, normal values. Blood groups - Rh factors, erythroblastosis fetalis , Blood coagulation , Blood transfusion.
- 1.4 Immunity –Definition and types of immunity, development of cellular immunity and humoral immunity.

#### UNIT-II

**18 hours**

##### **Respiratory system and Circulatory**

- 2.1 **Respiratory system** - Structure and function of respiratory organ, mechanics of respiration, exchange of gases ,lung volume, Extracorporeal membrane oxygenation (ECMO), artificial respiration.
- 2.2 **Circulatory system**- Heart – Anatomy and physiology. Blood vessels – structure of artery, vein, capillaries, cardiac output, factor affecting cardiac output, arterial blood pressure , clinical measurement of blood pressure , properties of cardiac muscle, origin and conduction of heart beat , cardiac cycle, electro cardiogram (ECG),Artificial pacemaker, CPR techniques.

#### UNIT-III

**18 hours**

##### **Digestive and Excretory system**

- 3.1 **Digestive system**- General anatomy of digestive system. Digestion in the mouth, stomach and intestines, Movements of intestine. Structure and function of liver and pancreas, Role of hormone secreted by pancreas.
- 3.2 **Excretory system** – Anatomy and Physiology of kidney- nephron, formation of urine, micturation. Dialysis and its types. #Skin- structure and functions, regulation of body temperature#

## UNIT-IV

18 hours

### Endocrine and Reproductive system

- 4.1 **Endocrine system** – Structure and functions of pituitary, thyroid, parathyroid, adrenals, islets of langerhans of pancreas , sex glands and its hypo and hyper secretions
- 4.2 **Reproductive system** – General anatomy of male and female reproductive system. Spermatogenesis and Oogenesis, Menstrual cycle Fertilization, Conception, implantation, pregnancy, labour.

## UNIT-V

18 hours

### Nervous system and special senses

- 5.1 **Nervous system**- Structure and functions of nerve cells synapse. **Spinal cord**- Ascending and descending tracts, reflex action, cerebro spinal fluid
- 5.2 Brain – structure and functions of cerebrum, optic thalamus, mid brain, pons, medulla oblongata, hypothalamus, cerebellum. Autonomic nervous system – sympathetic and parasympathetic nervous system- functions.
- 5.3 **Sense organs**- Eye - Physiology of vision: Structure of eye, dark and light adaptation, accommodation of the eye. **Ear** - Structure and physiology, functions of hearing. **Special senses**- structure and function of Tongue, Smell and cutaneous sensation.

#.....# self -study portion.

### TEXT BOOKS

1. Wilson, K.J.W and Waugh, A., Ross and Wilson, Anatomy and physiology in Health and illness, 8<sup>th</sup> Edition , Churchill Livingstone.2003
2. Sembulingam,K and Prema sembulingam (2010): essentials of medical physiology, 2<sup>nd</sup>Edition, jay pee brothers medical publishes (p) limited, New Delhi.2.
3. Guyton, A.C and Hall, J.B (1996): Text book of medical physiology, 5<sup>th</sup> edition, W.B, Saunders Company, prism books private limited, Bangalore.
4. Chatterjee, C.C (1998) Human physiology, Volume I &II, Medical allied agency,82/1 Mahatma Gandhiroad, Calcutta.

**UNIT I** : Text Book- 1 Chapter- VI-XXVII

**UNIT II** : Text Book- 1 Chapter-V, XII

**UNIT III** : Text Book- 2 Chapter- X, XIII

**UNIT IV** : Text Book- 2 Chapter-IX, XVIII

**UNIT V** : Text Book- 1 Chapter-VII, VIII

### REFERENCE BOOKS

1. Subramanian and Mathavan kutty, S.M (2001): text book of physiology, Chand and company, New Delhi.
2. Sembulingam,Kand Prema sembulingam (2000): Essentials of medical physiology, 2<sup>nd</sup>Edition, Jay pee brothers medical publishes (p) limited, New Delhi.

## SEMESTER: I ELECTIVE-I

### NUTRITIONAL NEEDS FOR SPECIAL CHILDREN

<b>Course Code</b>	<b>: 17PND1CE1</b>	<b>Max. Marks</b>	<b>: 100</b>
<b>Hours/Week</b>	<b>: 6</b>	<b>Internal Marks</b>	<b>: 25</b>
<b>Credit</b>	<b>: 4</b>	<b>External Marks</b>	<b>: 75</b>

#### Objectives:

To enable the students to

1. Understand the role of food for special children
2. Understand the role and special nutritional care for special children

#### UNIT I

**18 hours**

- 1.1 Regulations and School Food Service** - Disabilities Definition, Individuals with Disabilities Education Act (IDEA).
- 1.2 Diet Prescription-** #Role of Physician for Children with Disabilities#, Medical Statement for Children with Special Dietary Needs
- 1.3 The Role of School Food Service** - school issues, school food service responsibilities, Providing Special Meals to Children with Disabilities, Menu Modifications for Children with Disabilities, Texture Modifications for Children with Disabilities.

#### UNIT II

**18 hours**

- 2.1. Description of Selected Disabilities** – Attention deficit hyperactivity disorders- Autism , Spectrum disorders, Cerebral Palsy, Epilepsy or Seizure Disorder - Muscular Dystrophy.
- 2.2. Mental Retardation** - Down Syndrome - Prader Willi (PW) Syndrome - Spina Bifida - Cystic Fibrosis -Rett Syndrome.
- 2.3 Metabolic Diseases** - Inborn Errors of Metabolism (IEM) – Galactosemia, Phyneylketonuria.

#### UNIT III

**18 hours**

- 3.1. Food Allergies and Food Sensitivities** - Common Food Allergens , Foods that commonly contain the “Big Eight” allergens and should be avoided, Symptoms of Food Allergy.
- 3.2. Gastrointestinal symptoms associated with food allergy** - Cutaneous, or skin, symptoms associated with food allergy - Respiratory symptoms associated with food allergy – Anaphylaxis and its signs.
- 3.3. Managing Food Allergies in Children** – In the kitchen -Know which foods to avoid, Keep the kitchen organized to avoid cross-contamination, clean- Outside the kitchen. Monitoring for an allergic reaction. Food Intolerance.

**UNIT IV** **18 hours**

- 4.1 Issues Impacting Nutrition and Special Dietary Orders** - Energy Needs –  
Overweight- Intervention strategies for reducing calories in school lunch and Breakfast.  
Underweight - Ways to Increase Calories .
- 4.2 Feeding Problems.** Oral-Motor Problems. Modification of Food Texture – Chopped,  
Ground, Pureed. Positioning Problems. Behavioral Issues- Self-feeding, Tube Feedings.

**UNIT V** **18 hours**

- 5.1 Special Formulas and Special Medical Foods** - The Purchase of Special Formulas and  
Special Medical Foods. Fluids and Fiber.
- 1.2. Environmental Considerations.** Dining Environment . Scheduling. Space. Location.  
Lighting. Dealing with Distractibility. Food safety issues .

# ..... # self -study portion

**TEXT BOOKS**

1. Hand book for Children with Special Food and Nutrition Needs, Item No ET69-06,  
National Food Service Management Institute, The University Mississippi (2006).

<b>UNIT I</b>	Text book 1 Chapter – I
<b>UNIT II</b>	Text book 2 Chapter – II
<b>UNIT III</b>	Text book 2 Chapter – III
<b>UNIT IV</b>	Text book 2 Chapter – IV
<b>UNIT V</b>	Text book 2 Chapter – V

**REFERENCE BOOKS**

1. Horsley, J.Q., & Shockey, W.L. (1999). Nutrition management for children with special food and nutrition needs. In Martin, J., & Conklin, M.T. (Eds.), *Managing Child Nutrition Programs* (pp. 363-387). Leadership for Excellence Gaithersburg, MD: Aspen Publishers.
- Cloud, H.H., Ekvall S.W., & Hicks, L. (2005). Feeding problems of the child with special health-care needs. In Ekvall, S.W. & Ekvall, V.K. (Eds). *Pediatric nutrition in chronic diseases and developmental disorders* ( 2<sup>nd</sup> ed.) New York: Oxford University Press

## SEMESTER- II: CORE -V

### NUTRITION FOR GROWTH AND DEVELOPMENT

<b>Course Code</b>	<b>: 17PND2C5</b>	<b>Max. Marks</b>	<b>: 100</b>
<b>Hours/Week</b>	<b>: 6</b>	<b>Internal Marks</b>	<b>: 25</b>
<b>Credit</b>	<b>: 5</b>	<b>External Marks</b>	<b>: 75</b>

#### Objectives

To enable the students to

1. Get acquainted with growth and development changes from conception till death.
2. Understand the inter-relationship between nutrition, growth and development during life cycle.
3. Understand the role of nutrition facts in vulnerable groups and special group of society.

#### UNIT-I

**18 hours**

##### Nutrition during Pregnancy:

- 1.1 Importance of nutrition in pre gestational and gestational periods. Effect of malnutrition on maternal and fetal health.
- 1.2 Nutritional requirements during pregnancy, nutritional adaptations in pregnancy, complications of pregnancy and management.

#### UNIT-II

**18 hours**

##### Nutrition during lactation:

- 2.1 Growth and development of mammary gland, physiology of lactation-synthesis of milk components let down reflex, role of hormones, and effect of breast feeding on maternal health.
- 2.2 Feeding problems due to – sore nipples, inverted nipples, engorged breast, nutrient need and dietary modification. Nutrient requirement during lactation.

#### UNIT-III

**18 hours**

##### Nutrition during Infancy:

- 3.1 **Nutrition during Infancy** - Growth and development, factors influencing growth. Breast Feeding- Colostrum, Transition milk, Fore milk and Hind milk, Advantages of breast feeding to the infant, Difference between breast feeding and bottle feeding, factors to be considered in bottle feeding. Different types of milk formulae.
- 3.2 **Weaning Foods** -Weaning foods and homemade baby foods. Supplementary foods and low cost supplementary foods. Uses of growth chart to monitor growth and development. Nutritional requirement of infants. Feeding problems encountered for normal and premature infants.

#### UNIT-IV

**18 hours**

##### Nutrition for Preschool children, School children and Adolescence:

- 4.1 **Nutrition for Preschool Children** - Growth and development, nutritional requirements. Food habits, meal pattern and dietary modification, supplementary foods – provided by ICDS and nutritional composition for homemade supplementary foods. Malnutrition – under nutrition and over nutrition.

- 4.2 **Nutrition for School children-** Growth and development, nutritional requirements, Factors influencing nutritional status, packed lunch, establishing healthy eating habits, # Nutritional problems – under weight and obesity, iron deficiency anemia, anorexia nervosa, bulimia nervosa and dental caries#.
- 4.3 **Nutrition for Adolescents -** Growth and development during adolescence. Nutritional Requirements, food habits and dietary practices. Nutrient demand during adolescent - Adolescent pregnancy, during increased physical activity – exercise and sports.

#### **UNIT-V**

**18 hours**

##### **Adulthood and Old Age:**

- 5.1 **Nutrition in Adulthood-** Reference man and woman, nutritional requirements based on occupation – sedentary, moderate and heavy. Menopausal, pre menopausal and post menopausal women.
- 5.2 **Old Age -** The ageing process- physiological, socio-psychological. Aspects of ageing. Nutritional problems of elderly. Nutritional requirements of elderly and dietary management.

**#.....# self -study portion.**

#### **TEXT BOOKS**

1. B.Srilakshmi, Dietetics, Sixth edition, New Age International Pvt Ltd (2010).
2. S.Ghosh, The Feeding and Care of Infants and Young Children, VHAI, Sixth edition, New Delhi (1992).
- 3.M.Swaminathan, Essentials of Food and Nutrition, Vol I, Ganesh & Co. Madras (1985).
- 4.M.Swaminathan, Essentials of Food and Nutrition, Vol II, Ganesh & Co. Madras (1985).
5. C.Gopalan, Recent Trends in Nutrition, Oxford University Press (1993).
6. H.P.S.Sachdeva, P. Chaudhary, Nutrition in Children. Developing Country Concerns Department of Pediatrics, Maulana Azad Medical College, New Delhi (1994).
7. Vinodhini Reddy, Prahlad Roa, Govmth Sastry and Kashinath, Nutrition Trends in India, NIN, Hyderabad, 1993.

<b>UNIT I</b>	Text book 1 Chapter – VII
<b>UNIT II</b>	Text book 1 Chapter – VIII
<b>UNIT III</b>	Text book 1 Chapter – III
<b>UNIT IV</b>	Text book 1 Chapter – IV Text book 1 Chapter – V
<b>UNIT V</b>	Text book 1 Chapter – II Text book 1 Chapter – IX

#### **REFERENCE BOOKS**

1. WHO, A Growth Chart for International Use in Maternal and Child Health, Geneva (1978).
2. C. Gopalan, Indian Council of Medical Research Recommended Dietary Intakes for Indians (1989).

**SEMESTER –II: CORE-VI**  
**NUTRITIONAL BIOCHEMISTRY**

**Course Code : 17PND2C6**  
**Hours/Week : 6**  
**Credit : 5**

**Max.Marks : 100**  
**Internal Marks : 25**  
**External Marks : 75**

**Objectives:**

**To enable students to**

1. Understand the interrelationship between different metabolic pathways in the body.
2. Become proficient for specialization in nutrition.

**UNIT- I**

**18 hours**

**Carbohydrates:**

- 1.1 Structure, classification and #properties of monosaccharides, disaccharides and Polysaccharides#.
- 1.2 Intermediary metabolism – glycolysis, TCA cycle, HMP shunt, gluconeogenesis, glycogenesis, glycogenolysis. Role of liver on carbohydrate metabolism.
- 1.3 Disorders of carbohydrate metabolism – galactosemia. glycogen storage disease, pentosuria, fructosuria.

**UNIT II**

**18 hours**

**Proteins:**

- 2.1 Structure and classification of amino acids, peptide bond formation, structure of proteins.
- 2.2 Protein metabolism, Transamination, Deamination and Urea cycle, Amino acid pool. Protein biosynthesis.
- 2.3 Inborn errors of metabolism – Phenyl Ketonuria, Cystinuria, albinism, alkaptonuria, maple syrup disease.

**UNIT III**

**18 hours**

**Lipids:**

- 3.1 Definition, classification, structure, Metabolism of lipids in Denovo synthesis of fatty acids, Beta ( $\beta$ ) Oxidation. Cholesterol Biosynthesis and regulation.
- 3.2 Ketone bodies, Prostaglandins – significance. Plasma lipoproteins and Hyperlipidemias.
- 3.3 Disorders of lipid metabolism – Dyslipidemia and lipid storage diseases. Role of liver on fat metabolism.

**UNIT IV**

**18 hours**

**Nucleic Acids:**

- 4.1 Composition and classification. Structure and #Properties of DNA and RNA#. DNA replication, DNA mutation.
- 4.2 Metabolism of Purines, Metabolism of pyrimidines.
- 4.3 Disorder of nucleic acid metabolism – Gout, aciduria, xanthinuria.

## UNIT V

18 hours

### Vitamins and Minerals:

- 5.1 Major Vitamins(thiamine, riboflavin, niacin, pyridoxine, biotin and folic acid) with coenzyme functions.
- 5.2 Mode of action of thiamine, riboflavin, niacin, pyridoxine, biotin and folic acid.
- 5.3 Macro minerals(sodium, potassium, calcium)with other nutrients, interaction of micro minerals ( Iron, Iodine, zinc).

#.....# self- study portion

### TEXT BOOKS

1. Ambika Shanmugam, Fundamentals of Biochemistry for Medical Students, Seventh Edition, New Age Publishing Pvt. Ltd., New Delhi(1986).
2. C.P. Champe and A.R. Harvey, Lippincott's Illustrated Reviews(1987).
3. U. Sathyanarayana and U. Chakrapani, Textbook of Biochemistry, Third Edition, Books and Allied (P) Ltd, Kolkata (2010).
4. R. Davidson, Stanley Pass more, Brock and J.H. Heeman, Nutrition and Dietetics, Livingston's Ltd., Edinduragt London(1973).

UNIT I Text book 1 Chapter –I, XVII

UNIT II Text book 1 Chapter – III, XXI

UNIT III Text book 1 Chapter – II, XIX, XX

UNIT IV Text book 1 Chapter – VI, X

UNIT V Text book 1 Chapter – V, XXV

### REFERENCE BOOKS

2. T.M. Devlin, Text book of Biochemistry with Clinical Correlations,Fourth Edition, Wiley Liss Inc. (1997).
3. R.K.Murray, D.K. Granner, P.A. Mayes and V.W. Rodwell, Twenty Fifth Edition, Harper's Biochemistry Macmillan Worth Publishers(2000).
4. D.L. Nelson and M.M. Cox Lehninger's Principles of Biochemistry,Third Edition. Macmillan Worth Publishers.(2000)
5. Davidson, P. Passmore and L.P. Break, Human Nutrition and Dietetics, English language book society, Livingstone(1986).
6. J.S. Garrow. & W.P.T. James, Human Nutrition and Dietetics,Church Hill Living Stone, (1993).

## SEMESTER-II : CORE – VII

### DIET THERAPY- II

<b>Course Code</b>	<b>:</b>	<b>17PND2C7</b>	<b>Max. Marks</b>	<b>:</b>	<b>100</b>
<b>Hours/Week</b>	<b>:</b>	<b>6</b>	<b>Internal Marks</b>	<b>:</b>	<b>25</b>
<b>Credit</b>	<b>:</b>	<b>4</b>	<b>External Marks</b>	<b>:</b>	<b>75</b>

#### Objectives

To enable the students to

1. Understand the pathophysiology, aetiology, symptoms for various life style diseases.
2. Learn about the risk factors for degenerative diseases.
3. Gain knowledge about the role of dietary modifications in several disease conditions.

#### UNIT-I

**18 hours**

##### **Dietary management in Pulmonary, Liver and gall bladder disorders:**

- 1.1 **Dietary management in Pulmonary disorders:** Pathophysiology, medical nutrition therapy for asthma, broncho pulmonary dysplasia (BPD), chronic obstructive pulmonary disease, lung cancer, respiratory failure, tuberculosis.
- 1.2 **Dietary management in Liver disorders:** Pathophysiology, aetiology, symptoms and dietary regimen for Hepatitis- Fatty infiltration of liver, cirrhosis, hepatic encephalopathy.
- 1.3 **Dietary management in gall bladder disorders:** Cholecystitis, cholelithiasis

#### UNIT-II

**18 hours**

##### **Dietary management in Gastro Intestinal Tract Disorders**

- 2.1 **Upper gastro intestinal tract disorders** – aetiology, symptoms and dietary management for Esophagitis, gastritis, oral cavity cancer, peptic ulcer, stomach cancer and dumping syndrome.
- 2.2 **Lower gastro intestinal tract disorders** - aetiology, symptoms and dietary management for constipation, diarrhoea, steathorrhoea, flatulence, celiac disease, tropical sprue.
- 2.1 Aetiology, symptoms and dietary management for inflammatory bowel disease – Cohn’s disease, ulcerative colitis, irritable bowel syndrome, diverticulosis and colon cancer.

#### UNIT- III

**18 hours**

##### **Dietary management in Obesity, Under weight and Thyroid related disorders:**

- 3.1 Obesity- definition, aetiology, theories, type, dietary management, guidelines for a dietician in weight management programme.
- 3.2 Under weight-definition, aetiology, dietary modifications.
- 3.3 Pathophysiology and medical nutrition therapy for hypothyroidism, polycystic ovary syndrome and hyperthyroidism.

#### UNIT- IV

**18 hours**

##### **Dietary management in Pancreatic disorders:**

- 4.1 **Pancreatitis**- Acute and chronic Pancreatitis.
- 4.2 **Diabetes Mellitus** - Classification, symptoms and complications. Management– Insulin therapy and oral hypoglycemic agents. Dietary considerations, meal plan with and without insulin. Glycemic index and glycemic load of food.

- 4.3 **Other conditions:** Gestational diabetes – causes, complications and dietary management.  
Hypoglycaemia-causes, complications and dietary management

**UNIT- V**

**18 hours**

**Dietary management in Cardiovascular and Renal diseases:**

- 5.1. **Cardiovascular disorders:** Atherosclerosis - role of fat in the development of atherosclerosis, clinical effects, risk factors and dietary modification. Hypertension-pathophysiology, types, symptoms and dietary modification.
- 5.4 **Heart failure** – Cause, signs and dietary management in heart failure. #Role of functional Foods in prevention of cardiovascular disorders#.
- 5.5 **Renal disorders** – Glomerulonephritis, nephrotic syndrome, acute and chronic renal failure and nephrolithiasis. Dialysis- Types and dietary management in dialysis.

#.....# self -study portion.

**TEXT BOOKS**

1. Srilakshmi B(2011), Dietetics, Seventh Edition, New Age International (P) Ltd. Publishers, Chennai.
2. Joshi S. A(2008), Nutrition and Dietetics, Second Edition, Tata Mc.Graw Hill Publication, NewDelhi .
3. Mahan L.K and Arlin M.T (2000), Food and the Nutrition care process, Thirteenth Edition, W.B. Saunder Company, London

**UNIT –I** Text book - 3 Chapter – XXX,XXV.

**UNIT-II** Text book –1Chapter – XVI

**UNIT – III** Text book – 1 Chapter – XIV  
Text book-3 Chapter-XXXII

**UNIT –IV** Text book –1 Chapter – XVIII  
Text book –3 Chapter-XXXI

**UNIT-V** Text book –1 Chapter – XV, XIX  
Text book –3 Chapter-XXIV

**REFERENCE BOOKS**

1. Robinson (1990), Normal and Therapeutic Nutrition, Seventeenth Edition, Oxford & LBM Publishing, Bombay.
2. Mahtab S, Bamji Prasad Rao N and Vinodini Reddy (2003), Textbook of Human Nutrition, Second Edition, Oxford and IBH Publishing Co., Pvt., Ltd.
3. Eleanor. D, Schlenker and Sara Long Roth, Williams (2011), Essentials of Nutrition and Diet Therapy, Tenth Edition, St-Louis.

## SEMESTER-II : CORE – VIII

### DIET THERAPY PRACTICAL

<b>Course Code</b>	<b>:</b>	<b>17PND2CP8</b>	<b>Max. Marks</b>	<b>:</b>	<b>100</b>
<b>Hours/Week</b>	<b>:</b>	<b>6</b>	<b>Internal Marks</b>	<b>:</b>	<b>20</b>
<b>Credit</b>	<b>:</b>	<b>4</b>	<b>External Marks</b>	<b>:</b>	<b>80</b>

#### Objectives

To enable the students to

1. Develop skills in planning, calculating, modifying the nutrient requirements and in preparation of therapeutic diets
2. Develop skills in diet counseling and feeding of patients.

**Plan, calculate, modify the nutrient requirements and prepare the diets for the below mentioned pathological conditions:**

1. **Routine hospital diet:** clear fluid, full fluid, soft and bland diet.
2. **Diet in febrile conditions:**  
Short term fever – typhoid, intermittent fever - Malaria. Long term fever- Tuberculosis, Acquired immune deficiency syndrome
3. **Diet in burns and surgery-** post operative conditions.  
**Diet in special feeding:** Enteral feeding (any one blend preparation for tube feeding).
4. **Diet in metabolic conditions:** Gout
5. **Diet in gastro-intestinal disorders:** Ulcer, irritable bowel syndrome.  
**Diet in Liver diseases:** Fatty liver, hepatic encephalopathy.
6. **Diet in diabetes mellitus conditions:** Insulin dependent, Non –insulin dependent, Gestational diabetes mellitus.
7. **Diet in weight management:** Obesity grade-III, underweight.
8. **Diet in renal diseases:** chronic renal failure, Renal calculi.
9. **Diet in Heart diseases:** Hypertension, Atherosclerosis, Congestive heart failure.
10. **Diet in cancer**
11. **Prepare a diet counselling chart for any one disease condition.**

#### REFERENCE BOOK

1. Vimla.V(2010), Advances in diet therapy- practical manual, New age international publication, New Delhi.

## SEMESTER II: ELECTIVE-II

### FUNCTIONAL FOODS AND NUTRACEUTICALS

<b>Course Code</b> : 17PND2CE2	<b>Max. Marks</b> : 100
<b>Hours/Week</b> : 6	<b>Internal Marks</b> : 25
<b>Credit</b> : 4	<b>External Marks</b> : 75

#### Objectives

To enable the students to

1. Gain knowledge about functional foods and Nutraceuticals
2. Have thorough understanding about the health effects

#### UNIT- I

18hours

##### Functional Foods and Nutraceuticals

- 1.1 Definition – History of functional foods- Classification of Functional Foods, classifying Nutraceutical factor based on chemical nature.
- 1.2 Secondary metabolites in plants. a)Terpenoids, b) Phenols and Polyphenols c)Sulphur containing compounds d) Nitrogen containing alkaloids.

#### UNIT- II

18 hours

##### Organizational models for Nutraceuticals

- 2.1 **Food Source:** Plant, dairy, microbial
- 2.2 **Chemical Nature:** Isoprenoid derivatives, phenolic substances, structural lipids, fatty acids, carbohydrates and derivatives, amino acid base substances, minerals, microbes

#### UNIT – III

18 hours

- 3.1 **Prebiotics:** Definition, Sources, effect of processing, physiological effects, effects on human health and potential applications in risk reduction of diseases  
Perspective for food applications for the following:
  - Non-digestible carbohydrates/Oligosaccharides
  - Dietary fibre , Resistant Starch
  - Gums
- 3.2 **Probiotics** : Important features of probiotic. mechanism of action of probiotics and its health benefits. Probiotics in various foods: fermented milk products, non-milk products, safety of probiotics.
- 3.3 **Synbiotics** : Introduction and importance of synbiotics.

#### UNIT - IV

18 hours

- 4.1. **Useful food components with potential health benefits:** Definition, Sources, bioavailability, Effects on human health and potential applications in risk reduction of disease:
  - Polyphenols: flavonoids, catechins
  - Isoflavones, tannins
  - Phytoestrogens
  - Phytosterols
  - Glucosinolates
  - Pigments- Lycopene, curcumin

- Sulphur compounds
- Other components- phytates, protease inhibitors, saponins, amylase inhibitors
- Active compounds if spices and condiments (Allicin, trignollin, gingerol, capcisin)

## UNIT -V

18hours

### 5.1 Application of herbs as functional ingredients

### 5.2. Role of Herbs in Health and its Efficacy status

- a) Nervous System-Ashwagandha (withania Somnifera)
- b) Heart and Circulatory System- Green tea, Garlic
- c) Immune System –Neem, Shallot(small onion)
- d) Digestive System-Ginger , fennel
- e) Respiratory System-Tulsi(ocimum Sanctum)
- f) Urinary System-, Didymocarpus pedicellata (shilapushpa) , Cichorium intybus(kaasini keera). g) Musculoskeletal System-Indian gooseberry, Indian Aloe

## REFERENCES

- UNIT - I Net Reference [www.ajpcr.com/vol3Issue1/265.pdf](http://www.ajpcr.com/vol3Issue1/265.pdf)  
[www.ncbi.nlm.nih.gov/pubmed/](http://www.ncbi.nlm.nih.gov/pubmed/)-  
[www.nutrition.org/content/136/6/1636s.long](http://www.nutrition.org/content/136/6/1636s.long)  
[www.bodybuilding.com/store/cla.html](http://www.bodybuilding.com/store/cla.html)  
[www.whfoods.com/gen page.php? tname = nutrient](http://www.whfoods.com/gen_page.php? tname = nutrient)  
[www.eufic.org/article/en/expid/basics-functional -foods -](http://www.eufic.org/article/en/expid/basics-functional -foods -)  
 Ref Book-1 Chapter-I,II
- UNIT-II Net Reference [www.sphinxesai.com/vol.3No.1/pharm-Jan-Mar 11/pdf/JM 11](http://www.sphinxesai.com/vol.3No.1/pharm-Jan-Mar 11/pdf/JM 11)  
 UNI -III Net Reference [www.medicinet.com](http://www.medicinet.com)  
 UNIT- III Ref Book - 1 Chapter – XV  
 Ref Book – 2 Chapter – X  
 Net Reference [www.medicinet.com](http://www.medicinet.com)
- UNIT - IV Net Reference [www.Pitt.edu/~super7/45011-46001/45161](http://www.Pitt.edu/~super7/45011-46001/45161)  
 Net Reference [www.ipv.pt/millennium/mellineum](http://www.ipv.pt/millennium/mellineum)  
 Ref Book –2 Chapter – V
- UNIT - V Net Reference [www.ashwangandha.com](http://www.ashwangandha.com)  
[www.herbwisdom.com/herb-ashwafgandha.html](http://www.herbwisdom.com/herb-ashwafgandha.html)

## TEXT BOOKS

1. Hari Niwas Mishra, Rajesh Kapur, Navneet Singh Deora, Aastha Deswal, “Functional Foods”, New India Publishing Agency, India(2016)
2. Bibek Ray and Arun Bhunia, Fundamental Food Microbiology, CRC Press ( 2008)
3. Mary K Schmidl and Theodore P.Labuza, Essential of functional Foods. Springer (India) private Limited (2000)
4. G.Mazza. Functional Foods Biochemical Processing Aspects Culinary and Hospitality Industry Publications Services(1998)
5. Israel Goldberg Functional Foods Designer Foods Pharma Food,Nutraceuticals Culinary and Hospitality Industry Publications (2001)
6. Robert E C Wildman Handbook of Nutraceuticals and Functional Foods ( 2001).

### **Net Reference**

[www.ajpcr.com/vol3Issue1/265.pdf](http://www.ajpcr.com/vol3Issue1/265.pdf)

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[www.nutrition.org/content/136/6/1636s.long](http://www.nutrition.org/content/136/6/1636s.long)

[www.bodybuilding.com/store/cla.html](http://www.bodybuilding.com/store/cla.html)

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[www.whfoods.com/gen page.php? tname = nutrient & bid =84](http://www.whfoods.com/gen_page.php? tname = nutrient & bid =84)

[www.eufic.org/article/en/expid/basics-functional -foods -](http://www.eufic.org/article/en/expid/basics-functional -foods -)

[www.ashwangandha.com](http://www.ashwangandha.com)

[www.herbwisdom.com/herb-ashwafgandha.html](http://www.herbwisdom.com/herb-ashwafgandha.html)

<https://en.wikipedia.org/wiki/Shalot>

<http://www.home-remedies-guide.com/herbs/indian-aloe.htm>

<https://globalhinduism.wordpress.com//medicinal-herbs-names-and-uses-part-3/>

## SEMESTER-II: CORE BASED ELECTIVE – II

### NUTRITIONAL MANAGEMENT AND SAFETY FOR FOOD SERVICE

Course Code : 17PND2CE2

Hours/Week : 6

Credit : 4

Max. Marks : 100

Internal Marks : 25

External Marks : 75

#### Objectives:

To develop managing skill in food service industry.

#### UNIT- I

18 hours

**1.1 Food Service Industries in India** – acts and responsibilities. Fables, foibles, fraud and fact – note on eating preference and misinformation, reliable information, #source of reliable information, government information and regulations on healthful food program#.

#### UNIT- II

18 hours

**2.1 Menu Planning and Service** - Projecting and preserving nutrients during production, purchase, storage, cooking and serving. Types and function of menu, planning a menu according to food service type, recipes and #special menu for food service#.

#### UNIT – III

18 hours

**3.1 Kitchen management** - principles of layout, determination of equipment – factors affecting the selection, criteria for selection, types of equipment, #basic materials used in manufacture of equipments#, installation and care of equipments, fuel saving techniques, physical planning- architectural features, floor, walls, lighting, plumbing and ventilation.

#### UNIT - IV

18 hours

**4.1 Food service** - service areas, methods and styles, table winding up, setting, presentation techniques, clearing and customer relations.

**4.2 Laws governing food service institutions** – food laws, labour laws, #laws concerning hygiene and safety#.

#### UNIT -V

18 hours

**5.1 Environmental Hygiene and Sanitation** - Hygiene in food plant hygiene, safety handling, personal hygiene, to prevent procedure followed in food service establishment to prevent accidents, facilities and benefits to workers in each establishment. #Indices of food and water field of catering establishment#, biological criteria of food, testing and control measures. Management of food waste and waste water.

#.....# self- study portion.

## **TEXT BOOKS:**

1. M. Sethi, S. Malhan, "Catering management: An integrated approach", wiley Eastern, New Delhi, (1993).
2. M. Sethi, "Institutional Food Management", 1<sup>st</sup> edition, New Age International Publishers, (2004).
3. S. Andrews, "Textbook of Food & Beverage Management", Tata McGraw Hill Education (P) Ltd., (2008).
4. D.Kumar, "Food Service & Catering Management", Omega Publications, New Delhi-2, (2009).
5. George.B & Chatterjee.S, "Food Beverage Service & Management", Jaico Publishing house, (2008).
6. S. Andrews, "Food & Beverage Service (Training Manual)", Tata McGraw Hill Publishing Company Ltd., (1980).

**UNIT I** Text book 4 Chapter-VII, VIII, IX

**UNIT II** Text book 1 Chapter- XV, XVII  
Text book 2 Chapter-XVII  
Text book 3 Chapter-XII

**UNIT III** Text book 1 Chapter –IV, V, VIII, IX, XI  
Text book 2 Chapter- IX, X, XI, XII, XIII  
Text book 5 Chapter-XXXXIV

**UNIT IV** Text book 1 Chapter –XXVI, XXX  
Text book 2 Chapter – XIX, XXX, XXXI  
Text book 6 Chapter – XI, XIII, XV, XVI

**UNIT V** Text book 1 Chapter –XVI, XXVIII, XXIX  
Text book 2 Chapter-XX, XXX

## **REFERENCES BOOKS**

1. R. Kotscheva, and M.E. Teerell, "Food service planning; layout and equipment", 3<sup>rd</sup> edition, MacMillan Publication Co., New York, (1985).
2. H Delfakis, W.C. Scanion, and J. B.Van Burch, "Food service Management", South Western Publilcation Co., Cincinatti, Ohia, (1992).
3. J.P. Palacio, V. Harger, G. Shgart and M. West, "Introduction to food service", 17<sup>th</sup> edition, Mac Millan publication Co., New York, (1994).
4. D.R. Lillicap and J.A. Cousins, "Food and Beverage Service", 4<sup>th</sup> edition, ELBS, (1994).

### **SEMESTER III: CORE – IX**

#### **DIET THERAPY INTERNSHIP**

<b>Course Code</b>	<b>: 17PND3C9I</b>	<b>Max. Marks</b>	<b>: 100</b>
<b>Hours/Week</b>	<b>: 6</b>	<b>Internal Marks</b>	<b>: 25</b>
<b>Credit</b>	<b>: 5</b>	<b>External Marks</b>	<b>: 75</b>

The Practical work consists of internship in a multi-speciality hospital for one month.

- i. Visits to the different wards to observe the patients.
- ii. Patient's medical history
- iii. Planning the diet according to medical prescription.
- iv. Supervising the food preparation and service in the dietary department of the hospital.
- v. Calculating the diet according to medical prescription.
- vi. Accompanying the doctor while visiting the patient.
- vii. Diet counseling to the patient
- viii. Case study- Selecting and observing 2 patients requiring a therapeutic diet in relation to Patient's dietary history - income, occupation, food habits and social factors.

#### **Preparation of the report should include**

- i. History of the hospital.
- ii. Location
- iii. Organization structure
- iv. Facilities provided
- v. Layout of the kitchen
- vi. Work organization
- vii. Duties of the dietitian
- viii. Special dietary preparation
- ix. Types of service
- x. Equipments
- xi. Storage of food
- xii. Handling of leftovers and shortages
- xiii. Sanitation and hygiene.
- xiv. Case study

## SEMESTER III: CORE – X

### FOOD MICROBIOLOGY

<b>Course Code</b> : 17PND3C10	<b>Max. Marks</b> : 100
<b>Hours/Week</b> : 6	<b>Internal Marks</b> : 25
<b>Credit</b> : 5	<b>External Marks</b> : 75

#### Objectives:

This course will enable the students to

1. understand deeply about the importance of micro-organisms in food.
2. study about the factors affecting the growth of microorganism in food.
3. understand the microorganisms and food borne illness.
4. create awareness about emerging trends in the field of the food microbiology.

#### UNIT-I

18 hours

1.1 **Food microbiology** – Definition and scope of food microbiology.

1.2 **Importance of micro-organism in food microbiology:**

**Bacteria** –lactis, acetics, butyrics, propionics, proteolytic bacteria, lipolytic bacteria, saccharolytic bacteria, pectinolytic bacteria, thermophiles, thermophilic bacteria, psychrotrophs, halophiles, osmophilic bacteria, pigmented bacteria, gas forming bacteria, coliforms.

1.3 **Mould**- penicillium. **Yeast**- *saccharomyces cerevisiae*. **Algae**- red sea weed

#### UNIT-II

**Contamination and spoilage of food:**

18 hours

2.1 **Contamination**-definition, sources of contamination- green plants and fruits, animals, sewage, water, air, during handling and processing.

2.2 **Spoilage** -definition, causes of spoilage.

2.3 **Factors responsible for spoilage**-Factors affecting kind, numbers, growth of micro-organism in food. Changes caused by micro-organism in nitrogenous and non-nitrogenous compound of food

#### UNIT-III

18 hours

**Contamination, spoilage, preservation of foods:**

3.1 Contamination, spoilage, preservation of Cereals and cereal products, Fruits and Vegetable Products.

3.2 Contamination, spoilage, preservation of Milk and milk product,

3.3 Contamination, spoilage, preservation of Meat, fish, egg and poultry.

#### UNIT-IV

18 hours

**Food-borne illness:**

4.1 Food Infection and Food Intoxication: definition, classification of food diseases.

Bacterial Food-borne illness: staphylococcal intoxication, botulism, salmonellosis, Enteropathogenic *Escherichia coli* infection.

4.2 Non Bacterial Food-borne illness: mold-aflatoxin, virus-infectious hepatitis, poliomyelitis, rickettsias, parasites- trichinosis.

## UNIT-V

18 hours

### Current trends in food microbiology

- 5.1 Microbiology of food products- ingredients, packaging materials, equipments, sanitizing, the preservation process, vending machines for food and beverages, food handling on large scale. Microbiology criteria for food- specification, standards and guidelines
- 5.2 Probiotics- Antimicrobial activity and health promoting effects of Lactic acid bacteria.
- 5.3 Encapsulation- definition, Microencapsulation technology to protect probiotics.

### TEXT BOOKS

1. W.C. Frazier(2014)., Food Microbiology, Fifth Edition, Tata McGraw Hill Book Company, New Delhi.
2. Pelczar and Krieg(2006)., Microbiology, Fifth Edition, Tata McGraw Hill Book Co., London .
3. M.R.Adams and M.O. Moss (2005), Food microbiology, second edition, New Age International publishers, New Delhi.
4. A. K. Joshua(2001)., Microbiology, Fourth Edition, Popular Book Depot Publishers, Chennai.

UNIT I Text book –3 Chapter – I

Text book –1 Chapter – II

UNIT II Text book –1 Chapter – III, IV

UNIT III Text book –1 Chapter – XI, XIII, XIV, XV, XVI, XVII, XVIII.

UNIT IV Text book – 1 Chapter – XXIV, XXV

UNIT V Text book – 1 Chapter – XXVII, XXVIII,

Text book –3 chapter -IX

Net Reference: [www.cdn.intechopen.com/pdfs/.../In\\_Tech\\_Encapsulation\\_technology\\_to\\_prote...](http://www.cdn.intechopen.com/pdfs/.../In_Tech_Encapsulation_technology_to_prote...)

### REFERENCE BOOKS

1. Salle. A.J (2007), Fundamental Principles of Bacteriology, Seventh Edition, Tata McGraw Hill Book Company, New Delhi).
2. Vijaya Ramesh. K (2007) , Food Microbiology, MJP Publishers, Chennai.

### NET REFERENCE

1. [www.cdn.intechopen.com/pdfs/.../In\\_Tech\\_Encapsulation\\_technology\\_to\\_prote...](http://www.cdn.intechopen.com/pdfs/.../In_Tech_Encapsulation_technology_to_prote...)

**SEMESTER: III    CORE - XI**

**RESEARCH METHODOLOGY AND STATISTICS**

<b>Course Code</b> : 17PND3C11	<b>Max. Marks</b> : 100
<b>Hours/Week</b> : 6	<b>Internal Marks</b> : 25
<b>Credit</b> : 4	<b>External Marks</b> : 75

**Objectives:**

**To enable the students to**

1. Understand the importance of research
2. Learn about the various applications of students in the research
3. Familiarize on writing the project reports

**UNIT I**

**18 hours**

- 1.1 Meaning of Research, objectives of research, Types of Research and their application. Research Design – Qualities of good research, problems encountered by a researcher.
- 1.2 **Sampling**– Introduction, methods -Random sampling methods ( random, stratified, systematic, cluster sampling), Non-Random sampling methods( judgement, convenience, quota sampling) sampling and non-sampling errors.

**UNIT II**

**18 hours**

- 2.1 **Methods of data collection** - primary and secondary, Primary data - Questionnaire, preparation of schedules, Interview method. Secondary data - Sources of secondary data, precautions while using secondary data.
- 2.2 **Classification of data**- Classification – meaning and objectives, types of classification, formation of discrete and continuous frequency distribution, Tabulation –parts of a table, general rules of tabulation, Types of tables.

**UNIT III**

**18 hours**

**Representation of data** – Diagrammatic and graphical representation , Significance of diagrams and graphs, general rules for constructing diagrams, Types of diagrams, graphs of Time series, graphs of frequency distribution.

**UNIT IV**

**18 hours**

- 4.1 **Statistical analysis** Measures of central Tendency – Mean, Median, Mode, their relative advantages and disadvantages, Measures of dispersion- Mean deviation, standard deviation, quartile deviation. Correlation analysis, types of correlation, regression, difference between correlation and regression.
- 4.2 **Tests of significance**- large and small samples, “t” and “f” test, chisquare test, ANOVA technique – ANOVA table, types, one way and two way, ANOVA in research.

**UNIT V**

**18 hours**

- 5.1 **Report writing**-layout of research report, significance of report writing, #Steps in report Writing#, types of research report, oral presentation, mechanism of report writing, precautions and essentials of writing a good research report, footnotes and bibliographical citations.

**#.....# self- study portion.**

## **TEXT BOOKS**

1. C. R. Kothari, Research Methodology(2002).
2. P. Shanthi Sophia and Bharathi, Second Edition, Computer Oriented Statistical Methods/Probability and Statistics, Charulatha publication(2000).
3. R.S.N.Pillai and V. Bagavathi, Statistics, Chand and Company Limited(2001).

**UNIT I**      Text Book 1 Chapter-I, II

**UNIT II**      Text Book 3 Chapter- VI

**UNIT III**     Text Book 3 Chapter-VI, VIII

**UNIT IV**     Text Book 3 Chapter –IX, XII, XIII, XX

**UNIT V**      Text Book 1 Chapter -IX

## **REFERENCE BOOKS**

1. S.P. Gupta , Statistical Methods, 31<sup>st</sup>Edition, Sultana Chand and Sons (2002).
2. R.P.Devadas,A Handbook on Methodology of Research, Sri Ramakrishna Vidhyalaya, Coimbatore(1989).
3. P. Ramakrishnan, Biostatistics, Saras Publication(2001).
4. H.M.C. Donald,Burney , Research Methods, Fifth edition, Thomson and Wadsworth Publications(2002).

**SEMESTER: III CORE: XII**

**NUTRITIONAL BIO-CHEMISTRY AND FOOD MICROBIOLOGY PRACTICAL**

<b>Course Code</b> : 17PND3CP12	<b>Max. Marks</b> : 100
<b>Hours/Week</b> : 6	<b>Internal Marks</b> : 20
<b>Credit</b> : 4	<b>External Marks</b> : 80

**NUTRITIONAL BIO-CHEMISTRY PRACTICAL**

**Quantitative analysis of blood:**

- a) Glucose- WV method (or) Orthotoludine method
- b) Cholesterol – Zak’s method
- c) Urea-DAM method
- d) Serum A/G ratio and Total Protein

**Quantitative analysis of Urine :**

- a) Creatinine
- b) Urea-DAM Methods
- c) Calcium
- d) Phosphorus

**FOOD MICROBIOLOGY PRACTICAL**

1. Safety practices in Microbiological laboratory
2. Microscope and its operation
3. Principles and operations – Autoclave, Hot Air Oven, Incubators, colony counter, Centrifuge, pH meter, Colorimeter and Spectrophotometer
4. Preparation of culture media, cleaning of glassware and sterilization methods
5. Pure culture techniques - Streak plate, Pour plate and Spread plate.
6. Staining techniques – Simple staining, Gram’s staining, Spore-staining, Capsular staining.
7. Test for motility of bacteria – Hanging drop technique.
8. Identification of Gram positive organisms (using food strains): *Streptococcus pneumoniae*, *Staphylococcus aureus* and *Bacillus* sp. and Gram negative organisms (using food strains): *Escherichia coli* and *Proteus* sp.
9. Identification of important bacteria, moulds and yeast in food (by using slides/cultures)- *E-coli*, *rhizopus*, *penicillium*, *mucor*, *aspergillus*, yeast.
10. Bacteriological examination of milk by methylene blue reduction test.
11. Demonstration of bacterial count in the given sample by using colony counter.
12. Water analysis by MPN technique – presumptive *coliform* test – confirmed *coliform* test and completed *coliform* test.
13. Identification of microorganism – involved in preparation of wine and ginger beer.

**Related Experience:** Visit to an established microbiology laboratory.

## SEMESTER – III : ELECTIVE – III

### SPORTS NUTRITION

<b>Course Code</b> : 17PND3CE3	<b>Max. Marks</b> : 100
<b>Hours/Week</b> : 6	<b>Internal Marks</b> : 25
<b>Credit</b> : 4	<b>External Marks</b> : 75

#### Objectives:

1. To gain the knowledge and understanding of nutrition required for sports in order to enhance performance.
2. To learn the role and significance of macro nutrients and micronutrients in achieving fitness.

#### UNIT I

18 hours

##### Introduction to sports nutrition

- 1.1 Meaning and importance of sports nutrition. Different types of sports. Physiological changes during sports and exercise.
- 1.2 Nutritional consideration for sports person as compared to normal active person. Energy substrate for activities of different intensity and duration.

#### UNIT II

18 hours

##### 2.1 Role of macronutrients – Carbohydrate

Carbohydrate reserves. Carbohydrate as energy source for sports and exercise. Glycogen re synthesis and carbohydrate loading. Carbohydrate requirements.

##### 2.2 Consumption of carbohydrate –

Consumption of carbohydrate in pre exercise, duration and recovery period. Carbohydrate supplementation during exercise. Factors affecting utilization of carbohydrates during exercise.

#### UNIT III

18 hours

- 3.1 **Role of lipids as an energy source for sports** –Fat stores, oxidation of fats, factors affecting fat oxidation (intensity, duration, training status and carbohydrate feeding).
- 3.2 **Consumption of fats** – Fat requirements and utilisation. Influence of dietary factors on fat utilization – total fat intake, high carbohydrate diets, dietary fibre and alcohol.

#### UNIT IV

18 hours

- 4.1 **Protein and amino acid requirements** - Importance of protein and amino acid requirements during sports. Factors affecting protein turnover during endurance exercise, resistance exercise and recovery process. Protein supplementation.
- 4.2 **Importance of micronutrients for sports** – Role of vitamins, minerals and antioxidants. Dietary supplements and ergogenic aids (Mechanical, nutritional, pharmacological, physiological and psychological) – concept .

#### UNIT V

18 hours

- 5.1 **Water balance** – Fluid balance in sports and exercise; dehydration. Water recommendation for athletic performance. Sports anaemia.

## 5.2. Performance – influencing factors – Chronic dieting and eating disorder.

Female athlete triad, stress, type of exercise, gender influence, lipid metabolism and weight loss, caffeine and athletic performance.

### TEXT BOOKS

1. Balaram Thapar, Health and Physical Fitness, Rajat publications, New Delhi(2010).
2. Paul Insel, R. Elaine Turner and Don Ross, Nutrition, Third Edition, Jones and Bartlett Publishers (2007).
3. D. Eleanor, Schlenker and Sara Long Roth, Essentials of Nutrition and Diet Therapy, Tenth Edition Library of Congress Cataloging-in- Publication Data (2011).
4. Smolin and Grosvenor, Nutrition Science and Application, Library of Congress Cataloging-in- Publication Data (2008).
5. Anjana Agarwal and A. Shobha Udipi, Textbook of Human Nutrition, First Edition, Jaypee Brothers Medical Publishers (p) Ltd, (2014).

**UNIT I** [https://en.wikipedia.org/wiki/Sports\\_nutrition](https://en.wikipedia.org/wiki/Sports_nutrition)  
[http://www.medscape.com/viewarticle/717046\\_7](http://www.medscape.com/viewarticle/717046_7)

**UNIT II** Text Book-2 Chapter –VIII  
Text Book-3 Chapter-XIV  
<http://www.sportsnutritionworkshop.com/files/38.spnt.pdf>

**UNIT III** Text Book-2 Chapter -VIII  
Text Book-3 Chapter-XIV

**UNIT IV** Text Book- 2 Chapter -VIII  
Text Book- 4 Chapter -XIII  
Text Book- 5 Chapter -XIII

**UNIT V** Text Book- 5 Chapter -XIV

### REFERENCE BOOKS

1. Bucci, L., Nutrients as Ergogenic Aids for Sports and Exercise, Boca Raton, FL.:CRC Press (1993).
2. Don MacLaren., Advances in Sport and Exercise Science : Nutrition and Sport , ChPublished by Churchill Livingstone, Elsevier (2007).
3. Bruce Reider, Sports Medicine: The school age athlete, Published by W.B. Saunders (1996).
4. Dan Banardot, Nutrition for Serious Athletes, Human Kinetics(2000).
5. Judy A Driskell, Ira Wolinsky Energy-Yielding Macronutrients and Energy Metabolism in Sports Nutrition, Edited by, CRC Press (2000).
6. Satyanarayan, K; Nageshwar Rao. C; Narsinga Rao, B.S.; Malhotra, M.S. Recommended Dietary Intakes for Indian Sportsman and Women, Hyderabad, National Institute of Nutrition ((1985).
7. Brouns Fred and Caustan – Cargill, Essentials of Sports Nutrition – 2nd edition, John Wiley and Sons, England(2002).
8. Burke Louse and Deakin Vicky, Clinical Sports Nutrition, McGraw – Hill Pvt. Ltd. Australia (2006).
9. Summerfield Lianne M, Nutrition Exercise and Behaviour An integrated approach to weight management, Belmont (USA). Wadsworth/Thompson Learning (2001).
10. Wolinsky Ira, Nutrition in Exercise and Sports, CRC press Boca Raton(1998).
11. Wolinsky Ira, Drishill Judy, Sports and Nutrition Vitamins and Trace elements,

## SEMESTER: III ELECTIVE-III

### NUTRITIONAL COUNSELLING AND EDUCATION

<b>Course Code</b> : 17PND3CE3	<b>Max. Marks</b> : 100
<b>Hours/Week</b> : 6	<b>Internal Marks</b> : 25
<b>Credit</b> : 4	<b>External Marks</b> : 75

#### Objectives:

##### To enable students

1. To understand the principles and methods of counselling.
2. To apply counselling methods to patients with different diseases

#### UNIT I

18 hours

- 1.1 **Nutritional Counselling** - counselling techniques, stage of change. Activities that facilitate behavior change, understanding cultural factors, developing Discrepancy, avoiding arguments / defensiveness, rolling with resistance, supporting self- efficacy.
- 1.2 **Intervention Model** – Interviewing, assessment of current eating behavior and assessment of readiness to change.

#### UNIT II

18 hours

- 2.2 **Nutritional Counselling Sessions** – not ready to change counselling sessions - asking open – ended questions, reflective listening, affirming, summarizing, eliciting self-motivational statements, intention to change, ending the session.
- 2.3 **Ready to change counselling sessions**- action plan, arranging for the next contact, resistance behaviors and potential strategies to modify them-reflecting, double-sided reflection, shifting focus, emphasizing personal choice, reframing.

#### UNIT III

18 hours

- 3.1 **Psychology**- Introduction, definition., basic concepts –Attention, Perception, Learning, Memory, Personality, Cognition, Motivation.
- 3.2 **Counseling Psychology**-Introduction, definition, meaning and importance.

#### UNIT IV

18 hours

- 4.1 **Counselling Process** -Various phases / stages in counseling process. Types of Counselling:  
crisis counselling, facilitative counselling, preventive counselling and Development counseling.
- 4.2 **Counsellor-Counsee Relationship** - nature and characteristics, factors influencing the relationship. Counselling and Psychotherapy, values in counselling.

#### UNIT V

18 hours

- 5.1 **Family Counselling** - family planning counselling, abortion counselling, #importance of counselling for children and adolescents#
- 5.2 **Geriatric counseling** - for patients with specific diseases like HIV/AIDS, cancer, and Diabetes.

- UNIT I** Ref book 3 Chapter – V
- UNIT II** Ref book 1 Chapter – XVII
- UNIT III** Ref book 2 Chapter – XXIV
- UNIT IV** Ref book 2 Chapter – XXIV
- UNIT V** Ref book 1 Chapter – XXX, XXXII, XXXVIII  
Ref book 3 Chapter –V

**# ..... # Self -Study Portion**

**REFERENCE BOOKS**

1. L.K. Mahan and M.T. Arlin, Krause's Food Nutrition and Diet Therapy, Eleventh Edition, W.B.Saunders Company, London (2000).
2. Robinson, Normal and Therapeutic Nutrition, Seventeenth Edition, Oxford & LBM Publishing, Bombay (1990).
3. M. E. Shils, J. A. Olson, M. Shike, & A.C. Ross, Modern Nutrition in Health & Disease, Tenth Edition, Lippincott Williams and Wilkins (2006).
4. Currie, Joe, Barefoot Counseling, A Premier in Building helping Relationships, Asian Trading Cooperation, Bangalore (1976).
5. K.K. Bhatia, Principles of Guidance and Counselling, Kalyani Publishers Ludhiana (2002).
6. Nelson – Jones, Richard, Practical Counselling and helping Skills, Better Yourself Books, Bombay (1994).

## SEMESTER –III: EXTRA CREDIT COURSE - I

### PAEDIATRIC AND GERIATRIC NUTRITION

**Course Code : 17PND3EC1**

**Credit : 5\***

**Max. Marks : 100**

**External Marks : 100\***

#### **Objectives:**

To enable the students to

1. Learn the importance of nutritional care and nourishment of children
2. Understand the nutritional requirements of children and the effects of various diseases on their nutritional status
3. Gain knowledge on the various dimensions of ageing to improve quality of life
4. Understand the multifaceted aspects of aging the importance of nutrition during old age
5. Become competent to provide nutritional and health care for the elderly.

#### **UNIT I**

**18 hours**

##### **Infancy & Immunization Schedule**

- 1.3 Paediatrics – concept, physical development, assessment of nutritional status- anthropometric measurements, biochemical examination, clinical assessment. Nutritional and food requirements for infants.
- 1.4 Immunization schedule during pregnancy, infancy and childhood.
- 1.5 **Identification of Sick Newborn-** Detection of abnormal signs- cyanosis, jaundice, respiratory distress, bleeding, seizures, refusal of feeding, abdominal distention, dehydration, failure to pass meconium and urine.

#### **UNIT II**

**18 hours**

- 2.1 **Nutritional Management-** Premature, LBW Babies and children with developmental disabilities- characteristics, causes and complications, feeding methods, growth and nutritional assessment. Nutritional care for premature babies.
- 2.2 **Nutritional Management for Children with Special Conditions-** Causes, symptoms and dietary management for autism, ADHD (Attention Deficit Hyperactivity disorder), cerebral palsy.

#### **UNIT III**

**18 hours**

- 3.1 **Ageing and nutrition: a global challenge** – Introduction to geriatrics(old age), definition. The ageing process- physiological and biochemical changes. Lifestyle pattern. Policy framework of WHO related to ageing.

#### **UNIT IV**

**18 hours**

- 4.1 **Nutritional Requirements** – Nutritional requirements during old age, food requirements and balanced diet. Food habits of the elderly. Supplements for the elderly.
- 4.2 **Nutritional and health status of elderly-** Nutritional assessment during old age. Factors influencing food and nutrient intake- Changes in organ function and impact on nutrient intake, nutritional concerns of the elderly, modification of diet during old age.

## UNIT V

18 hours

- 5.1 Nutritional problems of the elderly, chronic degenerative diseases and disability disorder** – Malnutrition, osteoporosis, obesity, neurological dysfunction, anaemia, constipation, dental problems, indigestion, cardiovascular disease, diabetes mellitus, cancer, vision problems and arthritis – their etiology and prevention – a review. Drug and Nutrient Interaction.

### TEXT BOOKS

1. Sushila Srivastava and K. Sudha Rani, Text Book of Human development A life span developmental approach, First Edition, S. Chand & Company Pvt, 2014.
2. B. Srilakshmi, Dietetics, Seventh Edition, New Age International (P) Ltd. Publishers, Chennai, 2011.
3. S.R. Mudambi, M.V. Rajagopal, Fundamentals of Foods & Nutrition & Diet Therapy, 5<sup>th</sup> Edition, New Age International (P) Ltd, 2007.
4. Dr. M. Swaminathan, Advanced Text Book of Food & Nutrition Vol-I Fundamental Aspects, 2<sup>nd</sup> Edition, BAPPCO, 1985.
5. Jim Mann, A. Stewart Truswell, Essentials of Human Nutrition, 4<sup>th</sup> Edition, Oxford University press, 2012.

### REFERENCE BOOKS

1. Mahan, L.K. and Escott-Stump, S. Krause's Food Nutrition and Diet Therapy, 10<sup>th</sup> Edition, W.B. Saunders Ltd, 2000.
2. Depak K Guha, Neonatology Principles and Practices, Third Edition, Jaypee Brothers Medical Publications (P) Ltd, New Delhi, 2005.
3. Textbook of pediatric nutrition- Book review, Stephen J Rose, Arch Dis Child, 1995.
4. Shils, M.E., Olson, J.A., Shike, M. and Ross, A.C. Modern Nutrition in Health and Disease, 9<sup>th</sup> Edition, Williams and Wilkins, 1999.
5. Escott-Stump, S, Nutrition and Diagnosis Related Care, 4<sup>th</sup> Edition, Williams and Wilkins, 1998.
6. Davis, J. and Sherer, K., Applied Nutrition and Diet Therapy for Nurses, 2<sup>nd</sup> Edition, W.B. Saunders Co, 1994.
7. Walker, W.A. and Watkins, J.B. (Ed), Nutrition in Pediatrics, Boston, Little, Brown & Co, 1985.
8. Fauci, S.A. et al, Harrison's Principles of Internal Medicine, 14<sup>th</sup> Edition, McGraw Hill, 1998.
9. Chaudhary, A. (Ed), Active Aging in the New Millennium, Pub. Anugraha, Delhi, 2001.
10. Sharma, O.P. (Ed.) Geriatric Care in India – Geriatrics and Gerontology: A Textbook, M/s. ANB Publishers, 1999.

**UNIT – I** Text Book - 1 Chapter –I, III

**UNIT-II** Text Book –2 ,

Ref Book – 2 -Chapter – III, Chapter – XXXXXI, XXXXXXXXXXXVI, XXXXXXXXXXXXI

**UNIT -III** Text Book - 2 Chapter-IX

Text Book - 4

**UNIT -IV** Text Book -2 Chapter – IX

Text Book -3 Chapter – XVI, Text Book – 5

**UNIT-V** Text Book -2 Chapter – IX

**SEMESTER: IV CORE: XIII**

**INSTITUTIONAL FOOD MANAGEMENT**

<b>Course Code</b> : 17PND4C13	<b>Max. Marks</b> : 100
<b>Hours/Week</b> : 6	<b>Internal Marks</b> : 25
<b>Credit</b> : 5	<b>External Marks</b> : 75

**Objectives:**

**To enable the students to**

1. Understand the basic principles of management in food service units
2. Develop managerial skills among the students
3. Develop skills in setting up food service units
4. Create an awareness of the renewable sources of energy

**UNIT –I**

**18 hours**

**Food service industry**

- 1.1 Different Type of catering institutions - commercial and non-commercial.
- 1.2 Institutional food service- definition, objectives, types of institutional food service.
- 1.3 Food service system - Conventional systems, Convenience systems, ready food system, cook chill, cook freeze and vending systems.

**UNIT-II**

**18 hours**

**Management and resources**

- 2.1 Management – Definition, Principles and Tools of Management- tangible and intangible tools, styles of leadership, Qualities of a good Leader. Approaches –MBO,TQM
- 2.2 Resources-money, space, time, energy.
- 2.3 Equipments- classification of equipments, care and maintenance of equipment,

**UNIT-III**

**18 hours**

**Food management**

- 3.1 Menu planning – definition, functions and types of menu. Designing the menu card.- points to be considered while writing menus.
- 3.2 Food purchase - Purchasing procedure, food specification-objectives, methods of purchasing, forms used in food purchase, receiving, storing and issue.
- 3.3 Food production and service- process, effective use of leftover foods. Styles of service – Formal and Informal styles of service

**UNIT-IV**

**18 hours**

**Financial management.**

- 4.1 Financial and management accounting -definition, application of management accounting in catering operation.
- 4.2 Concept and components of cost, cost control, pricing of food.
- 4.3 Accounting system – Accounting techniques-single and double entry system, advantages.Types and Book of accounts.

**UNIT –V****18 hours****Fuel management, Hygiene and Sanitation**

- 5.1 Fuel management- types of fuel, merits and demerits, fuel saving economy in relation to food service industries.
- 5.2 Hygiene and sanitation - definition, importance, environmental hygiene and sanitation.
- 5.3 Hygiene in food handling, personnel hygiene, importance of pest and rodent control in food service units.

**TEXT BOOKS**

1. MohiniSethi(2011), Institutional Food Management, New Age International (P) Limit Publishers New Delhi.
2. West's and Wood's(1998)., Introduction to Food service, Second Edition, Mac Mhillan Publishing New York.

**UNIT I** Text Book- 1 Chapter I,IV

**UNIT II** Text Book- 1 Chapter I,III

**UNIT III** Text Book- 1 Chapter IV

**UNIT IV** Text Book- 1 Chapter V

**UNIT V** Text Book- 1 Chapter VII

**REFERENCE BOOKS**

1. Jag Mohan Negi (2009), Food and beverage management and cost control, Knanishka Publishers, New Delhi.
2. Sudhir Andrews (2008), Text book of Food and Beverage Management, Tata McGraw- Hill Publishing Company Limited New Delhi.
3. Mohini Sethi and Malham (2007), Catering Management and Integrated Approach, John Wiley&Sons, Eastern Limited New Delhi.

**SEMESTER: IV    CORE: XIV**

**COMMUNITY NUTRITION AND PUBLIC HEALTH**

<b>Course Code</b>	<b>: 17PND4C14</b>	<b>Max. Marks</b>	<b>: 100</b>
<b>Hours/Week</b>	<b>: 6</b>	<b>Internal Marks</b>	<b>: 25</b>
<b>Credit</b>	<b>: 5</b>	<b>External Marks</b>	<b>: 75</b>

**Objectives:**

To enable students

1. To understand national nutritional problems and their implications.
2. To become familiar with the national and international contributions towards improvement of nutrition in India.
3. To become better prepared to evaluate nutrition projects in the community.

**UNIT- I**

**18 hours**

**1.1 Food and Nutrition Security**

Food production, access, distribution, per capita food availability of food grains, losses, consumption, Food Security

**1.2 Nutrition and National Development**

Nutrition in National Development in terms of Socio – Economic, Industrial and Agricultural development

**UNIT-II**

**18 hours**

**2.1 Major Nutritional problems – Etiology, prevalence, Clinical manifestations, preventive and nutritional measures of**

Malnutrition – causative factors - Low birth weight, faulty child feeding practices, dietary inadequacy, frequent infections, large families, high family illiteracy, taboos and superstitious, Vicious cycle, Under Nutrition in Children and Adults

Macro and Micro Nutrient Deficiencies – PEM, Anaemia, Fluorosis, #Iodine deficiency# Osteoporosis, Prophylaxis Programme – Vitamin A,

**2.2 Special Health Problems – Smoking, alcoholism, Drug addiction, AIDS and AIDS Control Programme**

**2.3 Determinants of Nutritional Status -**

Nutritional Assessment – Anthropometry, Clinical Examination, Laboratory and Biochemical Assessment, Dietary Assessment.

**UNIT-III**

**18 hours**

**National, International organization and Nutrition Education**

**3.1 National Nutrition policy –XII five year plan, Recommendations, Action Plan**

Action Programmes (**International**)– WHO, ICDS, FAO, UNICEF, World Bank, Voluntary Services, CARE

**3.2 National organization – ICMR, NIN, CSWB, SSWB, FNB, NNMB, CFTRI, DFRL, NIPCCD**

**3.3 Nutrition Education - Definition, importance, Principle in Planning, Programme Execution and Evaluation, Mass Media, Types, Preparation of Educational Material- Coverage, Evaluation**

**UNIT- IV****18 hours****4.1 Approaches and strategies for improving nutritional status and health:**

Increased agricultural production and animal husbandry foods and Nutrition Gardens

**4.2 Issues and policies on access to food and Nutrition – Income, women and health, Growth and poverty****4.3 Social protection measures- PDS, TPDS****4.4 Food based interventions** including fortification and genetic improvement of foods, Supplementary feeding.**UNIT- V****18 hours****Nutrition In Emergencies and Disasters****5.1** Natural and manmade disasters resulting in emergency situations**5.2** Assessment and surveillance of affected population groups – Clinical, Anthropometric and Dietary methods**5.3 Nutritional relief and rehabilitation –** Assessment of food needs, food distribution strategy, mass and supplementary feeding, sanitation and hygiene, evaluation of feeding programmes**5.4 Nutrition for special conditions -** Introduction to Nutrition for physical fitness and sport Feeding problems in children with Special needs, Considerations during natural and man- made disasters, e.g. floods, War.- Basic guidelines in disaster management.

# ..... # self -study portion.

**TEXT BOOKS**

1. M.S. Bamji, N. Prahlad Rao, V. Reddy. Textbook of Human Nutrition, Second Edition, Oxford and PBH Publishing Co,Pvt.Ltd, New Delhi (2004).
2. M. Swaminathan, Essentials of Food and Nutrition. An Advanced Textbook Vol.I, Printing and Publishing Co.Ltd, Bangalore (2007).
3. B. Srilakshmi, Nutrition Science, Sixth Edition, New Age International (Pvt) Ltd, New Delhi (2007).

<b>UNIT : I</b>	Ref Book : 1	Chapter VIII
<b>UNIT –II</b>	Text Book - 1	Chapter IX, X, XI, XII, XIII, IXX, XX , XXI , XXII, XXXVII
<b>UNIT –II</b>	Text Book - 2	Chapter XVIII, XV
<b>UNIT- III,</b>	Net Ref	<a href="http://www.oxfamindia.org">www.oxfamindia.org</a> <a href="http://www.Planningcommission.nic.in">www.Planningcommission.nic.in</a>
<b>UNIT - IV</b>	Net Ref	<a href="http://www.oxfamindia.org">www.oxfamindia.org</a> <a href="http://www.fao.org">www.fao.org</a>
<b>UNIT - V</b>	Text Book : 3	Chapter – XXII

**REFERENCE BOOKS**

1. A. Park, Textbook of preventive and Social Medicine, Nineteenth Edition, M/S Banarasids, Bharat Publishers, Jabalpur (2007).
2. D.P Bhatt, Health Education, Khel Sahitya Kendra Publishers, New Delhi (2008)
3. M.J. Gibney, B.M Margetts, J.M Kearney, L. Arab, Public Health Nutrition, Blackwell Publishing Co.UK (2004)
4. Michael,*et, al*, “Public Heath Nutrition”, Blackwell Science, UK (2004)

## SEMESTER- IV: CORE – XV

### APPLICATION OF COMPUTER IN NUTRITION AND DIETETICS PRACTICAL

<b>Course Code</b>	<b>: 17 PND4CP15</b>	<b>Max. Marks</b>	<b>: 100</b>
<b>Hours/Week</b>	<b>: 6</b>	<b>Internal Marks</b>	<b>: 20</b>
<b>Credit</b>	<b>: 5</b>	<b>External Marks</b>	<b>: 80</b>

1. Working with computer,
  - Working with files and folders
  - Working with control panel: Installation of new programs, changing password and security options
  - Working with mail: creating e-mail ID, composing, sending and receiving mails
2. Application of Ms word in Nutrition related Research
  - Starting, creating, editing, saving, print previewing and printing a document
  - Creating Table and working with Graphs
  - Tabulating nutrient content of foods and editing the Table
3. Usage of Ms Power point in Nutrition
  - Starting, Creating, Inserting pictures and slides, transition and effects
  - Creating slide show presentation with animations on nutrition related topics.
4. Dietary calculations using Excel
  - Starting Excel, working with spread sheet
  - Working with formula, functions, graphs and charts
  - Applying Excel for dietary and nutrient calculations
5. Application of SPSS software in nutrition related research
  - Coding
  - Mean, Median, Standard deviation, t-test, f test, ANOVA, Sign test and Chi square test
  - Significance and interpretation
6. Online publication in Journals
  - Writing of a review or a research article
  - Framing the content
  - Submission of the article through online

## SEMESTER - IV: EXTRA CREDIT COURSE-II

### HOME MANAGEMENT

**Course Code** : 17PND4EC2  
**Credit** : 5\*

**Max. Marks** : 100  
**External Marks** : 100\*

#### Objectives

##### To enable students to

1. Acquaint with the different textiles and their performances
2. Impart knowledge on different textile finishes

#### UNIT I

- 1.1 **Resource Management:** Understanding, meaning, classification and characteristics of resources, factors affecting utilization of resources.
- 1.2 Maximizing use of resources and resource conservation.  
Availability and management of specific resources by an individual / family –money, time, energy, space
- 1.3 **Functions of Management:** Decision making, planning, supervising, controlling, organising.

#### UNIT II

- 2.1 **Design and good taste:** Objectives and meaning of designs and taste, expressiveness, functionalism. Concept of design, purpose of design, elements of design, types of design, structural design, and decorative design.
- 2.2 **Colour:** Sources of colour- dimension of colour (hue, value, intensity / chroma). The prang colour system (primary, secondary, intermediate hue, tertiary and quaternary colour)
- 2.3 **Colour scheme for a room:** factors affecting the use of colour scheme for room ( the room, mood, style, fashion, personality, possessions).
- 2.4. Principles in the use of colours for a room ( balance, proportion, harmony, rhythm, emphasis).

#### UNIT III

- 3.1 **Fibres** - Definition - Classification of fibre
- 3.2 **Natural fibre** – vegetable fibre (Cotton, Linen, Kapok) animal fibre (Silk, Wool) mineral fibre (Asbestos, Rocks).
- 3.3 **Manmade fibre** (artificial fibre) – synthetic fibre (Nylon, Polyester), Regenerated fibre (Rayon, Cellulose acetate).
- 3.4 **Yarn** – Definition-Types-Simple yarns (Single ply yarns, Multiply yarns, Cord yarns), Novelty yarns (Grandrelle, Spiral, Loop or Boucle, Ratine, Nub or Knoll, Slub, Chenille).
- 3.5 **Weaving**-Definition-Classification-Basic weaves, Plain weave (Rib weave, Basket weave), Twill weave, Satin weave, Sateen weave, Fancy weaves, Pile weave, Leno weave, Swivel weave, Jacquard weave, Lappet weave, Dobby weave.

## UNIT IV

- 4.1 **Finishing** – Definition-Aim-Make the material attractive, Improves suitability, Produce variety, and Give weight- process – Degree of permanence, Designers and sales.
- 4.2 **Application of colour** – Classification – Vegetable sources, Animal sources ( Cochineal, Tyrian purple), Mineral dyes, Artificial dyes or Synthetic dyes (Direct or Salt dyes, Basic dyes, Acid dyes, Sulphur dyes, Mordant dyes, Vat dyes, Developed colour or Dyes, Disperse dyes, Disperse colour, Reactive dyes, Pigment dyes), Resist dyeing ( Tie and dye, Batic dye).
- 4.3. **Printing** – Definition- Types – Hand printing (Block printing, Screen printing, Stencil printing), Machine printing (Direct roller printing, Discharge printing, Resist printing, Pigment printing, Duplex printing, Transfer printing, Photo printing, Flocking or Flock Printing).

## UNIT V

- 5.1. **Selection of suitable clothing** – Factors affecting selection of clothing – Age, Season, Income, Occasion, Fashion.
- Clothing for different age groups- Clothing for the infant (8-9 months).
  - Clothing for creeper (8 months to 1 year).
  - Clothing for the toddler (1 – 2 years)
  - Clothing for school going children (5 – 11 years).
  - Clothing for pre-adolescents (12 – 18 years).
  - Clothing for adolescents (15 years).
  - Clothing for elderly.
- 5.2. **Care of storage of clothing** – care during wearing and taking off cloths, care of different fabrics (cotton, woollens, silks).
- 5.3. **Storage of clothes** – steps while storing cloths.

## TEXT BOOKS

- Sushma Gupta, Neeru Garg and Rehu Saini Text book of Clothing Textiles and Laundry, Fifth Edition Kalyani Publishers, Chennai(2005).
- Premavathy Seetharaman and Parveen banu “Interior Design and Decoration” CBS Publishers, New Delhi, 2007.

**UNIT I** Text book 1 Chapter – V, VI

**UNIT II** Text book 1 Chapter – VI, VII

**UNIT III** Text book 1 Chapter – VIII

**UNIT IV** Text book 1 Chapter – IV

**UNIT V** Text book 1 Chapter – IV

## REFERENCE BOOKS

- A. Bane, Tailoring, McGraw Hill Publication, New York (1974).
- Readers Digest Complete guide to Sewing, Association Inc, New York (1982).
- Savitri Pandit Manual for Children,s Clothing, Orient Longman (1967).

