### M.Sc. NUTRITION AND DIETETICS

<table>
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<th>COURSE CODE</th>
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# Core Based Electives

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<tr>
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<td>III</td>
<td>Food Processing</td>
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* Not considered for Grand Total and CGPA
SEMESTER- I: CORE -I
APPLIED PHYSIOLOGY

Course Code : 14PND1C1       Max. Marks : 100
Hours/Week : 6       Internal Marks : 40
Credit : 5       External Marks : 60

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 and abnormal variation of counts. WBC-Types, structure and functions, normal and abnormal variation of counts. Platelets-structure and functions.
1.3 Blood group system, importance of ABO groups in blood transfusion, matching and cross matching, ABO incompatability.Rh factors, erythroblastosisfetalis.
1.4 Immunity –Definition and types of immunity, development of cellular immunity and humoral immunity.

UNIT-II                                                         18 hours
Circulatory and Digestive system
2.1 Circulatory system- Introduction to cardiovascular system, origin and spread of cardiac impulse, cardiac cycle, electro cardiogram (ECG) , heart rate, blood pressure-factor influencing blood pressure.
2.2 Digestive system - Structural and function of gastrointestinal tract, movements of intestine, physiology of digestion.

UNIT-III                                                           18 hours
Respiratory and Excretory system
3.1 Respiratory system- Structure and function of respiratory organ, mechanics of respiration, exchange of respiratory gases, pulmonary volumes, regulation of respiration.
3.2 Excretory system -Structure of kidney and nephron, urine formation, micturition, acid base balance by kidney.

UNIT-IV                                                         18 hours
Endocrine and Reproductive system
4.1 Endocrine system - Functions of hormones secreted by pituitary, thyroid, parathyroid, and pancreas, adrenal and its hyper and hypo secretion.
4.2 Reproductive system - Structure of male and female reproductive system, functions-spermatogenesis and oogenesis, menstrual cycle, pregnancy, conception, implantation, lactation- hormones involved.
UNIT-V

Nervous system and special senses

5.1 Nervous system- structure and functions- nerve cell, spinal cord, brain. Autonomic nervous system – sympathetic and parasympathetic nervous system- functions.

5.2 Ear, Eye, Nose and # Tongue-structure and functions#.

#.....# self –study portion.

TEXT BOOKS


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

Objectives:
To enable students to understand the interrelationship between different metabolic pathways in the body.

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 (β) 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).

TEXT BOOKS


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

SEMESTER-I: CORE –III
THERAPEUTIC NUTRITION- I

Course Code : 14PND1C3             Max. Marks : 100
Hours/Week : 6              Internal Marks : 40
Credit : 5              External Marks : 60

Objectives:
To enable the students to
1. Understand the physiology, metabolism and special requirements of critically ill.
2. Know the effect of various diseases on nutritional status.
3. Learn recent concepts in dietary management of recent concepts.

UNIT-I            18 hours
Role of Dietitian and Therapeutic Feeding
1.1 Definition—dietitian, professional ethics
1.2 Nutritional assessment of hospitalized patient
1.3 Team approach to nutritional care – effect of illness on food acceptance and utilization – inter – relationship with the patient. Psychology of feeding the patient.
1.4 Therapeutic Diet—types. Different types of feeding methods—enteral feeding—oral feeding, tube feeding—gastrostomy and jejunostomy. #Parenteral feeding—formula and complications#

UNIT-II            18 hours
Respiratory Disorders
2.1 Etiology, symptoms and dietary management for asthma, chronic lung disease of prematurity (CLD), bronchopulmonary dysplasia(BPD), chronic obstructive pulmonary disease.
2.2 Contributory factors, symptoms and dietary regimen for cystic fibrosis, #lung cancer, pneumonia#, respiratory failure and tuberculosis.

UNIT-III            18 hours
Gastro Intestinal Tract Disorders
3.1 Upper gastro intestinal tract disorders — etiology, symptoms and dietary management for esophagitis, oral cancer, peptic ulcer, gastritis, stomach and dumping syndrome.
3.2 Lower gastro intestinal tract disorders - etiology, symptoms and dietary management for #constipation, diarrhea, steathorrhoea#, celiac disease, tropical sprue, inflammatory bowel disease—(Crohn’s disease, ulcerative colitis), irritable bowel syndrome, diverticular disease and colon cancer.

UNIT-IV            18 hours
Liver, Gall Bladder, Pancreatic and Renal Disorders
Pathophysiology, etiology, symptoms and dietary regimen for the following disorders:
4.1 Hepatitis, Wilson’s disease, cirrhosis, hepatic encephalopathy and hepatic coma.
4.2 #Cholecystitis, cholelithiasis# and pancreatitis.
4.3 **Renal disorders** – glomeuronephritis, nephrotic syndrome, acute and chronic renal failure and nephrolithiasis. Types and dietary management of dialysis.

**UNIT-V**

**Metabolic and Musculo Skeletal System Disorder**

5.1 **Nutritional care** - gout, phenyl ketonuria, maple syrup urine disease and lactose intolerance.

5.2 **Nutritional care in diseases of musculo-skeletal system**- muscular dystrophy, osteoporosis, osteo arthritis and rheumatoid arthritis.

5.3 **Nutritional care in febrile conditions:**

   - Short term fever - typhoid and influenza.
   - Long term fever - tuberculosis and AIDS
   - Intermittent - malaria

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

**TEXT BOOKS**


**UNIT- I**

Text book –1 Chapter – XXIV

Ref book –1 Chapter – XXIV

**UNIT –II**

Ref book - 2 Chapter – XXXVIII

**UNIT-III**

Text book –1 Chapter – XVI

Text book –3 Chapter – VIII

Text book - 4 Chapter – XII

Ref book -2 Chapter - XXXIX

**UNIT - IV**

Text book – 1 Chapter – XVII, XIX

Text book – 2 Chapter – XXVIII, XXIX, XXX

Text book – 3 Chapter – VIII

Text book – 4 Chapter – XIII
UNIT –V
Text book – 1 Chapter –XIII
Text book – 3 Chapter – VIII
Ref book – 2Chapter – XXXIV

REFERENCE BOOKS

1. 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
   e. Serum Vitamin A

2. Quantitative analysis of urine
   a. Creatinine
   b. Urea- DAM method
   c. Calcium
   d. Phosphorus
   e. Vitamin C
Objective:
1. Realize the importance of nutritional care and nourishment of children.
2. Understand the specific needs of children and the effects of various diseases on nutritional status and nutritional requirements.

UNIT I  
Infancy & Immunization Schedule
1.1 Physiological development, assessment of nutritional status- anthropometric measurements, biochemical parameters, clinical & dietary data. Nutritional and food requirements for infants.
1.2 Immunization schedule during pregnancy, infancy and childhood.

UNIT II  
2.1 Nutritional Management- Premature, LBW Babies And children with developmental disabilities- characteristics, causes and complications, feeding methods, growth and nutritional assessment.
2.2 Identification of Sick Newborn- Detection of abnormal signs- cyanosis, jaundice, respiratory distress, bleeding, seizures, refusal and feed, abdominal distention, failure to pass meconium and urine.

UNIT III  
3.1 Nutritional Management in Malnutrition- Causes, Symptoms & Nutritional Managements for PEM, anaemia, scurvy, rickets, vitamin A deficiency, childhood obesity. Underweight and underweight nutrition- short term and long term consequences in brief.

UNIT IV  
4.2 Nutritional Management in Gastro Intestinal Disorders- Causes, Symptoms & Nutritional Managements for Lactose intolerance, celiac disease, inflammatory bowel disease, constipation and fat absorption test diet (calculation of fluids & electrolytes- both deficit and maintenance and management calorie intake).
UNIT V  

5.1 Nutritional Management for Children with Special Conditions—Causes, Symptoms & Dietary Managements for Autism, ADH (Attention Deficit Hyperactivity disorder), Spectrum disorders, Cerebral Palsy, Epilepsy, Muscular Dystrophy.

TEXT BOOKS


REFERENCE BOOKS

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
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 #.

UNIT V
5.1. Special Formulas and Special Medical Foods - The Purchase of Special Formulas and Special Medical Foods. Fluids and Fiber.

TEXT BOOKS

UNIT I Text book – 1Chapter – I
UNIT II Text book – 2Chapter – II
UNIT III Text book – 2Chapter – III
UNIT IV Text book – 2Chapter – IV
UNIT V Text book – 2 Chapter – V

REFERENCE BOOKS
SEMESTER- II: CORE -V

HUMAN NUTRITION

Course Code : 14PND2C5
Max. Marks : 100
Hours/Week : 6
Internal Marks : 40
Credit : 5
External Marks : 60

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  18 hours

1.1 Energy, Protein and Amino Acids
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
d) Energy balance, measurement of energy content of food

1.2 Proteins and Amino Acids
a) Classification, Functions, Digestion, Sources, RDA
b) Protein Quality Evaluation – PER,NPU, BV
c) Nutritional Classification of Amino Acids, Amino acid balance, Imbalance and Toxicity, Amino Acid Pool
d) Therapeutic applications of amino acid.

UNIT II  18 hours

Lipids and Carbohydrates

2.1 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 in the diet
d) Role of n-3, n-6 fatty acid in Health and Diseases.

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

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 16 hours

Water and Electrolyte

5.1 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


UNIT I Text book – 1Chapter – I, II
Text book – 2Chapter – VII

UNIT II Text book – 2Chapter – IV, III
UNITIII
Text book – 2 Chapter – IX, X, XI, XII

UNITIV
Text book – 2 Chapter – XIII, XIV, XV, XVI, XVII, XVIII

UNITV
Text book – 2 Chapter – XX

REFERENCE BOOKS

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-II: CORE –VI
THERAPEUTIC NUTRITION- II

Course Code : 14PND2C6             Max. Marks : 100
Hours/Week : 6              Internal Marks : 40
Credit : 5              External Marks : 60

Objectives:
To enable the students to
1. Understand the role of nutrition for good health.
2. Gain knowledge about the principles of diet therapy and different therapeutic diets
3. Develop aptitude for taking up dietetics as a profession.

UNIT - I            18 hours
Nutritional Care in Biological Stress
1.1 Definition, types, psychosomatic disorders due to stress. The biological effects of stress on various systems–vital organs-brain, cardiovascular system, respiratory system and non-vital organs and immune system.
1.2 #Stress inducing food, anti - stress nutrients and foods#. Dietary guidelines for the management of stress and other stress management factors.

UNIT - II            18 hours
Diseases of the Endocrine: Thyroid-Hypo and Hyper Thyroidism and Pancreas - Diabetes Mellitus
2.1 Clinical features, metabolic features, nutritional requirements and treatment for hypo and hyper thyroidism.
2.2 Classification, pathophysiology, symptoms, diagnosis, risk factors and complications.
Management of diabetes mellitus – Insulin therapy and oral hypoglycemic agents.
2.3 Dietary care and nutritional therapy, meal plan with and without insulin. Glycemic index of food, #special diabetic foods and lifestyle management#.
2.4 Gestational diabetes – causes, complications and dietary management.

UNIT - III            18 hours
Diseases of the Cardiovascular Diseases
3.1 Hyperlipidemias - classification of hyperlipidemias. Clinical and nutritional aspects of hyperlipidemias. Dietary regimen
3.2 Hypertention-types, pathophysiology, etiology and nutritional care.
3.3 Atherosclerosis- pathophysiology, role of fat in the development of atherosclerosis, clinical effects, risk factors and dietary modification.
3.4 Ischemic heart disease – #angina pectoris, myocardial infarction-clinical effects# and dietary management. Congestive heart disease- pathophysiology, etiology, symptoms and dietary management.
UNIT- IV

Nutritional Care in Cancer and Diseases of Nervous System  
4.1 Cancer-classification, pathophysiology, risk factors-environmental, hereditary and nutritional effects of cancer and abnormalities in metabolism.
4.2 Nutritional effects of cancer therapy-chemo therapy, radiation therapy and bone marrow transplantation. Side effects of cancer therapy and dietary management. #Role of food in the prevention of cancer#.
4.3 Diseases of Nervous system-nutrition care in Alzheimers diseases, epilepsy, migraine, multiple sclerosis and Parkinson’s disease.

UNIT- V

Assessment: Food – Drug – Interactions
5.1 Effects of food on Drug therapy – drug absorption, medication and enteral nutrition, interactions, 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


UNIT- I  
Ref book –2Chapter – XXXXII
Ref book -3 Chapter – XVII

UNIT –II  
Text book –1 Chapter – XVIII
Text book –1 Chapter – XVIII
Text book –2Chapter – XXVI
Text book –3Chapter – VIII
Text book –4Chapter – IX
Ref book - 1 Chapter – XXXVII
Ref book - 2 Chapter – XXXIII
Ref book - 3 Chapter – XXII
UNIT-III Text book –1 Chapter – XV, X
Text book –2 Chapter – XXV
Ref book – 2 Chapter – XXXV
Ref book - 3 Chapter - II

UNIT - IV Text book – 1 Chapter – XXII
Text book – 2 Chapter – XXVII
Text book – 3 Chapter – VIII
Text book – 4 Chapter – XVI
Ref book - 2 Chapter – XXXX, XXXXIII
Ref book - 3 Chapter – XXIV

UNIT –V Ref book – 2 Chapter – XIX
Ref book – 3 Chapter – XVIII

REFERENCE BOOKS

SEMESTER- II: CORE - VII
NUTRITION FOR GROWTH AND DEVELOPMENT

Course Code : 14PND2C7                Max. Marks : 100
Hours/Week : 6                           Internal Marks : 40
Credit : 5                External Marks: 60

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 in Pregnancy:
1.1 Importance of nutrition prior to pre gestational and gestational periods. Effect of malnutrition on maternal and fetal health- short term and long term, intra-uterine growth retardation (IUGR).
1.2 Nutritional requirements and storage during pregnancy, nutritional adaptations in pregnancy, complications of pregnancy and management.

UNIT-II  18 hours
Nutrition in lactation:
2.1 Growth and development of mammary gland, physiology of lactation-synthesis of milk components, let down reflex, role of hormones, effect of breast feeding on maternal health.
2.2 Feeding problems due to – sore nipples, engorged breast, inverted nipples, nutrient need and dietary modification.

UNIT-III  18 hours
Nutrition in Infancy:
3.1 Nutritional status at birth, growth and development, nutritional requirement during infancy.
3.3 Weaning- need and food selection. Feeding schedule. Feeding of low birth weight and pre-term babies.
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, malnutrition.

**4.2 Nutrition for School children** - growth and development, nutritional requirements, factors influencing nutritional status, packed lunch, establishing healthy eating habits, nutritional problems – over weight, obesity, under weight, iron deficiency anemia and dental caries.


UNIT-V  
**18 hours**

**Adulthood and Geriatric Nutrition:**

**5.1 Nutrition in Adulthood** - “Reference man and woman”, basis for nutritional requirements, nutrition and work efficiency. Per menopausal, menopausal and post menopausal women, nutritional needs.

**5.2 Geriatric Nutrition** - The ageing process - physiological, socio-psychological aspects of ageing. Nutritional problems of elderly. “Nutritional requirements of elderly and dietary management to meet nutritional needs”.

#.....# self study Portion

**TEXT BOOKS**


UNIT I  Text book – I Chapter – VII
UNIT II  Text book – I Chapter – VIII
UNIT III  Text book – I Chapter – III
UNIT IV  Text book – I Chapter – IV
          Text book – I Chapter – V
UNIT V  Text book – I Chapter – II
          Text book – I Chapter – IX

REFERENCE BOOKS
1.  WHO, A Growth Chart for International Use in Maternal and Child Health,
2.  C.Gopalan, Indian Council of Medical Research Recommended Dietary Intakes for
Plan, calculate, modify the nutrient requirements and prepare the diets for the below mentioned pathological conditions:

1. Routine hospital diet
   Fluid-clear, full.
   Soft and regular diets.

2. Diet for fever conditions
   Short term fever - Influenza, typhoid.
   Intermittent fever - Malaria.
   Long term fever - Tuberculosis.

3. Diet for pre and post-operative conditions.


5. Diet for gastro-intestinal disorders
   Diarrhoea, constipation, ulcer, Irritable bowel syndrome, chronic pancreatitis, liver diseases- hepatitis, cirrhosis.

6. Diet for diabetes mellitus
   Insulin dependent, Non-insulin dependent, Gestational diabetes mellitus.

7. Diet for weight management
   Obesity grade-I &III, underweight.

8. Diet for renal diseases
   Glomerulonephritis, Nephrosis, Renal failure-Acute, chronic, Dialysis and Renal calculi.

9. Diet for heart diseases
   Hypertension, Atherosclerosis, Congestive heart failure.

10. Diet for cancer

11. Diet for Acquired immune deficiency syndrome
SEMESTER-II: CORE BASED ELECTIVE – II
FUNCTIONAL FOODS AND NUTRACEUTICALS

Course Code : 14PND2CE2 Max. Marks : 100
Hours/Week : 6 Internal Marks : 40
Credit : 5 External Marks : 60

Objectives:
To enable the students to
1. Gain knowledge about functional foods and Nutraceuticals
2. Have thorough understanding about the health effects

UNIT- I 18 hours
Functional Foods and Nutraceuticals
1.1 Definition – History of functional foods- Classification of Nutraceuticals, composition based on chemical Nature
1.2 Nutraceuticals: Primary and Secondary metabolites in plants; a) Carotenoids b) Conjugated Linoleic acid c) Flavonoids d) Nitrogen and Sulphur containing aminoacid derivatives e) Proteinase and alpha amylase inhibitor f) omega 3 PUFA g) Terpenoids

UNIT- II 18 hours
Organizational models for Nutraceuticals
2.1 Food Source: Plant, Animal, Microbial
2.2 Mechanism of action: Anticancer, positive influence on blood lipid Profile, antioxidation, anti-inflammatory, osteogenic
2.3 Chemical Nature: Isoprenoid derivatives, phenolic substances, structural lipids, fatty acids, carbohydrates and derivatives, amino acid base substances, microbes, minerals

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 micro organisms
Health effects of probiotics including mechanism of action
Probiotics in various foods: fermented milk products, non-milk products etc
Safety of probiotics
3.3 Synbiotics: Important features of synbiotics.
UNIT - IV

4.1. Useful food components with potential health benefits: Definition, sources, bioavailability, effect of processing, physiological effects, effects on human health and potential applications in risk reduction of diseases

4.2 Perspective for food applications of the following:
- Polyphenols: flavonoids, catechins
- Isoflavones, tannins
- Phytoestrogenes
- Phytosterols
- Glucosinolates
- Pigments- Lycopene, curcumin
- Sulphur coopounds
- Other components- phytates, protease inhibitors, saponins, amylase inhibitors
- Active compounds if spices and condiments (Allicin, trignollin, gingerol, capcisin)

UNIT - V

5.1. Application of herbs as functional ingredients
Herb as ingredients in functional foods

5.2. Action of Herbs and its Efficacy and safety regulatory status
a) Nervous System-Ashwagandha (*withania Somnifera*)
b) Heart and Circulatory System-hawthorn plant
c) Immune System –Neem, Echinacea, *acacia catechu, citrus aurantium*
d) Digestive System-Ginger valerian root fennel
e) Respiratory System-Tulsi(*ocimum Sanctum*)
f) Urinary System-Cranberry, Saw palmetto, *ziziphus jujuba*
g) Musculoskeletal System-Fever few, eclipta prostate, *curcuma longa*

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

UNIT - I  Net Reference
www.ajpcr.com/vol3Issue1/265.pdf
www.ncbi.nlm.nih.gov/pubmed/-
www.nutrition.org/content/136/6/1636s.long
www.bodybuilding.com/store/cla.html
www.hspb.harvard.edu
www.eufic.org/article/en/expid/basics-functional -foods -

UNIT-II  Net Reference
www.sphinxsai.com/vol.3No.1/pharm-Jan-Mar 11/pdf/JM 11

UNIT - III  Net Reference
www.medicinet.com

UNIT- III,  Ref Book - 1  Chapter – XV
Ref Book – 2  Chapter – X
Net Reference
www.medicinet.com

UNIT - IV  Net Reference
www.Pitt.edu/~super7/45011-46001/45161
Net Reference
www.ipv.pt/millenium/mellineum/
Ref Book – 2  Chapter – V

UNIT - V  Net Reference
www.ashwangandha.com
www.herbwisdom.com/herb-ashwafgandha.html
REFERENCES BOOKS


   private Limited (2000)

3. G. Mazza. Functional Foods Biochemical Processing Aspects Culinary and Hospitality
   Industry Publications Services(1998)

4. Israel Goldberg Functional Foods Designer Foods Pharma Food, Nutraceuticals Culinary and
   Hospitality Industry Publications (2001)

SEMESTER-II: CORE BASED ELECTIVE – II
NUTRITIONAL MANAGEMENT AND SAFETY FOR FOOD SERVICE

Course Code : 14PND2CE2  Max. Marks : 100
Hours/Week : 6  Internal Marks : 40
Credit : 5  External Marks : 60

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
5.1 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:


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

SEMESTER- III: CORE -IX
NUTRITION AND PHYSICAL FITNESS

Course Code : 14PND3C9  Max. Marks : 100
Hours/Week : 6  Internal Marks : 40
Credit : 5  External Marks : 60

Objectives:
To enable the students to
1. Understand the components of health and fitness and the role of nutrition in these.
2. Make nutritional, dietary and physical activity recommendations to achieve fitness and well-being.
3. Develop ability to evaluate fitness and well-being.

UNIT– I  18 hours
Body composition and fitness
1.1 Body Composition- classification (Fat mass and fat free Mass) and its components, factors influencing body mass composition. Techniques for measuring body composition
1.2 Fitness-definition, parameters of fitness- cardiovascular endurance, muscular strength, muscular endurance, flexibility and body composition

UNIT -II  18 hours
Assessment and benefit of exercise
2.1 Benefit of exercise- physiological, psychological and sociological. Physical activity guidelines.
2.2 Assessing personal fitness- preparticipation, screening and risk assessment.
2.3 Role of exercise in disease prevention – diabetes, cardiovascular disease, obesity, bone health and cancer.

UNIT – III  18 hours
Energy systems and electrolyte balance
3.1 Reviews of different energy systems for endurance and power activity- Fuels and nutrients to support physical activity .Shifts in carbohydrate and fat metabolism, mobilization of fat stores during exercise.
3.2 Water and electrolyte balance- Losses and their replenishment during exercise and sports event, effect of dehydration, sports drinks.

UNIT-IV  18 hours
Nutrition for sport persons
4.1 Definition, physiological and significant changes during exercise, types of stress faced by sports persons, nutrition needs of sports persons-macro and micronutrient needs, role of water and electrolytes.
4.2 Role of nutrition and recommendations – pre-exercise, during and post –exercise
4.3 Nutrition supplement and ergogenic aids.
UNIT-V

Yoga and nutrition fitness in special conditions

5.1 Yoga and fitness- # effects on general vitality and on immune, endocrine, neurons, digestion and muscular systems, dietary pattern. Awareness about the alternative systems for health and fitness like ayurveda, yoga, vegetarianism and traditional diets#.

5.2 Nutrition and fitness in special conditions- space mission and high attitude-changes in body composition, nutrient requirements, food system and suitable types of food.

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

TEXT BOOKS


UNIT I
   Text Book- 5 Chapter-V
   Text Book- 1 Chapter- I

UNIT II
   Text Book- 1 Chapter- II

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


SEMESTER-III: CORE - X
ADVANCED FOOD SCIENCE

Course Code : 14PND3C10
Max. Marks : 100
Hours/Week : 6
Internal Marks : 40
Credit : 5
External Marks : 60

Objectives:

To enable the students to
1. Understand the Composition of various food stuffs.
2. Familiarize students with changes occurring in various foodstuffs as a result of processing, storage and cooking.

UNIT-I
18 hours
Colloids and Emulsions:
1.1. Colloids (sols, gels) - definition, characteristics, properties-physical and chemical, factors influencing their formation
1.2. Emulsions - definition, characteristics, types, properties-physical and chemical, emulsifying agents and uses.
1.3. Foams - definition, characteristics, uses, types, properties-physical and chemical, factors affecting foam stability.

UNIT-II
18 hours
Cereals, Pulses and Leavening agents:
2.1. Cereals & Millets - types (major & minor), composition, starch- types (amylose, amylopectin) and sources; Properties- retrogradation, gelation and dextrinisation, gelatinization, gluten formation and factors affecting gelatinization and gluten formation.
2.2. Pulses - types (major & minor), composition, toxicity in pulses (lathyrisim, favism, haemagglutinins, saponins, goitrogens, tannins). Germination – process and effects.
2.3. Leavening agents - definition, characteristics, types and uses.

UNIT-III
18 hours
Fruits and Vegetables:
3.2. Vegetables - composition, classification of pigments, effect of heat and acid on pigments, flavour and bitter compounds present in vegetables.
3.3. Role of fibre in cooking and Role of fruits and vegetables in food preparations.

UNIT-IV
18 hours
Fats and Sugar:
4.1. Fats - types of food fats- visible & invisible; Properties- rancidity (types and prevention), hydrogenation, winterization, iodine number, saponification value.
4.2. Sugar - types of Sugar, stages of Sugar cookery; Crystallization - meaning and factors affecting crystallization, crystalline (fondant, fudge) & non-crystalline candies (brittle, caramel) and Caramelisation.
UNIT-V

Animal foods and Beverages

5.1. Egg - composition, properties - denaturation, coagulation – definition and factors affecting coagulation; #Evaluation of egg quality#.
5.3. Milk- effect of heat, types of milk and milk products, non-enzymatic browning; #Pasteurization- definition, methods, effects#; Fermented beverages- types and their processing
5.4. Alcoholic beverages- processing of beer, wine, rum, brandy and toddy.
5.5. Non alcoholic beverages- malted and carbonated beverages.

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

TEXT BOOKS

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

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
REFERENCE BOOKS

SEMESTER-III: CORE - XI  
RESEARCH METHODOLOGY AND STATISTICS

Course Code : 14PND3C11     Max. Marks  : 100  
Hours/Week : 6       Internal Marks : 40  
Credit  : 5       External Marks : 60

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  
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  
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  
3.1 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  
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.

**TEXT BOOKS**


**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. Determination of moisture content present in food sample
2. Determination of pH content of fruit juices
3. Estimation of fibre content present in given sample
4. Estimation of protein (Kjeldhal Apparatus)
5. Estimation of fat (Soxhlet Apparatus)
6. Ashing of food and preparation of ash solution for mineral estimation
9. Determination of acid number and iodine number and peroxide value
SEMESTER- III: CORE BASED ELECTIVE-III
FOOD PROCESSING

Course Code : 14PND3CE3      Max. Marks : 100
Hours/Week : 6      Internal Marks : 40
Credit : 5       External Marks: 60

Objectives:
To enable the students to
1. Impart the basic concepts and principles of food processing.
2. Provide adequate knowledge on application aspects of food processing.
3. Learn about the various packaging methods and food processing units in india.

UNIT-I           18 hours
Introduction to food processing:
1.1Food processing: Definition, scope, merits and demerits.
1.2 Cereal processing:
   Rice–processing, parboiling- hot soaking process, by-products -ricebran, processed
   products-rice flakes, rice puff, rice starch. Wheat-milling, processed products-semolina,
   macroni and noodles.Corn - milling, by products- bran, germ, powder, processed
   products-flour, syrup, flakes and pop corn.Millet processing- ragi, jowar, bajra.
1.3 Breakfastcereal: Ready-to-cookcereals,ready-to-eatcereals – rice and wheat.

UNIT-II           18 hours
Pulse and oil processing:
2.1Pulse Processing : Processing-cleaning, grading, pitting, splitting and polishing,
   extrusion technology. Elimination of toxic constituents.
2.2 Oilseeds processing: Oilseed pressing, solvent extraction, purification, degumming,
   refining, bleaching,deodorization,hydrogenation,plasticizingandtempering,by-products-
   oilcake. Processed products: Margarine, shortening, mayonnaise and salad dressing.

UNIT-III           18 hours
Vegetables, fruits and dairy processing:
3.1 Canning, Freezing, Dehydration of Fruits and Vegetables
3.2 (a) Vegetables processing: Freezing of vegetables -potato, cauliflower, carrot.
    (b) Fruits processing: Preprocessing of tomatoes –field processing, washing in lye, peeling, freeze
    peeling, peeling in calcium chloride solution. Preparation & preservation of fruit juices. Dehydrated
    products-juice powders. Preserved products-jam, jellies, ketch-up’s and sauces.
3.3 Dairy processing: Clarification, separation, standardization, pasteurization,
   homogenation and packaging of milk. Milk products: (a) non fermented- whey protein
   concentrates, skim milk, cream, khoa, ice-cream(b)fermented- cheese processing.
UNIT-IV 18 hours
Meat, poultry, fish and egg processing:

4.1 Meat processing: ageing, tenderising, curing, smoking, freezing of meat. Processed products: Gelatin, casing, sausages.

4.2 Poultry processing: slaughter, bleeding, scalding, defeathering, eviscerating, chilling, packaging. Processed products: dehydrate form of poultry.

4.3 Fish processing: Dehydration, chilling and smoking. Processed products: Fish protein concentrates.

4.4 Egg processing: pasteurization, freezing and drying. Processed products: egg substitutes, egg powder.

UNIT-V 18 hours
Food packaging and processing units:

5.1 Food packaging: Meaning, functions, recent developments in packaging materials, laws related to packaging (standard of weight and measure), packaging of specific foods - cereal, pulses, milk, fruits and vegetables. Nutritional labeling.

5.2 Food processing units in India: Introduction and role of Indian Institute of Crop processing technology (IICPT, Thanjavur); Indian grape processing board (IGPB, Pune, Maharashtra); National meat and poultry processing board (NMPPB); National research centre for Banana (NRCB, Trichy) in the field of food processing.

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

TEXT BOOKS


UNIT I Text book – 2 Chapter – II
Text book – 3Chapter – IV, XI
Net Ref www.isites.harvard.edu/.../Millet%20processing%20and%20botanical%20nam...
UNIT II  Text book – 2 Chapter – III  
Text book – 1 Chapter – XVI

UNIT III  Text book – 1 Chapter – XVIII  
Text book – 5 Chapter – X, XI, XVII, XIX  
Text book – 2 Chapter – V  
Text book – 4 Chapter – XXI  
Ref book – 3 Chapter – II

UNIT IV  Text book – 1 Chapter – XIV, XV

UNIT V  Text book – 2 Chapter – XVII  
Net Ref  
www.iicpt.edu.in,  
www.igpb.in,  
www.nmppb.gov.in,  
www.nrcb.res.in/

REFERENCES BOOKS

SEMESTER- III: CORE BASED ELECTIVE-III
NUTRITIONAL COUNSELLING AND EDUCATION

Course Code : 14PND3CE3      Max. Marks : 100
Hours/Week : 6           Internal Marks : 40
Credit : 5              External Marks : 60

Objectives:
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 readiness to change.

UNIT II 18 hours
2.1 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.
2.2 Ready to change counselling sessions- action plan, arranging for the next contact, resistance behaviors & 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 Counselling Psychology- Introduction, definition, meaning and importance.

UNIT IV 18 hours
4.1 Counselling Process- various phases/ stages in counselling process. Types of Counselling: crisis counselling, facilitative counselling, preventive counselling and development counseling.
4.2 Counsellor-Counselee 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 Refbook – 3 Chapter – V

UNIT II Refbook – 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

REFERENCE BOOKS

SEMESTER- III: EXTRA CREDIT- I
HOSPITALITY ADMISTRATION

Course Code : 14PND3EC1
Hours/Week :
Credit : 5*

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

Objectives:
To acquaint the students with housekeeping department and its management in the hospitality industry.
To enable students to manage resources in the housekeeping department to fulfill the hospitality function.

UNIT I
Types of institutions offering hospitality services.

UNIT II
Hospitality functions
2.1 Role of housekeeping in hospitality industry.
2.2 Housekeeping in relation to commercial and welfare section.

UNIT III
Management of housekeeping department
3.1 Layout of housekeeping department
3.2 Planning, organization and communication of housekeeping activities
3.3 Coordination with other departments
3.4 Roles/ responsibilities of personnel in the housekeeping department.

UNIT IV
Administrative policies
4.1 Personnel management: recruitment, training, handling personnel promotion, evaluation, distribution of jobs, job schedules, job analysis.
4.2 Procurement policies, buying techniques, stores, stock control.
4.3 Cost control: inventory management, budget process, controlling expenses.
4.4 Safety, security and sanitation: safety, fire fighting, first aid safety in equipment use, pest control, sanitation standard.
4.5 Uniforms, types selection, distribution and control.

UNIT V
Maintenance: repairs and redecoration programmes.
TEXT BOOKS


UNIT I
Text book –1 Chapter –I

UNIT II
Text book –3 Chapter –III

UNIT III
Text book –2 Chapter – IV, V
Text book –3 Chapter – IV, V

UNIT IV
Text book –2 Chapter – VII, XI
Text book –3 Chapter – VI, VII, VIII, IX

UNIT V
Text book –3 Chapter –XIII

REFERENCE BOOKS

SEMESTER- IV: CORE COURSE-XIII
ADVANCES IN FOOD MICROBIOLOGY

Course Code : 14PND4C13       Max. Marks : 100
Hours/Week : 6       Internal Marks : 40
Credit : 5       External Marks : 60

Objectives:

This course will enable the students to
1. Understand deeply about the micro-organisms in food.
2. Learn the importance of the micro-organism in food spoilage, advanced techniques in preserving food.
3. Gain knowledge about the role of microbes in fermentation technology.
4. Aware about emerging trends in the field of the food microbiology.

UNIT-I
Introduction to food microbiology:
1.1 Food microbiology: History and scope, food spoilage, food preservation and food infection.
1.3# Economic importance of micro-organism: Bacteria, yeast and mould#.

UNIT-II
Factors affecting growth and detection of micro-organisms:
2.1 Intrinsic parameters - Nutrient content, pH, buffer capacity, redox- potential(Eh), antimicrobial barriers, water activity.
2.2 Extrinsic parameters - Relative humidity, temperature, gaseous atmosphere.
2.3 Methods for microbial examination of food- Indicator organisms, direct examination, cultural techniques, enumeration methods-most probable number counts, alternative methods-dye-reduction test, rapid method-immunological methods- enzyme linked immune-absorbent assay (ELISA).

UNIT-III
Contamination, spoilage, preservation and microbial toxins of foods:
3.1 Cereals and cereal products, Fruits and Vegetable products, Milk and milk products, Meat, fish and eggs.
3.2 Microbial toxins in food- mycotoxins, aflatoxin, sea foods toxicants.

UNIT-IV
Micro-organisms and food-borne disease:
4.1 Bacteria – salmonella, clostridium botulinum, Escherichia coli.
4.2 Virus- poliomyelitis, hepatitis A and E, gastro enteritis virus.
4.3 Porotoza- entamoebahistolytica, giardia lambia.
UNIT-V

Fermentation and current trends in food microbiology:
5.1 Lactic acid bacteria: Antimicrobial activity, Health promoting effects, Malo-lactic fermentation.
5.2 Yeast fermentation
5.3 Fermented foods: yoghurt, sauerkraut, cucumber, meat, fish, vinegar, tempeh, soya sauce.
5.2 Current trends in food microbiology: Encapsulation Technology to protect probiotics.

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

TEXT BOOKS


UNIT I
Text book – 3 Chapter – I
Text book – 1 Chapter – II
Text book – 5 Chapter – I

UNIT II
Text book – 3 Chapter – III, X

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

UNIT IV
Text book – 3 Chapter – VII, VIII

UNIT V
Text book – 3 Chapter – IX

Net Ref: www.cdn.intechopen.com/pdfs/.../In Tech_Encapsulation_technology_to_protect...

REFERENCE BOOKS

SEMESTER-IV: CORE –XIV
PUBLIC HEALTH NUTRITION

Course Code : 14PND4C14 Max. Marks : 100
Hours/Week : 6 Internal Marks : 40
Credit : 5 External Marks : 60

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
Population Dynamics :
1.1 Demographic transition- Demographic Cycle
1.2 Demographic trends in India – age and sex composition, age pyramids, sex ratio, dependency ratio, density of population, family size, urbanization, Literacy and education, life expectancy
1.3 Fertility behavior – age at marriage, duration of married life, spacing of children, education, economic status, caste and religion, nutrition, family planning and other factors

UNIT-II
18 hours
2.1 Nutrition and National Development
Nutrition in National Development in terms of socio – economic, industrial and agricultural development
2.2 Major Nutritional problems – Etiology, prevalence, Clinical manifestations, preventive and therapeutic measures of
    Malnutrition - Vicious cycle, Under nutrition in Children and adults
    Macro and Micro Nutrient Deficiencies – PEM, Anaemia,
    Vitamin A, fluorosis, Iodine deficiency, osteoporosis
    # Prophylaxis Programme – Vitamin A, Anaemia
2.3 Determinants of Nutritional Status - Low birth weight, faulty child feeding practices, dietary inadequacy, frequent infections, large families, high family illiteracy, taboos and superstitious
Nutritional Assessment – anthropometry, clinical examination, laboratory and biochemical assessment, dietary assessment.

UNIT- III
18 hours
Food and Nutrition Security
Food production, access, distribution, per capita food availability of food grains, losses, consumption, food security
3.1 Policies for improving availability of cereal and non-cereal foods
3.3 Performance in access to food and nutrition
    Performance in access to food – hunger, food insecurity at household level, employment
growth, real wages Socio-cultural aspects and Dietary patterns: Their implications for
nutrition and health.

UNIT- IV  18 hours

Approaches and strategies for improving nutritional status and health:
Increased agricultural production and animal husbandry  foods
and Nutrition Gardens

4.1 Issues and policies on access to food and Nutrition – income, women and health, growth
and poverty

Social protection measures- PDS, TPDS

4.2 Food based interventions including fortification and genetic improvement of foods,
Supplementary feeding

UNIT- V  18 hours

National, International and voluntary organization to combat nutritional problems

5.1 National Nutrition policy –XII five year plan, Recommendations, Action Plan
Action Programmes (International)– WHO, ICDS, FAO, UNICEF, World Bank, Voluntary
services, CARE

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

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

#…..# self-study portion.

TEXT BOOKS

(2007).

UNIT : I Ref Book : 1 Chapter VIII

UNIT –II Text Book - 1 Chapter IX, X, XI, XII, XIII, IXX, XX, XXI, XXII, XXXVII
UNIT –II Text Book - 2 Chapter XVIII, XV
UNIT- III, Net Ref www.oxfamindia.org
www.Planningcommission.nic.in
UNIT - IV Net Ref www.oxfamindia.org
www.fao.org
UNIT - V Text Book : 3 Chapter – XXII
REFERENCE BOOKS


JOURNAL REFERENCE:

UNIT-III - Indian Journal of Medical Research : 138, Sep 2013, PP 373-382
SEMESTER- IV: EXTRA CREDIT - II
CONSUMER IN THE MARKET

Course Code : 14PND4EC2
Max. Marks : 100*

Hours/Week :
Internal Marks :

Credit : 5*
External Marks : 100*

Objectives:
1. To familiarize the students with the Indian economy and the rising of consumerism.
2. To have an overview of the consumer behavior and the consumer movement.

UNIT I
Introduction to Indian Economy:
Introduction, History of Indian economy- Indian economy at the time of independence and after the independence. Current scenario of Indian economy.

UNIT II
(a) Market and Marketing:
Introduction, meaning, classification of markets, objectives, features of modern marketing & role of marketing in economic development.
(b) Modern way of Marketing:
Telemarketing, E - business, E - commerce, E - marketing, E - banking and E - trading.

UNIT III
The Indian Consumers:
Indian cultures, Profile of Indian consumers, classification of Indian consumers, consumer credit facility – segment wise classification of the middle class.

UNIT IV
Consumer Behaviour:
(a) Definitions, importance of studying consumer behavior, types of buyers, factors influenceing the consumer behavior.
(b) Buying Motives:- definition, types of buying motives, importance of buying motives.

UNIT V
Consumerism:
(a) Introduction: -Evolution of consumerism, unique problems of Indian consumers, consumer exploitation in India- pricing, adulteration, duplication, artificial demand, sub- standard, product risk, advertising, warranty & services, fitness.
TEXT BOOK


UNIT I  Net Ref  www.nios.ac.in/media/documents/seccecour/english/pdf.
         www.164.100.47.134/intranet/Currenteconomicscenario.pdf.

UNIT II  Text book – 1 Chapter – I, XIX, XXXXVII

UNIT III  Text book – 1 Chapter – XXI

UNIT IV  Text book – 1 Chapter – XX

UNIT V  Text book – 1 Chapter – XXII

REFERENCE BOOK