



**Bachelor of Science (B.Sc.)**  
**NUTRITION AND DIETETICS**  
**SYLLABUS**

(Under Choice Based Credit System)  
For the Students Admitted in the  
Academic Year 2017-2018



**DEPARTMENT OF NUTRITION AND DIETETICS**

**BISHOP HEBER COLLEGE (Autonomous)**

(Affiliated to Bharathidasan University)

(Reaccredited with 'A' Grade (CGPA – 3.58/4.0) by the NAAC &  
Identified as College of Excellence by the UGC)

DST – FIST Sponsored College & DBT Star College

**TIRUCHIRAPPALLI – 620 017**

**TAMIL NADU, INDIA**

**B.Sc. Nutrition and Dietetics Programme**



# Department of Nutrition and Dietetics

## VISION

- The department seeks to function with mutual love and social commitment to educate and engage students in research and extension activities to serve the community.

## MISSION

- Provide opportunity to students to realize their potential in the broad and diverse domains of Nutrition and Dietetics through teaching, innovation, training, research& mentorship on how nutrients impact human health and disease
- Provide opportunities to students to master communication Skills that prepares students for supervised practice through internships and extension activities leading to be a professional dietitians in providing service to professional, governmental and local community
- Propagate student curiosity and inquiry about the theory and practice of dietetics that will lead to discovery and application of new ideas and knowledge

**B.Sc., Nutrition and Dietetics – Programme structure**

Sem	Course	Course Title	Course Code	Hrs / week	Pre requisites	Credits	Marks		
							CIA	ESE	Total
I	Tamil I	Tamil	U15TM1L1	6		3	25	75	100
	English I	English for communication Skills -I	U16EGPL1	6		3	25	75	100
	Core I	Food Science	U17ND101	4		5	25	75	100
	Core Prac. I	Food Science Lab	U17ND1P1	3		3	40	60	100
	Allied I	Food Microbiology	U17ND1Y1	4		4	25	75	100
	Allied Prac.	Food Microbiology & Food chemistry Practical	U17NDY P1	3*			40	60	100
	Env. Stud	Environmental studies	U16EST11	2		2	25	75	100
	Value Education	Value EducationRI/MI	U15VL1:1/U15UL1:2	2		2	25	75	100
II	Tamil II	Tamil	U15TM2L2	6		3	25	75	100
	English II	English for communication Skills -II	U16EGPL2	6		3	25	75	100
	Core II	Human Physiology	U17ND202	6		5	25	75	100
	Core Prac. I	Human Physiology Practical	U17ND2P2	3		3)	40	60	100
	Allied II	Food Chemistry	U17ND2Y2	4	U17ND101	4	25	75	100
	Allied Prac.	Food Microbiology & Food chemistry Practical	U17NDY P1	3*		2	40	60	100
	SBEC I	Food Packaging	U17ND2S1	2		2	40	60	100
III	Tamil III	Tamil	U15TM3L3	6		3	25	75	100
	English III	English for Competitive Examination Business Communication in	U16EGPL3/ U17EGCL3	6		3	25	75	100

		English							
	Core III	Principles of Nutrition	U17ND303	6		5	25	75	100
	Core Prac. II	Principles of Nutrition Practical	U17ND3P3	3		3	40	60	100
	Allied III	Food Standard and Quality Control	U17ND3Y3	40		4	25	75	100
	Allied Prac.	Food Standard and Quality Control & Nutritional Biochemistry Practical	U17NDY P2	3*		-	--	--	--
	NMEC -I	To be selected from the courses offered by other departments		2		2	25	75	100
IV	Tamil IV	Tamil	U15TM4L4	6		3	25	75	100
	English IV	English through Literature	U16EGN L4	6		3	25	75	100
	Core IV	Nutrition Through Life Cycle	U17ND404	6		5	25	75	100
	Core Prac. II	Nutrition Through Life Cycle Practical	U17ND4P4	3		3	40	60	100
	Allied IV	Nutritional Biochemistry	U17ND4Y4	4		4	25	75	100
	Allied Prac.	Food Standard and Quality Control & Nutritional Biochemistry Practical	U17NDY P2	3*		2	40	60	100
	NMEC-II	To be selected from the courses offered by other departments		2		2	25	75	100
	Soft Skills	Life skills	U16LFS41	2		1			100
	Extension activities	NSS, NCC, Rotract, Leo Club, Etc.	U16ETA41			1			
V	Core V	Dietetics -I	U17ND505	6		5	25	75	100
	Core VI	Community Nutrition	U17ND506	6		5	25	75	100
	Core Prac. III	Dietetics -I Practical	U17ND5P5	3		3	40	60	100
	Elective I	Food Preservation /Functional Foods	U17ND5:1/ U17ND5:2	5		4	25	75	100

	Elective II	Principles of Human Resource Management and Interior Design /Food Sanitation and Hygiene	U17ND5: 3/ U17ND5: 4	5		4	25	75	100
	SBEC – II	Nutrition in special conditions	U17ND5 S2	2	U17ND2S 1	2	40	60	100
	SBEC – III	Bakery and Confectionery	U17ND5 S3	2		2	40	60	100
VI	Core VII	Dietetics –II	U17ND6 07	6	U17ND50 5	5	25	75	100
	Core VIII	Nutrition and Fitness	U17ND6 08	6		5	25	75	100
	Core IX	Institutional Food Service management	U17ND6 09	6		5	40	60	100
	Core Prac. IV	Dietetics –II Practical & Dietary Internship	U17ND6 P6	3		3	40	60	100
	Elective III	Food product development and marketing strategy	U17ND6: 1	4		3	25	75	100
	Core Project	Project	U17ND6 PJ	4		3			100
	Gender studies	Gender studies	U16GSD 61			2 1			

SBEC – Skill Based Elective Courses; NMEC – Non Major Elective Courses;

**Total credits 140**

*Other Languages	Hindi	Sanskrit	French		Hindi	Sanskrit	French
Semester I				Semester III			
Semester II				Semester IV			

Part I : 4                      Core theory :9                      Core Practical's : 6                      SBEC:3  
    Environmental studies:1                      Extension Studies  
    : 1

Part II :4                      Allied theory :4                      Allied Practical's :2                      NMEC: 2  
    Elective : 3                      Value Education : 1                      Gender Studies :  
    1      Project : 1

**Total courses : 41**

NMEC offered by the department:      1. Basics of Nutrition  
    2. Diet in health and disease

**SEMESTER : I**

**COURSE CODE : U17ND101**

**CREDITS : 5**

**TOTAL HOURS : 60**

### **CORE COURSE I - FOOD SCIENCE**

#### **Objectives**

1. To know about the different types of food and nutrients.
2. To understand various cooking methods and apply appropriate cooking methods for different foods (cereals, pulses and vegetables).
3. To analyze the nutrient composition of milk, meat, fish and egg.
4. To interpret the effect of various fats and oils and analysis of their cooking quality.
5. To understand the composition of sugar, its types and its nutritive value and compare the uses of spices and condiments in Indian cookery.

#### **UNIT-I**

##### **Introduction to Food science**

**Definition** - Food Science, Food , Nutrients, Nutritional status, Mal – nutrition-under nutrition over nutrition, Hunger- Hollow Hunger , Appetite Satiety and Health.

**Food groups** - Basic five food groups, Nutritional classification of foods - energy yielding, body building and protective foods.

**Methods of cooking** - Moist, dry and combination heat methods of cooking, Merits and demerits. Microwave cooking- principle, Merits & demerits.

#### **UNIT-II**

##### **Cereals & Pulses**

**Cereals:** Structure and nutritive value of rice and wheat, Gelatinization, Process of milling and malting - wheat, Rice, Gluten formation , Nutritive value of millets - ragi, bajra.

**Pulses:** Germination process, factors affecting cooking quality of pulses, composition, nutritive value, and its advantages in cookery.

#### **UNIT-III**

##### **Vegetables and Fruits**

**Vegetables** – Selection of vegetables, Nutritive value , Changes in nutritive value before and after cooking,, Effect of cooking on the vegetable pigments.- chlorophyll, carotenoids, anthocyanin, anthoxanthin.

**Fruits-** Classification, nutritive value, ripening of fruits, Effect of browning and its prevention , Storage of fruits.

## **UNIT-IV**

### **Milk and meat products**

**Milk and Milk Products:** Types of milk , pasteurization of milk , composition and nutritive value, milk products – cheese, paneer and khoa

**Egg:** Structure, composition and nutritive value, Qualitative determination of egg and its role in cookery .

**Meat:** Structure, composition and nutritive value of meat, cutting process of meat, cooking changes in meat, and tenderness of meat.

**Poultry-**classification, Nutritive value, Selection and cooking methods poultry.

**Fish** - selection of fish, Structure, composition and nutritive value.

## **UNIT-V**

### **Fats, Sugar, Beverages and Spices**

**Fats and Oils** - composition of common fats and oils, smoking temperature, rancidity and role of fats and oils in cookery.

**Sugar** – Nutritive value, sugar related products, stages of sugar cookery, Crystallization, Factors affecting crystallization.

**Beverages:** classification, nutritive value - coffee, tea, cocoa, milk based beverages, fruit juices and aerated beverages.

**Spices and condiments** – Types and use in Indian cookery, Medicinal value.

## **TEXT BOOK**

1. Srilakshmi, B., “Food science” ,7<sup>th</sup> edition, New Age International Pvt. Ltd., New Delhi., 2018.
2. Potter, N.N. and Hotchkiss, H.J., “Food Science”, 5<sup>th</sup> edition, CBS Publishers and Distributors, New Delhi, 2007.

## **REFERENCE BOOKS**

1. Mudambi, R.S. and Rao. S. “Food Science”, 2<sup>nd</sup> Edition, Wiley Eastern limited.New Delhi. 2007,
2. Mudambi, R.S. and Rajagopal, M.Y.,“Fundamentals of Food, Nutrition and Diet Therapy” 5<sup>th</sup> Edition, Wiley Eastern Limited. New Delhi.,2010
3. Manay. N.S., “Foods – facts and principles”, 3<sup>rd</sup> Edition, New age International Pvt. Ltd. Publishers, New delhi, 1996.
4. Swaminathan, M. “Food Science and Experimental Foods”,Ganesh and Co., Chennai, 1988.

**SEMESTER : I**

**COURSE CODE : U17ND1P1**

**CREDITS : 3**

**TOTAL HOURS : 45**

### **CORE PRACTICALS - I FOOD SCIENCE LAB**

#### **General objectives :**

1. To gain knowledge of structure of various nutrient molecules.
2. To understand the effect of cooking on various food products.
3. To study in detail various cooking techniques.
4. To assess the changes in vegetables due to effect of heat and pH.
5. To clearly study the various subjective evaluation techniques.

#### **1. INTRODUCTION TO LABORATORY**

Laboratory rules

Familiarising with laboratory equipment, procedure, and learn to weigh food ingredients.

#### **2. CEREALS**

Microscopic examination of various starches.

Preparation of modified starch and their application.

Estimation of Gluten formation.

Preparation of cereal products using rice, wheat, ragi based on steaming, absorption, pressure cooking and straining methods.

#### **3. PULSES:**

Determination of Factors affecting cooking quality of pulses- use of hard water, soft water, sodium bi carbonate, vinegar; soaking and pressure cooking.

Preparation of few pulse recipes.

#### **4. VEGETABLES AND FRUITS:**

Effect of heat and pH on vegetable pigments like: chlorophyll, carotenoids, anthocyanin, anthoxanthin.

Effect of cooking on flavouring compounds of vegetables.

Browning reaction and its prevention.

Preparation of vegetable recipes by using the above experiment.

#### **5. MILK COOKERY**

Preparation of cheese, Paneer, Phirnee and Butter milk

#### **6. EGG**

Preparation of boiled egg, Scrambled egg, Poached egg, Omelette.



7. **SUGAR**  
Enumeration in Stages of sugar cookery
  
8. **FATS AND OILS:**  
Estimation of Smoking temperature of different fats and oils.  
Preparation of few deep fat food products.
  
9. **BEVERAGES:**  
Preparation and taste evaluation  
Coffee  
Tea  
Soup and  
Few nourishing beverages (fruit and milk based).

**References :**

1. Connie M.Weaver and James., “A Manual for Experimental Foods, Dietetics”, 2<sup>nd</sup> Edition, CRC press, Newyork, 2005.
2. Suzanne Nielsen.S., “Food Analysis laboratory Manual”, 2<sup>nd</sup> Edition, Springer, 2015.
3. Potter, N.N. and Hotchkiss, J.H., “Food Science”, 5<sup>th</sup> Edition, CBS Publication, Wadsworth, 2007.

**SEMESTER : I**

**COURSE CODE : U17ND1Y1**

**CREDITS :4**

**TOTAL HOURS : 60**

**ALLIED COURSE - FOOD MICROBIOLOGY**

**OBJECTIVES**

1. To understand the scope in the field of food microbiology
2. To acquire knowledge about different types of microorganisms and their role in food spoilage.
3. To study the characteristics of foodborne, waterborne microorganisms, and methods for their isolation, detection and identification.
4. To understand the beneficial role of microorganisms in food industry.
5. To study the adaptability of microorganisms to various environments.

**UNIT- I**

**Introduction to Food Microbiology**

History and Development of Food Microbiology, Light and Electron microscopy, Definition and Scope of food microbiology ,Inter-relationship of microbiology with other sciences

**UNIT- II**

**Characteristics of Microorganisms in Food**

Types of microorganisms associated with food, their morphology and structure, Significance of spores in food microbiology

**UNIT- III**

**Microbial Food Spoilage**

Sources of Microorganisms in foods, Types of food spoilage microorganisms  
Spoilage of specific food groups- Milk and dairy products, Meat, poultry and sea foods, Cereal and cereal products, Fruits and vegetables and canned products .

**UNIT- IV**

**Food Fermentations**

Fermentation – definition and types, Microorganisms used in food fermentations

Dairy Fermentations-starter cultures and their types, concept of probiotics, types of fermented foods, methods and preparation for vinegar, sauerkraut, soya sauce.

**UNIT- V**

Soil – Role of microorganism in nitrogen cycle.

Water – bacteriological examination of water, water borne disease and their control.  
Sewage – Types of sewage, method of sewage disposal  
Air – principles of air borne disease and their control

**Text Books:**

- 1) Adams, M.R., and Mosses, M.O., “Food Microbiology”, 5<sup>th</sup> Edition, New age International(P) Ltd., New Delhi, 20155.
- 2) Vijaya Ramesh,K, “Food Microbiology”, MJP Publishers, Chennai, 2007.

**REFERENCES**

- 1) Frazier William. C., and Westhoff, Dennis C., “Food Microbiology”, TMH, New Delhi, 2004
- 2) Jay, James M. “Modern Food Microbiology”, CBS Publication, New Delhi, 2000
- 3) Garbutt, J., “Essentials of Food Microbiology”, Arnold, London, 1997.
- 4) Banwart.G.J., “Basic Food Microbiology”, Chapman and Hall, New York, 1991.

**SEMESTER : I**

**COURSE CODE : U17NDYP1**

**CREDITS : 2**

**TOTAL HOURS : 45**

### **ALLIED PRACTICAL I - FOOD MICROBIOLOGY AND FOOD CHEMISTRY**

#### **General Objectives:**

- To understand the functions of microscope and gram staining.
  - To learn about the interrelationship between microorganism and food.
  - To understand the role of microbes in relation to food spoilage.
  - To evaluate the chemical changes that takes place in foods under varying conditions..
  - To assess the effects of various chemicals on foods.
1. Instrumentation in microbiology laboratory and their function.(microscope, autoclave& hot air oven)
  2. Preparation of culture media.
  3. Preparation of Pure culture techniques (Spread plate, Streak plate, pour plate methods)
  4. Estimation of Staining technique - simple and differential.
  5. Preparation of Microbiological evaluation of milk and milk products.
  6. Isolation of spoilage organism from different food commodities.
  7. Estimation of Microbiological analysis of water and air.

### **FOOD CHEMISTRY**

#### **Chemistry of Starch and Sugars:**

Gelatinization of starch,

Microscopic examination of uncooked and gelatinized starch

Estimation of Retro gradation and syneresis

Preparation of Gluten formation

Identification of Stages of sugar cookery

Preparation of fondant, Fudge, and Toffee

Preparation of Scum formation in milk .

#### **Chemistry of Proteins:**

Effect of Soaking, germination and fermentation of pulses

Preparation of coagulation in egg white and egg yolk.

Preparation of Boiled egg, poached egg, omelettes, Custards, Cake and Mayonnaise.

Preparation of Coagulation and precipitation of milk proteins.

Preparation of cooking Meat, Fish and Poultry,

Testing the tenderness of meat by food thermometers

**Chemistry of fat and Oils:**

Estimation of Smoking temperature in different Fats.

Analysis of Factor affecting absorption of fat.

Effect of acids , alkali and heat on water soluble and fat soluble pigments, Enzymatic browning and methods of prevention.

**References:**

1. Bennion M. and Hughes D., "Introductory foods", Macmillan Publishing Co.Inc, New York, 1975
2. Brich, C.G., Spencer .M and Cancerron A.G. "Food Science", Pergamon Press, New York, 1977.
3. Dennis D Miller., "Food Chemistry", Wiley Inter Science Edition, 1998.
4. Gopalan.C, Ramasastri.P.N., Balasuramanian S.C. "Nutritive value of Indian Foods", National Institute of Nutrition, Hyderabad, 1977.

**SEMESTER : II**

**COURSE CODE : U17ND202**

**CREDITS : 5**

**TOTAL HOURS : 90**

**CORE COURSE : II HUMAN PHYSIOLOGY**

### **Objectives**

- To learn about the fundamentals of anatomical structures and physiology of human body.
- To identify and use proper terminology in describing various parts of the body.
- To study various organs systems in our body with reference to health and disease.
- To Understand the Composition and Functions of Blood, Haemostasis, Homeostasis, Blood Coagulation, Anemia, Blood Transfusion and Blood Groups.

### **UNIT – I**

#### **Blood, Heart and Circulation**

**Blood** : Composition, functions, RBC – Structure, functions, erythropoiesis, Haemoglobin, WBC –Structure, functions, Classification.

Blood Platelets: Structure, functions, Reticulo endothelia system, Blood groups –Rh factor. Blood coagulation , spleen – Structure and functions, Lymph – Lymphatic system.

**Heart and Circulation:** Heart – Anatomy and physiology, Blood vessels –Structure of artery, vein, capillaries, Cardiac output, Arterial Blood pressure, clinical measurement of blood pressure, properties of cordite muscle, origin and conduction of heart beat, cardiac cycle, Regulation of the Heart's action.

### **UNIT – II**

#### **Respiratory and Excretory System**

**Respiratory System:** Structure of respiratory organs, Mechanics of respiration, subdivisions of lung air, Chemistry of respiration. Artificial respiration, control of respiration.

**Excretory System** - Physiology of kidney – nephron, formation of urine, voiding of urine. Skin – Structure and functions, Regulations of body temperature.

### **UNIT – III**

**Digestive System-** General anatomy of digestive system – Digestive in the mouth, stomach and intestines, Movements of small intestine , Role of pancreas, Liver – Structure and function.

## **UNIT – IV**

### **Endocrine and Reproductive system:**

**Endocrinology** - Structure and functions of thyroid, pituitary, parathyroid, adrenals, islets of langerhans of pancreas, sex glands.

**Reproductive System** - General anatomy – Female and male reproductive system. Testis – Spermatogenesis , male sex hormones, ovaries – genesis, Female sex hormones, menstrual cycle. Phases and endocrine control . Mammary glands – Structure, lactation and process of reproduction, fertilization, development of embryo, pregnancy and parturition..

## **UNIT – V**

### **Nervous System and Special Senses**

#### **Nervous System:**

Spinal cord – Structure and functions. Ascending and descending tracts, reflex action.

Brain – Structure and functions of cerebrum, optic thalamus, midbrain, Pons medulla oblongata, Hypo thalamus, cerebellum.

Autonomic nervous system, sympathetic and parasympathetic.

#### **Special Senses.**

Physiology of vision, Structure of eye, dark and light adaptation, accommodation of the eye, visual fields, common due to abnormalities – presbyopia, cataract, Astigmatism, Blindness.

Ear – Structure and Physiology of hearing.

#### **Text**

1. Guyton A.C., “Human Physiology and Mechanism and Disease”, 13<sup>th</sup> Edition, Elsevier., 2015 .
2. Sembulingam, K., “Essentials of Medical Physiology”, 6th Edition, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi, 2012.

#### **Reference**

1. Best and Taylor, “The Physiological Basis of Medical Practice”, 13th Edition, Saunders Company, (2011)
2. Chaudhri, K., “Concise Medical Physiology”, 7th Edition, New Central Book Agency (Parental) Ltd., Calcutta, (2016).
3. Chatterjee C.C., “Human Physiology, Volume I & II”, 11<sup>th</sup> Edition, CBS Publishers, 2017.

**SEMESTER : II**

**COURSE CODE :U17ND2P2**

**CREDITS : 3**

**TOTAL HOURS : 45**

**CORE PRACTICAL : II HUMAN PHYSIOLOGY LAB**

**General Objectives**

- To learn about the fundamentals of anatomical structures and physiology of human body
- To know about the body composition, Organs and System.
- To measure vital parameters such as blood pressure and pulse.
- To analyze blood for its constituents – hemoglobin, RBC and WBC.
- To microscopically analyze the structure of various cells and tissues.

**HUMAN PHYSIOLOGY**

1. Histology of the epithelial, muscular, connective tissue.
2. Microscopic structure of bone and cartilage.
3. Microscopic structure of nerve.
4. Estimation of Haemoglobin, RBC and WBC count Demonstration.
5. Identification of different types of white blood cells – Demonstration.
6. Determination of blood groups.
7. Recording of normal heart beat of frog.
8. Effect of temperature on heart beat – demonstration.
9. Arterial blood pressure and pulse rate, effect of exercise.
10. Histology of artery, vein, trachea and lung.

**Related Experiences**

1. Visit to blood bank.
2. Observation of blood transfusion.

**Reference**

1. Clark Patricia., “Human Physiology Lab Manuel Study Guide”, Second Edition, Pat Clark., India.
2. Best and Taylor ,”The Physiology Basis For Medical Practice”, Saunders Company, 1992.



**SEMESTER : II**

**COURSE CODE : U17ND2Y2**

**CREDITS : 4**

**TOTAL HOURS : 60**

**ALLIED COURSE : II FOOD CHEMISTRY**

**OBJECTIVES**

1. To enable the students to Study the physio-chemical changes that occur in foods during cooking.
2. To gain knowledge about the chemistry underlying the properties and reactions of various food components.
3. To understand the various properties exhibited by starch and sugars, proteins, fats and oils , pectic substances and spices and condiments.
4. To explain the properties and reactions of the various food components.
5. To develop products with minimum nutritional loss based on the knowledge of food chemistry.

**UNIT – I**

**Chemical properties of food**

Moisture in food, Hydrogen Bonding, Bound water, Water activity foods, Determination of moisture content in food.

True solution dispersion, Sols, Gels, Foams, Colloids and Emulsions

**UNIT- II**

**Chemistry of sugar and starch.**

Components of starch, Swelling of starch granules, Gel formation, Retro gradation, Syneresis.

Stages of sugar, Acid, Alkali, Fat and surface Active agents of starch.  
Chemistry of Milk Sugar, Non Enzymatic Browning.

**UNIT- III**

**Chemistry of Proteins**

Components of wheat protein, Structure, Gluten Formation  
Effect of soaking, Fermentation and Germination on Pulse proteins  
properties of Egg Protein, Chemistry of Milk Protein, Changes in milk, Egg and Meat protein during Heating action of heat, Acid, Alkalis on Vegetables Proteins and Animal Proteins.

## **UNIT- IV**

### **Chemistry of Fat and oils**

physical and chemical properties of fat and oils.  
Rancidity , Hydrogenation, Winterization, Decomposition of Triglycerides,  
Shortening power of fats, Changes in fats and oils during Heating, Factors affecting fat absorption in foods.

## **UNIT- V**

### **Plant Pigments**

Pectins, Phenolic Components, Enzymatic browning in Fruits and vegetables.  
Volatile compounds from cooked vegetables,  
Estimation of different types of plant pigments – Water and fat soluble pigments Such as Chlorophylls,

### **Text Books:**

1. Shakuntala Manay, Shadaksharaswamy, M. “ Foods, Facts and Principles”, 2<sup>nd</sup> Edition, New Age International Pvt Ltd Publishers, (2017) .
2. Chandrasekhar, U. “Food Science and applications in Indian Cookery”, Phoenix Publishing House, New Delhi
3. Swaminathan, M. Food Science, “Chemistry and Experimental Foods”, Bappco Publishers, Bangalore, (2015).

### **Reference Books:**

1. Meyer, L.H, “Food Chemistry”, (2004) CBS Publishers and Distributors, 4th edition
2. Paul, P.C. and Palmer, H.H. “Food Theory and Applications”, JohnWiley and Sons, New York, (Revised Edition) (2002)
3. Chopra H.K, Panesar, P.S, “Food Chemistry”, Narosa Publishing House, New Delhi, (2010).

**SEMESTER : I**

**COURSE CODE : U17NDYP1**

**CREDITS :2**

**TOTAL HOURS : 45**

**ALLIED PRACTICAL :I**

### **FOOD MICROBIOLOGY AND FOOD CHEMISTRY**

#### **General Objectives:**

- To understand the functions of microscope and gram staining.
- To learn about the interrelationship between microorganism and food.
- To understand the role of microbes in relation to food spoilage.
- To evaluate the chemical changes that takes place in foods under varying conditions.
- To assess the effects of various chemicals on foods.

1. Instrumentation in microbiology laboratory and their function. (microscope, autoclave& hot air oven)
2. Preparation of culture media.
3. Estimation of Pure culture techniques (Spread plate, Streak plate, pour plate methods)
4. Preparation of staining technique simple and differential method.
5. Estimation of Microbiological evaluation of milk and milk products.
6. Isolation of spoilage organism from different food commodities.

### **FOOD CHEMISTRY**

#### **Chemistry of Starch and Sugars:**

Estimation of Gelatinization of starch

Microscopic examination of uncooked and gelatinized starch

Determination of Retro gradation and syneresis ,

Preparation of Gluten formation,

Estimation of Stages of sugar cookery ,

Preparation of fondant, Fudge,and Toffee, Scum formation in milk.

### **Chemistry of Proteins::**

Effect of Soaking, germination and fermentation of pulses

Determination of coagulation of egg white and egg yolk.

Preparation of Boiled egg, poached egg, omelettes, Custards, Cake and Mayonnaise.

Preparation of Coagulation and precipitation of milk proteins.

Changes observed in cooking Meat, Fish and Poultry, Testing the tenderness of meat.

### **Chemistry of fat and Oils:**

Estimation of Smoking temperature of different Fats, Factors affecting absorption of fats .

### **Chemistry of plant pigments**

Effect of acids, alkali and heat on water soluble and fat soluble pigments Enzymatic browning and methods of prevention.

### **References :**

1. Denis D Miller., "Food chemistry a laboratory Manual", John wiley Nasher, Newyork.
2. James G. Cappuccino and Natalie Shermen, "Microbiology- A laboratory Manual", Pearson Education Publishers,USA, 2008.
3. Fennema,Owen.R., "Food Chemistry", 3<sup>rd</sup> Edition, Marcell Dekker,Newyork,1996.

**SEMESTER : II**

**COURSE CODE : U17ND2S1**

**CREDITS : 2**

**TOTAL HOURS : 30**

### **SBEC I - FOOD PACKAGING**

#### **Objectives:**

- To Gain knowledge on importance of packaging.
- To evaluate various packaging materials used in food industry.
- To ensure the safety of the product and preserve it in good condition for the anticipated shelf life.

#### **UNIT I PACKAGING**

Concepts, definition, significance, classification. Development, unit/Retail. Fresh and processed, general characteristics and food preservation.

#### **UNIT II PRIMARY PACKAGING MEDIA Properties and applications.**

Paper boards, metals, plastics, wood and plywood, glass, flexible, etc.

Labels, caps and closures, waxes, adhesives, inks and lacquers, cushioning materials.

#### **UNIT III FOOD PRODUCTS**

General classification and packaging types.

#### **PACKAGING SYSTEMS AND METHODS**

Vacuum packaging, gas flush Packaging, CAP and MAP, aseptic and retort packing bag-in-boxete.

#### **UNIT IV STORAGE, HANDLING AND DISTRIBUTION OF PACKAGES (FOODS)**

Palletisation and containerization. Marketing - barcoding and marketing.

#### **UNIT V PACKAGING LAWS AND REGULATIONS**

FDA, FPO, packaging commodity. Rules, Weight and Measures Act.

## Reference Books

1. Bhatia, S.C., “Canning and Preservations of Fruits and Vegetables” – New Delhi, Inc. 2010.
2. Darry, R. Blackie. T. “Principles of Applications of MAP”, Academic Professions, 1996
3. Multon, J.K. Food packaging Technology, (Vol.1 and 2) VCH – Publishers, Inc. New York,1986
5. Robertson, G.L., Food Packaging – Marcell, Dekker, Inc, New York.
6. Sacharow & Griffini, Food Packing, AVI Publications, 1987

**SEMESTER : III**

**COURSE CODE : U17ND303**

**CREDITS : 5**

**TOTAL HOURS : 90**

**CORE COURSE -III- PRINCIPLES OF NUTRITION**

**Objectives:**

1. To acquire an understanding of nutrition science for health promotion and disease prevention
2. To gain knowledge on functions, metabolism, requirements and effects of deficiency of nutrients.
3. To gain scientific knowledge about the vital link between nutrition and health of individuals.
4. To study in detail the basic components of foods and nutrients and their function.
5. To gain overall knowledge on the concept of nutrition.

**Unit**

**UNIT I**

Recommended dietary allowances – Definition, General principles of deriving RDA, Factors affecting RDA, Methods used for deriving RDA.

Carbohydrates – Definition, Nutritional classification, Functions, Digestion and absorption, Requirements and Sources.

Disorders- Diabetes mellitus

Dietary Fibre – Definition, Classification, Sources and Role of Fibre in human Nutrition.

**UNIT II**

Energy – Definitions, units of Energy, Determination of energy value of foods , Bomp Calorimeter, Types of calorimeter- Direct and Indirect calorimeter and Thermal effect of food.

BMR – Definitions, Determinations, Factors affecting the BMR, Specific dynamic action, Energy requirement and sources.

### UNIT III

Proteins – Definition, Nutritional classification of protein , Functions of Proteins ,Digestion and absorption Sources and Requirements. Deficiency Disorder- PEM, Amino acids- Essential and non-essential Evaluation of Protein quality – PER, BV, NPU and chemical score.

Lipids – Definition, Nutritional classification, Functions, Digestion and absorption, Sources and requirements, Deficiency disorder – diseases related to heart

### UNIT IV

Vitamins – Classification, functions and Deficiency,  
Fat Soluble Vitamins – Vitamin A, D, E and K – Functions, Requirements, Sources and Effect of deficiency.

Water soluble vitamins – Thiamine, Riboflavin, Niacin, Ascorbic acid, Folic acid, Vitamin B6 and B12 – Functions, Requirements, Sources and Effects of deficiency

### UNIT V

Minerals – Classification and General Functions.

- (B) Macro minerals – Calcium, Phosphorus, Magnesium, Sodium and Potassium – Functions, Requirements, Sources, Effects of Deficiency, Effect of imbalance of Sodium and Potassium.
- (C) Micro Minerals – Iron, Iodine, Copper, Fluorine and Zinc – Functions, Requirements, Sources and Effect of Deficiency..

### Text books

1. Swaminathan, M., “Essentials of food and Nutrition”, Vol I & II, Bappco Publishers, Madras 2000.
2. Srilakshmi. B., “Nutrition Science”, New age International (p) ltd, publishers, 2004.

### Reference

1. Frances sizer and Ellie whitney, “Nutrition Concepts and Controversies”, Thomson wadsworth Publisher, New York, 2006.
2. Mangale Kango, “Normal Nutrition, Curing Diseases through Diet”, 1<sup>st</sup> Edition, CBS publication, 2005.
3. Bonnie, Worthington – Roberts and Sue Rodwell Williams, “Nutrition throughout the lifecycle”, 3rd edition, WCB/MC Graw Hill Publisher, New York, 1996.
4. Paul. S., “Text of Bio Nutrition Fundamental and Management”, RBSA Publishers, 2003



**SEMESTER : III**  
**CREDITS : 3**

**COURSE CODE : U17ND3P3**  
**TOTAL HOURS : 45**

### **CORE PRACTICALS - PRINCIPLES OF NUTRITION LAB**

#### **Objectives:**

1. To learn the qualitative and quantitative analytical tests in foods.
2. To understand how food react while identifying various foods.
3. To acquire the basic skills required to analyze nutritional components of foods.
4. To practically demonstrate and analyse the nutritional constituents in foods.

#### **Qualitative Analysis:**

1. Qualitative test for Carbohydrate – Glucose, Fructose, Lactose, Maltose and Galactose.
2. Qualitative test for Protein.
3. Qualitative estimation of iron, Ascorbic acid Vitamin A.
4. Demonstration of estimation of nitrogen.
5. Demonstration of fibre estimation.
6. Demonstration of total fat estimation.

#### **TEXT BOOKS**

1. Varley, H., Gowenlak, A.H. and Hill, M. “Practical Clinical Biochemistry”, William Itinmaon Medical Books, London, 2000.
2. Oser, B.L., “Harke’s Physiological Chemistry” ,15<sup>th</sup> Edition, Tata McGraw Hill Publishing Company Ltd., Bombay, 2001.

#### **REFERENCE BOOKS**

1. Sadasivam, S. and Manickam, “A. Biochemical Method”, Second Edition, New Age International P. Ltd., Publishers, New Delhi, 2003.
2. Raghuramulu, N., Madhavannair, K. and KalyanaSundaram, National Institute of Nutrition, “A Manual of Laboratory Techniques”, Hyderabad, 500007, 2013.

**SEMESTER : III**  
**CREDITS : 4**

**ALLIED COURSE : III**  
**COURSE CODE : U17ND3Y3**  
**TOTAL HOURS: 60**

## **FOOD STANDARD AND QUALITY CONTROL**

### **OBJECTIVES:**

- To Identify and apply the various quality control measures involved in the food industry.
- To understand what food specification is and the importance of reading food label.
- To analyze the effect of food additives and preservatives in processed foods.
- To interpret the effects of food adulterants and experimentally identify common food adulterants.
- To analyze various food law and Government regulations in detail and their day-to-day application.

### **Unit I:**

Food quality ,quality features of food, quality checking of raw materials and processed food ,simple technique of quality checking of raw food materials – cereals ,pulses, vegetables, fruits , milk and meat products, oils and spices and condiments, processed foods-tinned foods ,baked food, advantages of quality control and stages of quality control.

### **Unit-II**

#### **Quality control measures:**

(a)Food specifications:- Food specifications for various food products- starchy food , milk and milk products, fruit products , beverages , spices and condiments , oils and fats; objectives and advantages .

(b)Food Additives & their specifications:- Classifications of food additives , usages and optimal level recommended for usage as specifications - Food colors , leavening agents , preservatives.

### **UNIT III**

#### **Quality Evaluation of food**

(a) Subjective evaluation: Sensory characters of food, organs involved in assessment – physiological process, types of sensory test- requirements to contact sensory evaluation, Role and purpose and defects in sensory evaluation- panel member, essential qualities of a panel member, procedure of sensory evaluation, popular centres for sensory evaluation in India and their role.

#### **(b), objective evaluation:**

Objectives, requirements, different test, and instruments used for objective valuation, advantages and limitations, popular centre in India.

#### **Unit-IV**

##### **Food contaminants and adulterants:**

(a). Food toxins – Myco toxins – aflatoxins, aspergills and penicillium species, Mushroom poisoning sea food toxins.

(b) Other toxins- Naturally occurring in foods, Lathyragens, haemoagglutinins, goitrogens

(c) toxic minerals and other inorganic components in food and water: selenium, Fluorine, nitrates and nitrites, oxalate and phytates.

(d). Food adulterations and food standards : adulterations- Definition, common food adulterants : Test for detecting food adulterants, contamination with toxic minerals, pesticides and insecticides : Effects of food adulterants and contamination, measures to control food adulterants. Prevention of food adulterants act

#### **Unit –V**

##### **Food standards and food laws:**

(a) international food standard and Codex Alimentarius

(b) AGMARK & BIS

(c) FSSAI

(d) HACCP

##### **TEXT BOOK**

1. Srilakshmi, B., “Food science”, 7<sup>th</sup> edition, New Age International Pvt. Ltd., New Delhi., 2018.

2. Potter, N.N. and Hotchkiss, H.J., “Food Science”, 5<sup>th</sup> edition, CBS Publishers and Distributors, New Delhi, 2007.

##### **REFERENCES:**

1. Edward G. Schilling., “Acceptance Sampling in Quality control”, 2<sup>nd</sup> Edition, CRC Press, Mallbook., 1996

2. Swaminathan.M., “Essential of Food and Nutrition”, New Age publication, New Delhi. 2011

3. Eillian H. Meyer, “Food Chemistry”, Affiliated West Press Pvt., Ltd, New Delhi, 1973.

**SEMESTER : III**  
**CREDITS : -**

**ALLIED practical : II**  
**COURSE CODE : U17NDYP2**

**FOOD STANDARD AND QUALITY CONTROL AND NUTRITIONAL  
BIOCHEMISTRY**

**Objectives:**

- To know about the components of blood and urine through analysis.
- To understand the normal and abnormal constituents in body fluids.
- To analyze the common food adulterants.
- To understand the role of sensory evaluation in assessing food quality.
- To acquire knowledge of food processing and packaging and the importance of reading food label.

**Qualitative Analysis of urine and blood.**

1. Quantitative analysis of Urine sugar, protein, Bile pigments, Bile Salts
2. Estimation of Glucose in Urine (Benedict's Method)
3. Estimation of Urea in Urine (DAM Method)
4. Estimation of Blood Glucose (Folin-WU Method)
5. Estimation of Blood Urea (DAM Method)
6. Estimation of serum cholesterol (Zak's Method)

**II FOOD STANDARD AND QUALITY CONTROL PRACTICAL**

Display the standard food products available in the market.

**III Food Adulterants**

Physical and chemical method of identifying common food adulterants.

**IV SE Common foods:**

Sensory Evaluation of common foods by using five point Hedonic scale.

**References :**

1. Inteaz Alli., "Food Quality Assurances, Principles and Practices", CRC press, India.
2. Margaret M.C. Williams, "Food Fundamentals", John Wiley and Sons, London, 1974.

**SEMESTER : III**  
**CREDITS : 2**

**COURSE CODE :U17ND3E1**  
**TOTAL HOURS : 30**

**NMEC I : BASICS IN NUTRITION**

**Objectives**

- To Appreciate the importance of early eating habits for the shaping of later eating behavior and health status;
- To understand the importance of nutrition nourishing the body.
- To develop the basic knowledge of the disorder of nutrition among students.
- To create awareness of the various concepts of food and nutrition.

**Unit-I**

**Food:**

Food definition ,classification of food, basic five food groups classification of nutrients, RDA- reference man and women, factors influencing RDA

**Unit-II**

Carbohydrates: functions, sources, classifications and requirements, disorder of CHO- under nutrition and obesity and Diabetes mellitus, Role of dietary fibre in health and disease.

**Unit-III**

**Proteins:**

Sources, functions of proteins, nutritional Classifications of amino acids, and it's requirements, deficiency of protein metabolism.

**Unit-IV**

**Lipids:**

Lipids - sources, functions of protein Classifications and types of fatty acids and requirements, Disorder of lipid metabolism- disease related to heart- hypertension and atherosclerosis.

**UNIT -V**

**Macro minerals & Vitamins**

**Macro minerals:** sources, functions. Classifications, Requirements of macro minerals and effect of deficiency and excess.

**Micro minerals:** sources, functions. Classifications, Requirements of iron, Iodine Zinc and flourine effect of deficiency and excess.

**Vitamins**

Fat soluble Vitamins: Vitamin A, Vitamin D, E & K. Functions, Sources, Requirements and Deficiency diseases.

Water soluble vitamins: Thiamine, Riboflavin, Niacin, Pantothenic acid, Biotin, Folic acid, Vitamin B12, VitaminB6 and Vitamin C, Functions, Sources , Requirements and Deficiency diseases.

## **Books**

1. Srilakshmi, B., “Food science” , 7<sup>th</sup> edition, New Age International Pvt. Ltd., New Delhi., 2018.
2. “Dietary Guidelines for Indians”, ICMR, National Institute of Nutrition, Hyderabad, 2013.

**SEMESTER : IV**

**COURSE CODE :U17ND404**

**CREDITS : 5**

**TOTAL HOURS: 90**

**Core : IV - NUTRITION THROUGH LIFE CYCLE**

**Objectives:**

- To understand the relationship between nutrition and health.
- To obtain knowledge on the nutritional needs pertaining to different stages of life.
- To acquire knowledge on the physiological changes on various stages of life and coping up with their daily dietary requirements.
- To plan and execute diets based on RDA for the various stages of life.

**UNIT – I**

a. Basics principles of meal planning, RDA , Food allowance for different age groups, factors influencing nutritional requirements for all age groups.

b. Nutrition during Pregnancy- stages of pregnancy, physiological changes, Weight gain in pregnancy, Complications, factors influencing the outcome of pregnancy, nutritional requirements and diet planning for pregnant women.

**UNIT – II**

Nutrition for lactating women- physiology and psychology of lactation, hormonal control, colostrums- composition, composition of breast milk, Factors affecting the volume and composition of breast milk, nutritional requirements of a nursing mother, diet planning, factors responsible for the lactating failure.

**UNIT – III**

a. Nutrition in infancy- birth weight of infants, rate of growth, milestones in development (only stage) immunization schedule, nutritional requirements, process of breast feeding, comparison of human milk with cow's milk, artificial feeding, weaning and supplementary foods, feeding problems.

b. Nutrition in pre- school age- growth and development, nutritional requirements, factors affecting nutritional status, food requirement, low cost supplementary foods, nutrition related problems in childhood, diet planning for the pre- school child.

**UNIT- IV**

a. Nutrition in school age children – growth in school children, nutritional and food requirement, packed lunch- factors to be considered, sample menu for the school children.

b. Nutrition in adolescence – growth and development, body composition, puberty, secondary sexual characteristics, psychological changes, nutritional requirements, nutritional problems, malnutrition due to early marriage, food habits and diet plan.

**UNIT- V**

a. Nutrition in adulthood – reference men and reference women, nutritional requirements of an adult man and women, body composition, nutrition and health issues, planning diet to suit different income levels.

b. Nutrition in elderly – definitions of geriatrics, changes in body composition, physiological changes, psychological and socio economic factors in relation to food intake, nutritional requirement, modification of diet in old age.

**TEXT BOOKS:**

1. Mahtab,S, Banarji, Kamala Krishnasamy ,G.N.V. Brahmam, “Text book of Human Nutrition”, Third Edition,Oxford and IBH PublishingCo.P.Lit.,New Delhi, 2012.

2. Srilakshmi, B., “Dietetics”, Sixth Edition, New Age International (p) Ltd., New Delhi, 2013.

**Reference books:**

1. “Dietary Guidelines for Indians”, ICMR, National Institute of Nutrition, Hyderabad,2013.

2. Gobalan,C. Rama Sastri B.V. and Balasubramanian, “Nutritive value of Indian Foods”, NIN, ICMR, Hyderabad,2014.

3. Krause,M.V and Hunscher, M.A., “Food, Nutrition and Diet Therapy”, 14<sup>th</sup> Edition, W.B.Saunders. 2014



**SEMESTER : IV**

**COURSE CODE : U17ND4P4**

**CREDITS : 3**

**TOTAL HOURS : 45**

**NUTRITION THROUGH LIFE CYCLE LAB**

**General Objective:**

- To understand the nutritional requirements in different age groups in human life cycle.
- To gain a thorough knowledge on the nutritive value of various food stuffs.
- To acquire skills in planning and preparing menus for different age groups based on RDA.

**Menu planning**

**1. Planning , Preparing and serving a meal for**

- a. Expectant women
- b. Lactating women
- c. Infancy
- d. Pre-School children
- e. School going children
- f. Adolescent
- g. Adult
- h. Old age person

**Reference books:**

1. M. Swaminathan “Principles of Nutrition and Dietetics”, New age international, 1993
2. Srilakshmi.B., “Dietetics”, 6<sup>th</sup> Edition, New Age Publication, New Delhi, 2013

**SEMESTER : IV**

**COURSE CODE : U17ND4Y4**

**CREDITS : 4**

**TOTAL HOURS : 60 HOURS**

## **ALLIED COURSE IV : NUTRITIONAL BIOCHEMISTRY**

### **Objectives**

- To understand the fate of food from mouth to anus.
- To gain in depth knowledge on the digestion and absorption of various nutrients.
- To get an insight on interrelations between various metabolic pathways.
- To study in detail the normal and abnormal constituents of the body.
- To acquire knowledge on the interrelationships between various metabolic pathways and inborn errors of metabolism

### **UNIT-I**

#### **Carbohydrate Metabolism**

Definition, Classification of carbohydrates – Monosaccharide, Disaccharide and polysaccharide. Metabolism – glycolytic pathway, Electron transport chain, glycogenesis, Glycogenolysis and Gluconeogenesis. Disorder of carbohydrate metabolism-Diabetes mellitus – Definition, Types, Diagnosis and Complications

### **UNIT-II**

#### **Protein metabolism**

Definition, Classification of protein, Structure, Physical properties, Chemical properties, Amino acids- Essential and non- essential.

Inborn errors of aminoacid metabolism-Albuminuria, phenylketonuria, cystinuria and Maple syrup disease.

### **UNIT-III**

#### **Lipid metabolism**

Definition, Structure, Classification of lipids-Saturated, Unsaturated fatty acid, Bio Synthesis of fatty acid.

**Lipoproteins:** Types, composition, role and significance in diseases.

**Inborn errors of fat metabolism**-Wolman disease, Gaucher's disease and Niemann pick disease.

## **UNIT-IV**

### **Genetic & Liver Function Metabolism**

Nucleic acids – Types, Composition, Functions, Replication and Transcription.

**Liver function test-** Functions of Liver, Tests based on metabolic functions, capacity for detoxification, enzymes, Bile Synthesis.

## **UNIT-V**

### **Basic Clinical Techniques:**

Collection and preservation of blood and urine - Normal and abnormal constituents of urine and blood.

### **Renal Function Tests:**

Inulin clearance test, urea clearance test, endogenous creatinine clearance, concentration test, addis test, mosenthal test, urea concentration test and dye test.

## **TEXT BOOKS**

1. Ambika Shanmugam, “Fundamentals of Biochemistry for Medical Students”, Seventh Edition, New age publishing Pvt.Ltd., New Delhi, 1986.
2. Deb.A.C., “Fundamentals of Bio chemistry”, 5<sup>th</sup> edition, New Central Book Agency(P) Ltd.,1992.
3. Sathyanarayana,U.,Chakrapani,U., “Textbook of Biochemistry”. 3rd edition, Books and Allied (P) Ltd, Kolkata, , 2010.

## **REFERENCE BOOKS**

1. West, E.S., Todd, W.R., Mason, H.S and Van Bruggen, J.T, “Text book of biochemistry”, Amerind , 4<sup>th</sup> Edition, Publishing Co PvtLTd., 1974.
2. Devlin, T.M., “Text Book of Biochemistry (with Clinical corrections)”, 2<sup>nd</sup> edition, John Wiley and sons, 1986.
3. Ramakrishnan,S.,Prassanan,K.G.,Rajan,R., “Text book of Medical Bio chemistry”, 2<sup>nd</sup> edition, Orient Longman limited, 1989.

**SEMESTER : III**  
**CREDITS : - 2**

**ALLIED practical : II**  
**COURSE CODE : U17NDYP2**

### **FOOD STANDARD AND QUALITY CONTROL AND NUTRITIONAL BIOCHEMISTRY**

#### **Objectives:**

- To know about the components of blood and urine through analysis.
- To understand the normal and abnormal constituents in body fluids.
- To analyze the common food adulterants.
- To understand the role of sensory evaluation in assessing food quality.
- To acquire knowledge of food processing and packaging and the importance or reading food label.
- 

#### **Qualitative Analysis of urine and blood.**

1. Quantitative analysis of Urine sugar, protein, Bile pigments, Bile Salts
2. Estimation of Glucose in Urine (Benedict's Method)
3. Estimation of Urea in Urine (DAM Method)
4. Estimation of Blood Glucose (Folin-WU Method)
5. Estimation of Blood Urea (DAM Method)
6. Estimation of serum cholesterol (Zak's Method)

### **II FOOD STANDARD AND QUALITY CONTROL PRACTICAL**

Display the standard food products available in the market.

### **III Food Adulterants**

Physical and chemical method of identifying common food adulterants.

### **IV SE Common foods:**

Sensory Evaluation of common foods by using five point Hedonic scale.

#### **References :**

1. Inteaz Alli., "Food Quality Assurances, Principles and Practices", CRC press, India.
2. Margaret M.C. Williams, "Food Fundamentals", John Wiley and Sons, London, 1974.

**SEMESTER : IV**

**COURSE CODE : U17ND4E2**

**CREDITS : 2**

**TOTAL HOURS : 30**

**NMEC: II DIET IN HEALTH AND DISEASE**

**Objectives:**

- To understand the basics of nutrition.
- To gain a basic knowledge on the role of diet in various diseased conditions.
- To acquire a fundamental insight on hospital diets.
- To basically understand the role of diet in various disease conditions.

**Unit-I**

**Nutrition and nutrients:**

Food - definition, classification of food, basic five food groups classification of nutrients, RDA- reference man and women, factors influencing RDA.

Macronutrients and micronutrients.

**UNIT II**

**Diet in Fever**

- a. Causes, Types, general Dietary consideration
- b. Typhoid, Influenza, Malaria and Tuberculosis
- c. Diet in Obesity and underweight.
- d. Nutritional Anaemia – prevalence, causes, Types, iron deficiency anaemia and Prevention of anaemia.

**UNIT – III**

**Diet in Cardio vascular disease**

- a. Prevalence, clinical effects
- b. Risk factors, Role of fat in the development of atherosclerosis
- c. Hypertension
- d. Dietary management
- e. physical activity and Heart diseases

**UNIT IV**

**Diet in Diabetes Mellitus**

- a. Prevalence, Types, etiology and symptoms
- b. Diagnosis, treatment and Complication
- c. Dietary management

**Diet in diseases of the Kidney**

- a. Functions of kidney
- b. Symptoms, Chronic and acute renal failure and urinary Calculi
- c. Principles of Dietary Management

## **UNIT V**

### **Diet in Cancer**

- a. Risk factors and Symptoms
- b. Nutritional problems of Cancer therapy
- c. Nutritional requirements
- d. Role of food in the prevention of cancer.

### **References:**

1. Antia P. "Clinical Dietetics and Nutrition", 2<sup>nd</sup> edition, Oxford University Press.
2. Garrow J.S, James W.P.T, Ralph A, (2000), "Human Nutrition and Dietetics", 10<sup>th</sup> edition, Churchill Livingstone, London.
3. Srilakshmi B, "Dietetics", 7<sup>th</sup> Edition, New Age International, New Delhi, (2016).

**SEMESTER : V**

**COURSE CODE : U17ND505**

**CREDITS : 5**

**TOTAL HOURS : 90**

**CORE V : DIETETICS-I**

**Objectives:**

- To learn about the growth and scope of dietetics and concepts of diet therapy
- To gain knowledge about the role of nutrition in disease conditions.
- To develop skills and techniques in the planning and preparation of therapeutic diets for various disease conditions
- To understand the causes and symptoms of deficiency disorders.

**UNIT – I**

**Basic Concepts about Dietetics**

- a. Definition of dietetics, dietitian, goals of diet therapy.
- b. Types of dietitian, role and responsibilities of dietitians, qualifications, qualities and professional ethics, code of conduct.
- c. Therapeutic adaptations of normal diet, Routine hospital diets –Regular, soft, full fluid, clear fluid diet.
- d. Specially modified therapeutic diets, High calorie, low calorie, high and low protein, bland, high and low residue diets.

**UNIT- II**

**Special feeding methods**

- a. Enteral nutrition – methods – nasogastric, gastrostomy and jejunostomy. Types of food, infusion techniques, TPN – Types of infusion, TPN formula for adults.
- b. Dietary modification, diet planning and preventive measures for – PEM, iron deficiency anaemia and Vitamin A deficiency.
- c. Causes, risk factors, pathogenesis, dietary modifications, diet planning and counseling measures for febrile conditions – fevers of long duration and short duration.

**UNIT- III**

**Malnutrition**

- a. Causes, risk factors, pathogenesis, dietary modifications, diet planning and counseling measures for overweight.
- b. Causes, risk factors, pathogenesis, dietary modifications, diet planning and counseling for underweight.
- c. Anorexia nervosa and Bulimia.

**UNIT IV**

**Diseases of the gastrointestinal tract**

Diseases of upper-gastrointestinal tract: Causes, pathogenesis, dietary modification and diet planning for:

- (i) GERD
- (ii) Gastritis
- (iii) Peptic ulcer

Diseases of lower-intestinal tract: Causes, pathogenesis, dietary modification and diet planning for:

- (i) Diarrhea, dysentery
- (ii) Constipation.
- (iii) Haemorrhoids.
- (iv) Surgery of colon – gastrostomy, jejunostomy.
- (v) Cancer of colon.

## **UNIT V**

### **Nutraceuticals & Dietary counselling**

(i) **Nutraceuticals** – Definition, types, use of nutraceuticals in the prevention and treatment of – obesity, Diabetes, CVD and Cancer.

(ii) Functional foods .

#### **Text Books:**

1. Srilakshmi, B. “Dietetics”, 7<sup>th</sup> Edition, New Age International P. Ltd., New Delhi, 2016.
2. “Dietary Guidelines of Indians” – A Manual, National Institute of Nutrition, Hyderabad, 2011.
3. Garg, M. , “Diet, Nutrition and Health”, ABD Publishers, 2006.
4. Corinne H.Robinson, M.R.Lawber, W.L.Chenoweth and A.E.Garwick, “Normal and Therapeutic Nutrition”, MacMillan Publishing CO, New York, 1982

#### **Reference Books:**

1. Krause, M.V. and Mahan, L.K. “Food, Nutrition and Diet Therapy”, 14th Edition W.B. Saunders Company, Philadelphia, 2009.
2. Maimun Nisha, “Diet Planning for Diseases”, Kalpaz Publishers, 2006.



**SEMESTER : V**

**COURSE CODE : U17ND506**

**CREDITS : 5**

**TOTAL HOURS : 90**

**CORE VI - COMMUNITY NUTRITION**

**OBJECTIVES**

- To understand the importance of nutrition in national progress.
- To gain knowledge about means of overcoming problems of malnutrition in the country and the role of National and International agencies.
- To understand the concept of public health Nutrition
- To gain knowledge on food and nutritional security, epidemiology in public health
- To develop skills to assess nutritional status of the community.

**UNIT-I**

**Malnutrition**

Nutrition and health in National Development: Malnutrition - Etiology , symptoms, Under nutrition and Over nutrition, Prevalence of malnutrition, balance between food and population growth.

**UNIT-II**

**Macro and Micro Nutrient Deficiency**

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

**UNIT-III**

**Nutritional Assessment**

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

**UNIT-IV**

**Nutritional Programme**

Role of National and International organizations - ICDS, Noon Meal Programme, FAO, WHO, UNICEF, CARE, ICMR, ICAR, CSIR, NIN, CFTRI, National Nutrition Policy, NGO.

**UNIT-V**

**Nutrition Education & Intervention programme:**

Nutrition Education - Meaning, Scope, Methods - Planning, conduct of evaluation of Nutrition education Programme.

## **TEXT BOOKS**

1. A Lesties Banks and Hislop J.A., “Health and Hygiene”, Universal Tutorial Press, London, 1987.
2. Senha H.K, “Challenges in Rural Development”I Discovery publishing, 1996.
3. “Food consumption and planning” - Vol V, International encyclopedia, 1998

## **REFERENCE**

1. Willium Hobson., “Theory and practice of public Health”, Oxford University press, London,2001
2. Sabarwal B, “Applied Nutrition and Health Education”, Common wealth publishers, New Delhi,2003
3. Barbara Hernandez.,McGraw Hill., “Foundations of Community Health Education, London, 1999
4. P.K. Shukla, “Nutritional Problems of India”, Prentice Hall, India,2001

**SEMESTER : V**

**COURSE CODE : U17ND5P5**

**CREDITS : 3**

**TOTAL HOURS : 4 x 15**

**CORE PRAC V : DIETETICS- I LAB**

**Objectives**

- To know the corrective measures for malnutrition.
- To develop skills and techniques in the planning and preparation of therapeutic diets
- To understand the concepts of various diseases and plan diet accordingly.

**Planning, Nutritive value calculation and preparation of Various Diets**

- a. Clear fluid diet, full fluid diet and soft diet.
- b. Low and medium cost diet for protein calorie malnutrition,
- c. Fevers
- d. Diet for Vitamin A deficiency and iron deficiency anaemia
- e. diet for Obese and underweight conditions.
- f. Diet for Peptic ulcer, diarrhoea and constipation.
- g. Diet for Surgery and burns.

**References:**

1. Garg.M. Diet, “Nutrition and Health”, ABD Publishers,2006.
2. NIN., “Dietary Guidelines of Indians- A Manual”, National Institute of Nutrition, Hyderabad,2011.

**SEMESTER : V**

**COURSE CODE : U17ND5:1**

**CREDITS : 4**

**TOTAL HOURS : 75**

### **ELECTIVE I : FOOD PRESERVATION**

#### **Objectives:**

- To learn the principles behind preservation techniques.
- To understand the various stages of cookery and chemical attributes in preserving fruits.
- To enrich the preserved fruit products with added nutrients.
- To be able to identify and preserve different food groups based on perishability.

#### **UNIT I**

##### **PRESERVATION**

- (i) History, importance.
- (ii) Definition, needs, principles of food preservation.
- (iii) Methods of low and high temperature.
- (iv) Dehydration – Types, objectives and principles of dehydration, steps involved in dehydration process, merits and demerits- effects on nutritive value in dehydrated foods.

#### **UNIT II**

##### **FOOD ADDITIVES**

- (i) Food additives – Definition; Preservatives – class 1 and class 2 preservatives, colours, flavouring agents, sweeteners, emulsifiers and stabilizers, leavening agents, antioxidants, flour improvers.
- (ii) Government regulations.

#### **UNIT III**

##### **PRESERVATION TYPES**

- (i) Bacteriostatic – Dehydration-types of dehydration (Sun drying, spray drying) Pickling, Salting, Smoking, Freezing – slow and quick, merits and demerits.
- (ii) Bactericidal – Canning-steps involved in the process of canning, Irradiation, microwave cooking.

#### **UNIT IV**

##### **Food Spoilage**

- (i) Definition, role of microorganisms in food spoilage, types of food spoilage, causes of spoilage, factors affecting spoilage, kinds of spoilage – perishable and non-perishable.
- (ii) Anaerobic and aerobic microorganisms involved in food preservation – mold, fungi, bacteria.
- (iii) Remedial measures to be taken on spoilage.
- (iv) Storage conditions – storage conditions leading to food spoilage.

#### **UNIT V**

##### **PRESERVED FOODS**

- (i) Products using sugar - squash, jam, jelly
- (ii) Products using salt - tomato ketchup, pickles, chutneys.

(iii) Preservation using vinegar

(ii) Preparation of dehydrated products – papads, vathal, vadams and dehydrated vegetables.

### **TEXTBOOKS**

1. N.Shakuntala Manay & M.Shadaksharaswamy, “Foods Facts and Principles (III Revised Edition)”, New Age International (P) Ltd. Publishers, New Delhi, 2011
2. M.Swaminathan., “Food and Nutrition”, Bangalore Printing and Publishing Company, Bangalore, 2010

### **REFERENCES**

1. Maria Parloa (2012), “Canned fruit, preserves and jellies: Household methods of preparation”, Published by US department of Agriculture, Washington
2. M. Shafiur, Rahman (2017), “Handbook of food preservation,” 2nd edition, CRC press.

**SEMESTER : V**

**COURSE CODE : U17ND5:2**

**CREDITS : 4**

**TOTAL HOURS : 75**

### **ELECTIVE I : FUNCTIONAL FOODS**

#### **OBJECTIVES**

- Gain knowledge about functional foods, nutraceutical and nutrigenomics.
- Understanding the molecular level interaction between nutrients and other dietary bioactives with human genome.
- Know the applications of Nutrigenomics in wellness and disease management.
- To evaluate the future prospects of development of functional foods based on the needs of the growing world.

#### **UNIT – I INTRODUCTION**

Definitions Background, status of nutraceuticals and functional food market, difference between nutraceuticals and functional foods, Types of nutraceutical compounds and their health benefits, current scenario.

#### **UNIT- II NUTRACEUTICALS**

Types of nutraceutical compounds – Phytochemicals, phytosterols and other bioactive compounds, peptides and proteins, carbohydrates (dietary fibers, oligosaccharides and resistant starch), prebiotics, probiotics and synbiotics, lipids (Conjugated Linoleic Acid, omega-3 fatty acids, fat replacers), vitamins and minerals; their sources and role in promoting human health.

#### **UNIT –III FUNCTIONAL FOODS**

Cereal and cereal products, Milk and milk products, egg, oils, meat and products, sea foods, nuts and oilseeds, functional fruits and vegetables, herbs and spices, beverages (tea, wine etc), Fermented foods – their health benefits and role in conditions like cardiovascular diseases, hypertension, diabetes etc.

#### **UNIT-IV FUTURE PROSPECTS OF FUNCTIONAL FOODS AND NUTRACEUTICALS**

Their potential for use in improving health. Development in processing of functional foods. Formulation and fabrication of functional foods.

**UNIT –V**  
**LEGAL ASPECTS**

Stability of nutraceuticals. Safety, Consumer acceptance and assessment of health claims, labeling, marketing and regulatory issues related to nutraceuticals and functional foods.

**REFERENCES**

1. Wildman REC, “Handbook of Nutraceutical and Functional Foods”, CRC Press, 2001
2. Ghosh, D. et al, “Innovations in Healthy and Functional Foods”, CRC Press , 2012
3. Pathak YV., “Handbook of nutraceuticals Volume 2”, CRC Press , 2011

**SEMESTER : V**

**COURSE CODE : U17ND5:3**

**CREDITS : 4**

**TOTAL HOURS : 75**

**ELECTIVE II: PRINCIPLES OF RESOURCE MANAGEMENT AND INTERIOR DESIGN**

**Objectives:**

1. To Understand the concepts and principles and functions of management.
2. To recognize the importance of wise use of resources to achieve one's goal.
3. To acquire the knowledge of various elements and principles of art in interior.
4. To Learn skills in using the basic principles of art at home in commercial situations and other occasions.
5. To apply theoretical knowledge of interior decoration to practical situations.

**UNIT I**

**1.1 Resource Management:** Understanding, meaning, classification and characteristics of resources, factors affecting utilization of resources.

**1.2** Maximizing the use of resources and resource conservation.

**1.3** Availability and management of specific resources by an individual / family-money, time, energy, space.

**1.4 Functions of management:** Decision making, planning, supervising, controlling, organizing.

**UNIT II**

**2.1 Design and good taste:** Objectives of aesthetic planning, beauty, 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, intensify/chroma). The pang colour system (primary, secondary, intermediate hue, tertiary and quaternary colour).

**2.3 Procedure for making a colour scheme for a room:** Factors affecting the use of colour scheme for room (the room, mood, style, fashion, personality, possession).

**2.4** Application of art principle in the use of colours for a room (balance, proportion, harmony, rhythm, emphasis).

**UNIT III**

**3.1 Lighting:** Source of light (natural, artificial light).

**3.2 Types of lighting:** General/ambient lighting, task lighting, accent lighting.

**3.3 Requirements of an ideal lighting installation –** Steadiness of the source of light, elimination of glare, avoidance of shadows, sufficient illumination to suit the nature of the visual task, nonproduction of excessive heat, minimum consumption of oxygen from the air.



## UNIT IV

4.1 **Furniture:** Requirement and arrangement in the home, materials used in furnishing items.

4.2 **Furnishing:** Different types of furnishing, factors considered in the selection of furnishing.

4.3 **Floor coverings:** Factors for selecting floor coverings, salient features of carpet, types use and care of floor coverings.

## UNIT V

5.1 Accessories: Selection, types, use and care of accessories.

5.2 Traditional and Modern: Art objects, pictures.

5.3 Flower arrangement: Principles, types and steps in preparing flower arrangement.

## TEXTBOOKS

1. Graig, H.T., and Rush, C.H. "Homes with Character", D.C. Health and Company, Boston 1965.
2. Alexender, M.J., "Designing Interior Environment", Har Court Brace Jauaroui Inc., New York, 1972.
3. Sherwood, R.F. "Homes Today and Tomorrow", Chart Bannet, Co., Inc., PEORIC, Illinois, 1972.
4. Premavathy Seetharaman and Parveen Banu, "Interior Design and Decoration", CBS Publishers, New Delhi, 2007.

## REFERENCES

1. Nickell, P. and Dorsey, J.M. "Management in Family Living", John Wiley and Sons, Inc, New York 1960.
2. Goldstein, H and Goldstein, V. "Art in Everyday Life", Macmillan and Company, New York, 1966.
3. Rutt, A.H., "Home Furnishings", John Wiley and Sons, New York, 1961.
4. Roy Day, "All about Decorating Your Home" Hamlyn, London, 1976.

**SEMESTER : V**

**COURSE CODE : U17ND5:4**

**CREDITS : 4**

**TOTAL HOURS : 75**

## **ELECTIVE II : FOOD SANITATION AND HYGIENE**

### **Objectives:**

- To integrate concepts in chemistry, organic chemistry, and biochemistry, with food processing sanitation and safety operations and understand their role in processing of food.
- To know about the issues in food processing.
- To learn about the food processing industry's role in society.
- To understand that about food hygiene, sanitation, and safety during food processing and unit operations.

### **Unit-I**

**Sanitation Overview Sanitary Regulations:** Definition, Types of Hygiene and sanitation, Management of Sanitation, Microorganisms and Their Relationship to Sanitation Food Contamination sources. Hazard Analysis and Critical Control Points (HACCP)

### **Unit-II**

#### **Cleaning Agents**

Classification of Cleaning Equipments ,Functioning and care of Manual leaning Equipment Functioning and care of Mechanical Cleaning Equipment, Groups of Cleaning agents , Use of Detergents, Use of after, Abrasives, degreasers acids, organic solvents and dry-cleaning agents.

### **Unit-III**

Food Storage Sanitation; Food Transport Sanitation, Pest Control, Packaging Sanitation ,Waste Product Disposal

### **Unit-IV**

#### **WATER & AIR**

Sources of water and hazards of water pollution Sources of air Pollution health effects of air pollution, Pollution Control ,Water born diseases, air born diseases preventing measure for diseases.

**Unit-V**  
**HANDLING OF FOOD**

Personal hygiene of the food handlers • Program of Good Health For Food handlers • Food Borne Diseases – Roots of Contamination • safety measures for food service personnel. • Care maintenance of Protective Clothing .

**Reference**

1. Norman G. Marriott, “Principles of Food Sanitation”, 6th edition, 1996
2. John A. Troller, “Sanitation in Food Processing”, Academic Press
3. Peleezar, M.I. and Reid, K. D., “Microbiology”, McGraw Hill Company, New York, 1978.
4. Benson Harold, J., “Microbiological Application”, Publishers, U.S.A., 1990
- 5.. Colling, C.E. and Lyne, P.M., “Microbiological Methods”, Butterworth. Lon, 1976

**SEMESTER : V**

**COURSE CODE : U17ND5S2**

**CREDITS : 2**

**TOTAL HOURS : 30**

**SBEC II : NUTRITION IN SPECIAL CONDITION**

**OBJECTIVES :**

- To identify and contribute to the prevention of public health/ social health problems in the country.
- To equip students with workable knowledge to treat common illnesses at home.
- To combat various National nutritional emergencies and epidemic diseases.
- To understand the difficulties involved in feeding children with special needs.

**UNIT I:**

**Nutritional care for the children with special needs**

Overview of the disability, food and nutritional needs and their modification.

- i. Attention deficit hyperactivity disorder.
- ii. Autism.
- iii. Cerebral palsy.
- iv. Down's syndrome.

**Unit-II**

**Epidemic diseases** - (i) Dengue, chikenguniya and other epidemic conditions.

Hypothyroidism and hyperthyroidism.

Wilson's Disease.

**Unit- III**

**Nutritional Emergency**

Nutrition during emergency: Natural calamity - war, flood, fire famine

Nutrition in sea voyage, Mountaineering,

**Unit- IV**

**Space Nutrition:**

Food Selection. Food preparation for space ,Planning and serving the food, Classification of space food and Dehydrated foods use in space.

**Unit - V****Armed forces nutrition:**

The history of Military nutrition, Nutrient Support in Military person, the role of nutrient in injured person, Estimation of energy and protein metabolism in armed person.

**References:**

1. Gibney ., “Public Health Nutrition”, Blackwell Publishing, 2004.
2. Khanna., “Textbook of Nutrition and Dietetics”, Phoenix Publisher,2013.
- 3.Sharma S, Wadhwa A., “Nutrition in the Community- A textbook”, Elite Publishing House Pvt. Ltd, 2003.
4. Srilakshmi B. “Dietetics” Seventh Edition, New Age International (P) Ltd, 2016
  
5. Bamji MS, Rao NP, and Reddy V. Text Book of Human Nutrition; Oxford & IBH Publishing Co. Pvt Ltd, 2009.
6. Lakra P, Singh MD. Textbook of Nutrition and Health,, First Ed, 2008; Academic
7. Defiance Food Services Integrated Project Food for thought (DVD), Team 2007.

**SEMESTER : V**

**COURSE CODE :U17ND5S3**

**CREDITS : 2**

**TOTAL HOURS : 30**

### **SBEC I - BAKERY AND CONFECTIONERY**

#### **Objectives**

- To Understand basic concepts of baking.
- To be acquainted with the role of various major and minor ingredients in bakery products.
- To familiarize with baking process and operation.
- To learn the quality parameter of bakery products.

#### **UNIT I**

**Introduction of bakery**—definition, principles, types of baked and confectionary products.

**Major and minor equipment** – required to start a small bakery unit.

#### **UNIT II**

**Major and minor ingredient in baking**

**Major ingredients** – flour, fat, sugar and leavening agent – types, role in bakery

**Minor ingredients** – milk, water, salt – types, role in bakery

#### **UNIT III**

##### **Bread**

Principles involved in the yeast products preparation, methods – straight dough method, salt delayed method, no dough time method, sponge and dough method, ferment and dough method.

Methods of Processing

Faults and remedies in baked bread, types of bread improvers.

#### **UNIT IV**

##### **Cake**

Principles involved in the preparation of cake, sponge cake – types (fatless sponge, Genoese sponge, plain sponge, gel sponge).

Methods – sugar batter method, flour batter method, blending method, boiling method, sugar water method, all-in process method (slow speed, medium speed, fast speed), foaming method.

Faults and remedies in baked cakes.

Icing –Types and Preparation Methods

## **UNIT V**

### **Biscuits and cookies**

Principles involved in cookies preparation, methods for mixing cookies – single or one stage method, creaming or sugar batter method, blending or rub in method, foaming method, flour batter method.

Types – sheeted types, piped types, bar types, dropped types, rolled types

Difference between biscuits and cookies

Faults and remedies in baked biscuits and cookies

### **TEXT BOOKS**

1. John Kingslee A, “Professional Text to Bakery and Confectionary”, 1<sup>st</sup> edition, New Age International (P) Limited Publishers, 2006.
2. Yogambal Ashokkumar, “Theory of Bakery and Confectionery”, 5<sup>th</sup> edition, PHI Learning Private Limited, New Delhi 2009.

### **REFERENCE BOOKS**

1. Wayne Gisslen, “The Professional Baking”, 6<sup>th</sup> edition, Publishers John Wiley & Sons 2012.
2. Pat Sinclair, “Basic Baking”, Publisher Agate, 2006

**SEMESTER : VI**

**COURSE CODE : U17ND607**

**CREDITS : 5**

**TOTAL HOURS : 6 x 15**

**CORE : VII DIETETICS - II**

**Objectives**

- To understand the role of dietician in preventive, promotive and curative health care.
- To know appropriate dietary modifications for various disease conditions based on the pathophysiology.
- To learn about the causes, symptoms and treatment of various disease conditions
- To gain knowledge about the role of nutrition in disease conditions.
- To develop skills and techniques in the planning and preparation of therapeutic diets for various disease conditions.

**UNIT- I**

**Diabetes Mellitus**

- a) Types –IDM, NIDM, GDM
- b) Pathogenesis, Symptoms, Causes, Diagnostic tests, Complications.
- c) Dietary modification and diet planning of the disease.

**UNIT II**

**Diseases of the liver**

- a) Diseases of the liver, gall bladder and exocrine pancreas – pathogenesis, causes, signs and symptoms, dietary modifications and diet planning for:
  - i. Liver- fatty liver, hepatitis, cirrhosis, hepatic coma
  - ii. Gall bladder – cholecystitis, cholelithiasis
  - iii. Pancreas – Pancreatitis.
- b) Nutritional care for patients with inborn errors of metabolism – prognosis, symptoms, dietary management – phenylketonuria, galactosemia.

**UNIT- III**

**Kidney Disease:**

Pathogenesis ,Symptoms, causes, Nutritional modification, diet planning and dialysis for kidney disease

- a) Nephritis
- b) Nephrosis
- c) Urinary Calculi
- d) Renal failure – acute and chronic

**UNIT IV**

**Disease of the cardio vascular system**

Pathogenesis, symptoms, causes, diagnostic tests, complications, dietary modification and diet planning of:

- a) Hypertension
- b) Atherosclerosis – Myocardial infarction
- c) Ischemic heart disease
- d) Hyperlipidemia



- e) Acute and Chronic cardiac disease and congestive cardiac failure.
- f) CABG.

## **UNIT-V**

### **Skeletal and Allergy**

- a) **Nutritional care in disease of the musculoskeletal system** – Arthritis, Osteoporosis, Gout, dental caries.
- b) **Allergies** – Food allergy and intolerance, Factors influencing ,Symptoms, test for allergy, Nutritional care and elimination diet.

### **Nutrition Care in Cancer and AIDS**

- c) **Cancer** – mechanism of cancer formation, pathophysiology ,classification, , etiology, symptoms, dietary management and role of food in prevention of cancer.
- d) **AIDS** – epidemiological features, mode of transmission, clinical manifestation and dietary management.

## **TEXT BOOKS**

1. Antia, F.P, “Clinical dietetics and Nutrition”, 4th Edition, Oxford University Press, New Delhi,2002.
2. Joshi, S.A, “Nutrition and Dietetics”, 2<sup>nd</sup> edition, TATA McGraw Hill publications, New Delhi, 2008.
3. Srilakshmi. B, “Dietetics”, 7<sup>th</sup> Edition, New Age International (P) Ltd. Publishers, Chennai, 2016.
4. Swaminathan, M. “Essentials of Food and Nutrition-Vol. I and II” BAPPCO., The Bangalore Printing and Publishing co., ltd., No.88, Mysore Road, Bangalore ,2010
5. Davidson and passmore, “Human Nutrition and Dietetics”, English Language Book Society, Livingstone,1986.

## **REFERENCE BOOKS**

1. Mahan,L.K.,Arlin.M.T.,Krause’s, “Food Nutrition and Diet Therapy”, 14<sup>TH</sup> Edition. W.B.Saunders Company, London ,2016.
2. Williams, S.R., “Nutrition and Diet Therapy”, 6<sup>th</sup> Edition,Times Mirror / Mosby College Publishing, St. Louis, 1989.
3. Raheena Begum, “A Text Book of Foods, Nutrition and Dietetics”, Sterling Publishers, New Delhi.1989.
4. Gopalan,C., “Dietary Guidelines for Indians – A Manual”, National Institute of Nutrition, Hyderabad, 2005
5. Shills, M.E, Oslon, J.A, Shike, M and Ross, A.C, “Modern Nutrition in Health and Disease”, 10<sup>th</sup> Edition, Lippincott Williams and Wilkins 2006.

**SEMESTER : VI**

**COURSE CODE : U17ND608**

**CREDITS : 5**

**TOTAL HOURS : 75**

**CORE COURSE VIII : NUTRITION AND FITNESS**

**Objectives:**

1. To understand the components of health and fitness and the role of nutrition in these.
2. To know nutritional, dietary and physical activity recommendations to achieve fitness and well-being.
3. To develop ability to evaluate fitness and well-being.
4. To critically assess the lack of fitness in community.
5. To realize the impact of life-style changes in the betterment of the community.

**UNIT – I**

**Body composition and fitness**

**Body Composition-** classification (Fat mass and fat free Mass) and its components, factors influencing body mass composition. Techniques for measuring body composition

**Fitness-**definition, parameters of fitness- cardiovascular endurance, muscular strength, muscular endurance, flexibility and body composition

**UNIT -II**

**Assessment and benefit of exercise**

**Benefit of exercise-** physiological, psychological and sociological. Physical activity guidelines.

**Assessing personal fitness-** preparticipation, screening and risk assessment.

**Role of exercise in disease prevention** – diabetes, cardiovascular disease, obesity, bone health and cancer.

**UNIT – III**

**Energy systems and electrolyte balance**

**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.

**Water and electrolyte balance-** Losses and their replenishment during exercise and sports event, effect of dehydration, sports drinks.

## **UNIT-IV**

### **Nutrition for sport persons**

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.

**Role of nutrition and recommendations** – pre-exercise, during and post –exercise

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 altitude-changes in body composition, nutrient requirements, food system and suitable types of food.

## **TEXT BOOKS**

1. Mahan, L.K. & Ecott-Stump, s., Krause's "Food, Nutrition and Diet therapy", 14<sup>th</sup> edition, W.B. Saunders Ltd, 2016.
- 2.Sizer, F. & Whitney, E., "Nutrition- Concepts & Controversies", 8<sup>th</sup> edition, Wadsworth Thomson learning, 2000.
3. Shills, M.E., Olson, J.A., Shike, N. and Ross, A.C. (Ed), "Modern Nutrition in Health & disease", 9<sup>th</sup> edition, Williams & Wilkins, 1999.

## **REFERENCE BOOKS**

1. Whitney, E.N. & Rolfes, S.R., "Understanding Nutrition", 8<sup>th</sup> edition, West/Wadsworth, an International Thomson publishing Co., 2002
2. Ira Wolinsky (Ed), "Nutrition in exercise and sports", 3<sup>rd</sup> Edition, CRC press, 1988
3. Parizkova, J. "Nutrition, physical activity and health in early life", Ed. Wolinsky, I., CRC press, 2001
4. Mc Ardle, W. Katch, F. and Katch, V. "Exercise Physiology. Energy, Nutrition and Human performance", 4<sup>th</sup> edition, Williams and Wilkins, Philadelphia, 2009
5. Barbak Ann Dushman, "Complete guide to fitness and health", American college of sports medicine library and congress catalog in publication data, 2006.

**SEMESTER : VI**

**COURSE CODE : U17ND609**

**CREDITS : 5**

**TOTAL HOURS : 75**

## **CORE IX - INSTITUTIONAL FOOD SERVICE MANAGEMENT**

### **Objectives**

1. To gain knowledge on systems, types and styles of food service in catering establishments.
2. To develop skills for quantity cookery.
3. To gain knowledge and develop skills in handling equipments and their maintenance.
4. To gain knowledge on ideal food service layout.
5. To acquire the basic managerial skills needed in hospitality industry.

### **UNIT – I**

#### **Layout**

Food Plan Layout: Flow of work, characteristics of a typical food service layout, layout of food plants-space allocation for the various areas and flow of traffic through receiving, storage, preparation, service and dish washing areas; arrangements of equipments in work centers; optimum working heights.

### **UNIT – II**

#### **Equipment and Furnishings**

(i) Classification of equipment, factors involved in selection of equipments; purchase of equipment, operational know-how, care and maintenance of equipments; dining room furnishings.

(ii) Materials Used: Base materials used in the manufacture of equipments, materials used for finishes, materials used in the manufacture of dining room furnishings.

### **UNIT III**

#### **Food Service – Classification of food service according to**

(i) Types of food service systems - Conventional systems, Commissary system, read prepared system and assembly –service system.

(ii) Styles of Service : Service of food-self-service, tray service, Waiter –Waitress Service and portable service, formal and informal service

## **Meal Planning**

(iii) Menu : Types of menu, Principles involved in menu Planning: Indian and Western, menu planner, why menu Planning; techniques in writing menu card.

### **UNIT – IV    *Quantity Food Purchasing and Storage.***

Purchasing : Purchasing officer, duties, purchasing procedure, selection of supplier, methods of purchasing, purchase specifications.

(i) Receiving : Procedure and forms.

(ii) Storing and issuing : Objectives, types of store records, and stores issues.

#### ***Quantity Food Production and Service.***

(iii) Quality standards and control.

(iv) Standardisation of recipes

(v) Portion control: Utilization of left over foods.

(vi) Ways and means of creating good atmosphere (Interior decoration)

(vii) Informal and formal service styles (Table Service)

### **UNIT – V**

#### **Cost control**

(i) Food Cost Control : Principles of food cost control, elements of cost-food cost, labour cost and overhead expenses; why good cost control; factors responsible for losses in a food

(ii) Service industry; methods of controlling goods costs leading to profit; costing of dishes, meals and events; methods of pricing items.

#### **Text Books**

1. Mohini Selti and Surjeet Malhan, “Catering Management – an integrated approach”, Wiley Eastern Limited, New Delhi, 1987.

2. West, B.B., Wood, L., Harger, V.F. and Shugart, G., “Food Service in Institutions”, John Wiley and Sons, New York, 1988.

#### **Reference Books**

1. Kotschevar, L. and Terrel, M.E, “Food service Planning, Layout and Equipment”, John Wiley and Sons, 1971.

2. Kotas, R and Davis, B., “Food Cost Control”, Mc.Millan & Sons, 1973.

**SEMESTER : VI**

**COURSE CODE : U17ND6P6**

**CREDITS : 3**

**TOTAL HOURS : 45**

**CORE PRACTICALS VI : DIETETICS - II PRACTICAL & DIETARY INTERNSHIP**

**General Objectives:**

- To understand the pathology of Metabolic diseases, Cardiovascular disease and Renal disease and their dietary modification.
- To develop diet formulation for HIV and Cancer patients.
- To understand and practice diet counseling of patients.

**PLANNING ,NUTRITIVE VALUE CALCULATION AND PREPARATION DIET FOR...**

1. Diabetes Mellitus-IDDM, NIDDM and Gestational Diabetes
2. Hypertension, atherosclerosis and congestive heart disease
3. Nephritis, nephrotic syndrome acute and chronic renal failure and nephrolithiasis.
4. Liver disease – cirrhosis, jaundice, hepatitis.
5. Cancer
6. AIDS

**References:**

1. Krause, M.V.Mahan, “Nutrition Diet Therapy”, 13<sup>th</sup> Edition., W.B.Saunders Company, Philadelphia,2013.
2. Maimun Nisha,” Diet Planning for Disease”, Kalpaz Pub, 2006.
3. Srilakshmi.V. “Dietetics”, New age International pub., New Delhi,2011.

**SEMESTER : VI**

**COURSE CODE : U17ND6:1**

**CREDITS : 3**

**TOTAL HOURS : 75**

**ELECTIVE II - FOOD PRODUCT DEVELOPMENT AND MARKETING STRATEGY**

**Objectives**

- To understand the principles of food product development.
- To acquire basic knowledge in marketing skills.
- To develop entrepreneurial skills in students through product development and marketing.

**UNIT-I**

**Concepts of product development:**

Basic principles and concept of food product development, cultural approach to development of dietary pattern of various groups-language, linguistic, regional, religious (ethnic), Factors involved in food habit alteration, availability, importance and role of different research and development departments in food production industry.

**UNIT-II**

**Market Process**

Steps in product development-material resources based on market demand, standardization methods involved in product development. Portion size and portion control; Calculation of nutritive value and cost of production, shelf life and storage stability evaluation procedure of developed food products.

**UNIT-III**

**Formula Development**

Formulation of new food products for infants, preschool children, adolescents, pregnant and nursing mothers, old age, sports persons, armed sources personnel and therapeutic uses. Selection and training of judges, Development of Score Card and analysis of data, Role of advertisement and Technologies in promotion of new products.

**UNIT-IV**

**Government proportion**

Concept of market and marketing - approaches of study marketing and marketing functions, market structure, marketing efficiency and market integration, Role of Government in promoting agricultural marketing. Market promotion and positioning of food products.

**UNIT-V**

**Sanitation:**

Conditions for sale, license and identification and quality processing, conditions for distribution, storage and sanitation, Studying the global market status, Role of export promoting agencies, Economic feasibility of new products.

**Text Books:**

1. Sudhir Gupta, “Handbook of Packaging Technology”, Engineers India Research Institute, New Delhi , (2017)
2. Khanaka, S.S., “Entrepreneurial Development”, S. Chand and Company Ltd, New Delhi, 2016.

**Reference Books:**

1. Suja, R. Nair, “Consumer Behaviour and Marketing Research”, 1st Edition, Himalaya Publishers, (2014).
2. Hmacfie, “Consumer led Food Product Development”, Weedhead Publishing Ltd., UK, (2017)
3. Fuller, Gordon, W., “New Food Product Development”, 2nd Edition, CRC Press, Boca Raton, Florida, (2015)
4. Schaffner .D,J, Schroder , W.R. “Food Marketing and International Perspectives”, Web/McGraw Hill , (2010)