UG (Science) Programme – Course Structure under CBCS
(Applicable to the candidates admitted from the academic year 2017 -2018 onwards) 22.10.2016

SEM	COURSE CODE	PART	COURSE	COURSE TITLE	Ins. Hrs / Week	CREDIT	MARKS		TOTAL
							CIA	ESE	
I	17U1LT1/LA1/LF1/LH1/LU1	I	Language – I	Tamil / Arabic-I	6	3	25	75	100
	17UCN1E1	II	English - I	English –I	6	3	25	75	100
	17UND1C1	III	**Core – I**	Food science	5	5	25	75	100
	17UND1CP2		**Core – II**	Food science practical	3	2	20	80	100
	17UND1A1		**Allied –I**	Principles of Nutrition	5	4	25	75	100
	17UND1AP2		**Allied –II**	Principles of Nutrition practical	3	2	20	80	100
	17UCN1VE	IV	Value Education	Value Education	2	2	-	100	100
			TOTAL		**30**	**21**			**700**
II	17U2LT2/LA2/LF2/LH2/LU2	I	Language – II	Tamil / Arabic-II	6	3	25	75	100
	17UCN2E2	II	English – II	English –II	6	3	25	75	100
	17UND2C3	III	**Core – III**	Nutrition Through Life Cycle	6	5	25	75	100
	17UND2CP4		**Core – IV**	Nutrition Through Life Cycle practical	3	2	20	80	100
	17UND2A3		**Allied – III**	Human physiology	4	3	25	75	100
	17UND2AP4		**Allied –IV**	Human physiology practical	3	2	20	80	100
	17UCN2ES	IV	Environmental Studies	Environmental Studies	2	2	-	100	100
			TOTAL		**30**	**20**			**700**
III	17U3LT3/LA3/LF3/LH3/LU3	I	Language– III	Tamil / Arabic-III	6	3	25	75	100
	17UCN3E3	II	English – III	English –III	6	3	25	75	100
	17UND3C5	III	**Core– V**	Dietetics-I	4	4	25	75	100
	17UND3CP6		**Core– VI**	Dietetics-I practical	3	2	20	80	100
	17UND3A5		**Allied– V**	Nutritional Biochemistry	4	3	25	75	100
	17UND3AP6		**Allied–VI**	Nutritional Biochemistry practical	3	2	20	80	100
	17UND3N1	IV	Non Major Elective I	Food and Health	2	2	-	100	100
	17UCN3S1		Skill Based Elective - I	Soft Skills Development	2	2	-	100	100
			TOTAL		**30**	**21**			**800**
IV	17U4LT4/LA4/LF4/LH4/LU4	I	Language–IV	Tamil / Arabic-IV	6	3	25	75	100
	17UCN4E4	II	English– IV	English –IV	6	3	25	75	100
	17UND4C7	III	**Core– VII**	Dietetics-II	5	5	25	75	100
	17UND4CP8		**Core - VIII**	Dietetics-II practical	3	2	20	80	100
	17UND4A7		**Allied– VII**	Food Microbiology	5	3	25	75	100
	17UND4AP8		**Allied–VIII**	Food Microbiology practical	3	2	20	80	100
	17UND4N2	IV	Non Major Elective - II	Nutrition For the Family	2	2	-	100	100
	17UCN4EA	V	Extension Activities	NCC, NSS, etc.	-	1	-	-	-
			TOTAL		**30**	**21**			**700**
V	17UND5C9I	III	**Core – IX**	Dietetics Internship	6	5	25	75	100
	17UND5C10		**Core – X**	Food Service Management-I	5	5	25	75	100
	17UND5C11		**Core – XI**	Food Preservation and Bakery	5	5	25	75	100
	17UND5CP12		**Core - XII**	Food Preservation and Bakery practical	5	5	20	80	100
	17UND5M1		Major Based Elective – I		5	4	25	75	100
	17UND5S2	IV	Skill Based Elective II		2	2	-	100	100
	17UND5S3		Skill Based Elective – III		2	2	-	100	100
	17UND5EC1		**Extra Credit Course - I**	Food Packaging	**-**	**4***	**--**	**100***	**100***
			TOTAL		**30**	**28**			**700**
VI	17UND6C13	III	**Core - XIII**	Food Service Management-II	5	5	25	75	100
	17UND6C14		**Core - XIV**	Community Nutrition	5	5	25	75	100
	17UND6CP15		**Core - XV**	Food Service Management Practical	5	5	20	80	100
	17UND6C16		**Core - XVI**	Food Standards and Quality Control	5	5	25	75	100
	17UND6M2		Major Based Elective II		5	4	25	75	100
	17UND6M3		Major Based Elective III		4	4	25	75	100
	17UCN6GS	V	Gender Studies	Gender Studies	1	1	-	100	100
	17UND6EC2		**Extra Credit Course - II**	Principles of Resource Management and Interior Design	**-**	**4***	**--**	**100***	**100***
			TOTAL		**30**	**29**			**700**
			GRAND TOTAL		**180**	**140**	**-**	**-**	**4300**

* Not Considered for Grant Total and CGPA.

Skill Based Elective		Major Based Elective	
II	Basics in Computer	I	Food Chemistry
	Nutrition for Physical Fitness		Food Biotechnology
III	Food and Nutrition	II	Human Development
	Basics in Nutrition		Basics in Food Safety
		III	Community Development
			Nutrition in Critical Care

SEMESTER-I: CORE COURSE- I

FOOD SCIENCE

Course Code	**: 17UND1C1**		**Max. Marks**	**:**	**100**
Hours/Week	**: 5**		**Internal Marks**	**:**	**25**
Credit	**: 5**		**External Marks**	**:**	**75**

Objectives

To enable the students to

1. Know the basic concepts about different foods and nutrients.
2. Develop the scientific attitude of the students towards the principle of food science.
3. Obtain the knowledge of composition and nutritive value of different foods.
4. Know the impact of cooking on various foods.

UNIT-I **15 hours**

Introduction to Food science

1.1 **Food -** Definition: Food, Food Science and Balanced diet. Basic Four, Five food groups. Functions of food - Energy yielding, Body Building and Protective foods.

1.2 **Cooking Principles and Methods:** Principle of cooking**, Method of cooking-**Moist, Dry and Combination heat methods of cooking, merits and demerits.

1.3 **Microwave cooking**- principle, merits & demerits. Solar cooking- solar cooker and solar oven- Principle.

UNIT-II **15 hours**

Cereals, Pulses, Nuts & oil seeds

2.1 **Cereals: Wheat -** Structure, composition and nutritive value, milling process, by products. Gluten formation**. Rice** - Structure, composition and nutritive value, milling process, by products, parboiling- method, merits. **Millet** - Types and nutritive value. Role of cereals in cookery.

2.2 **Pulses:** Composition and Nutritive value, factors affecting cooking quality of pulses. Germination- Process and its advantages. Role of pulses in cookery.

2.3 **Nuts and Oil seeds: Nuts-** Composition of specific nuts (almonds, coconut, groundnut, walnut) and their importance, role of nuts in cookery**. Oil seeds-**Composition of specific oil seeds (Flaxseed, Pumpkin seed, Gingelly seed) and their importance. Role of oil seeds in cookery

UNIT-III **15 hours**

Vegetables, Fruits and Sugar

3.1 **Vegetables:** Classification, composition and nutritive value. Pigments- Classification, selection, Effect of acid, alkali medium on the pigments, changes during cooking of vegetables, # role of Vegetables in cookery#.

3.2 **Fruits:** Classification, composition and nutritive value, changes during ripening of fruits, Browning reaction- types and its prevention.

3.3 **Sugar:** Types of sugar and related products, stages of sugar cookery, crystallization- meaning, Types.

15 hours

UNIT-IV

Milk, Egg and Fleshy foods

4.1 **Milk and Milk Products:** Composition and nutritive value, types of milk and milk products, Pasteurization- definition and types.

4.2 **Egg:** Structure, composition and nutritive value, quality of egg, factors affecting foam formation, factors affecting the coagulation of egg. # Uses of egg in cookery#

4.3 **Fleshy foods: Meat-** Structure**,** composition and nutritive value of meat, post mortem changes, Ageing and tenderness of meat. **Poultry-** Classification, composition and nutritive value and poultry cooking. **Fish**- Classification, composition and nutritive value, selection and methods of Cooking.

UNIT-V **15 hours**

Fats, Beverages and Spices

5.1 **Fats and Oils:** Composition and nutritive value, smoking temperature. Rancidity- Types and Prevention. Role of fats and oils in cookery.

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

5.3 **Spices and condiments** – Classification, uses, role of spices in cookery.

#.....# Self-Study portion

TEXT BOOKS

1. Srilakshmi, B, "Food science",5th edition,New Age International Pvt. Ltd. Publishers, New Delhi,(2010).
2. Mudambi. S.R, Rao. S.M, & Rajagopal.M.V, "Food Science", New Age International Pvt. Ltd. Publishers, New Delhi, (2007).

UNIT I	Text Book 1	Chapter I
	Text Book 2	Chapter V
UNIT II	Text Book 1	Chapter II, III, IV, XII
	Text Book 2	Chapter IX, X
UNIT III	Text Book 1	Chapter VIII, IX
	Text Book 2	Chapter XII, XIII
UNIT IV	Text Book 1	Chapter V, VI, VII
	Text Book 2	Chapter X
UNIT V	Text Book 1	Chapter X, XI, XII
	Text Book 2	Chapter XI, XIV, XV

SEMESTER-I: CORE COURSE- II

FOOD SCIENCE PRACTICAL

Course Code	**: 17UND1CP2**		**Max. Marks**	**:**	**100**
Hours/Week	**: 3**		**Internal Marks**	**:**	**20**
Credit	**: 2**		**External Marks**	**:**	**80**

1. **INTRODUCTION TO LABORATORY:**
   (a) Laboratory rules
   (b) Familiarizing with laboratory equipments, procedure, and weighing methods
2. **CEREALS:**
   (a) Determination of Gluten content in wheat, maida and rice flour.
   (b) Cereal preparations using rice, wheat, ragi by various cooking methods (Boiling, pressure Cooking, steaming, frying) and related recopies.
3. **PULSES:**
   (a) Factor affecting the quality of pulses- Use of hard water, soft water, sodium bi Carbonate, vinegar; pressure cooking and preparation of few pulse based recipes.
4. **VEGETABLES AND FRUITS:**
   (a) Effect of heat and pH on vegetable pigments like: chlorophyll, carotenoids, anthocyanin, anthoxanthin.
   (b) Browning reaction in vegetables and fruits and methods of its prevention.
   (c) Preparation of vegetables and fruits based recipes
5. **MILK COOKERY:**
   (a) Effect of prolonged heat, acid and enzyme.
   (b) Preparation of Milk based recipes
6. **EGG:**
   (a) Boiled egg – Hard and Soft cooked egg.
   (b) Preparation of scrambled, poached egg, custards (stirred and baked), omelette, egg curry.
7. **SUGAR:**
   (a) Identify the stages of sugar cookery using food thermometer.
   (b) Sweet preparations - Vanilla fondant, chocolate fudge, peanut brittle, laddu, mysore pak and Gulab jamun
8. **FATS AND OILS:**
   (a) Smoking temperature of different fats and oils (safflower oil, groundnut oil & palm oil)
   (b) Frying poori at different smoking temperature
   (c) Preparation of few deep fat fry snacks.
9. **BEVERAGES:**
   Preparation and evaluation of
   (a) Coffee (Filter and instant method)
   (b) Tea
   (c) Soup
   (d) Beverages -fruit and milk based drinks

REFERENCE BOOKS

1. Swaminathan, M. “Food Science and Experimental Foods”(1988), Ganesh and Co., chennai.
2. William Aspden, “Practical skills in food science, Nutrition and Dietetics” (2011), Prentice hall., U.K .

SEMESTER-I: ALLIED – I

PRINCIPLES OF NUTRITION

Course Code	**: 17UND1A1**		**Max. Marks**	**:**	**100**
Hours/Week	**: 5**		**Internal Marks**	**:**	**25**
Credit	**: 4**		**External Marks**	**:**	**75**

Objectives:

To enable the students

1. Understand the meaning of nutrition
2. Understand the role of nutrition in human life
3. Increase the ability to overcome deficiency

UNIT-I **15hours**

Introduction to Nutrition and Carbohydrates

Definition – Nutrition, Nutrients, Nutritional Status, Health.

1.1 **Carbohydrates** –Nutritional classification, Function, Digestion and Absorption, Deficiency and Excess, Sources and Requirements.

1.2 **Fibre**- Definition, Types, Role of fibre in prevention of disease

UNIT-II **15hours**

Protein

2.1 **Protein-** Nutritional Classification, Functions, Digestion and Absorption, Sources and Requirements, Deficiency.

2.2 **Methods for the determination of protein quality** - DC, BV, NPU, NPR, PER and NDPER.

2.3 **Classification of Amino Acids** – Essential and Non Essential, Functions and Deficiency.

UNIT –III **15 hours**

Lipids

3.1 **Lipids -** Classification- Functions, Digestion and Absorption, Sources and Requirements, Deficiency, Essential fatty acids – Functions, Sources, Deficiency.

3.2 **Water**

Water - Distribution, Functions, Sources, Requirements, Dehydration and Intoxication

UNIT-IV **15hours**

Energy

4.1**Energy** - Units of energy - Calorie, Joule, Determination of energy value of foods - Bomb Calorie meter.

4.2 **BMR -** Definition of BMR, Measurement of basal metabolism – Benedicts oxy calorimeter, Atwater and rose respiration colorimeter, Benedict Roth Apparatus method. Factors affecting metabolic rate

4.3Total Energy requirement, Thermic effect of food,# Factors affecting thermic effect of food#.

UNIT-V **15hours**

Vitamins and Minerals

5.1 **Vitamins –**

(i) Fat Soluble Vitamins (A, D, E, K): Functions, Sources, Requirements, Deficiency and excess.

(ii) Water Soluble Vitamins (B_1, B_2, B_3, B_4, B_6, B_{12} & C): Functions, Sources, Requirements, Deficiency and excess.

5.2 **Minerals** – Functions, sources, requirements and Deficiency and excess of Calcium, Phosphorous, Sodium, Potassium, Iron, iodine, Flurorine, Zinc and Magnesium,

#.....# Self - study portion.

TEXT BOOKS

1. B. Srilakshmi, Nutrition Science, Fifth Edition, New Age International (P) Ltd, New Delhi (2008).
2. Ambika Shanmugam, Fundamentals of Biochemistry for Medical Students, Seventh Edition, New Age Publishing Pvt.Ltd., New Delhi (1986).

UNIT I Text book – 1 Chapter – III
Text book – 2 Chapter – I, XVII

UNIT II Text book –1 Chapter – VII
Text book –1 Chapter – VIII
Text book –2 Chapter – III, XXI

UNIT III Text book –1 Chapter – XX, IV
Text book –2 Chapter – II, XIX

UNIT IV Text book – 1 Chapter – V
Text book – 2 Chapter – XXIII

UNIT V Text book – 1 Chapter – IX, X, XI, XII
Text book – 2 Chapter – V, XXV

REFERENCE BOOKS

1. Joshi.A.S, "Nutrition & Dietetics", Third Edition, Tata McGraw Hill Education Pvt. Ltd., New Delhi, (2010).
2. R. Passmore and M.A. Eastwood, Human Nutrition and Dietetics, 8th language book Society/Churchill Livingstone, Hong Kong, (1986).
3. Neiman N. Catherine, Nutrition, Wm. C. Brown Publishers. USA (1990).
4. U. Sathyanarayana and U. Chakrapani, Biochemistry, Third Edition, Uppala Author – Publisher Interlinks, Vijayawada (2010).

SEMESTER-I: ALLIED – II

PRINCIPLES OF NUTRITION PRACTICAL

Course Code	**: 17UND1AP2**		**Max. Marks**	**:**	**100**
Hours/Week	**: 3**		**Internal Marks**	**:**	**20**
Credit	**: 2**		**External Marks**	**:**	**80**

1. **Qualitative tests for Carbohydrates, Proteins and Minerals.**

   Qualitative analysis for Carbohydrates in gives food samples.
   a) Monosaccharide – Glucose (commercial Glucose), Fructose (fruit juice)
   b) Disaccharide - Lactose (milk), Sucrose (table sugar)
   c) Polysaccharide - Starch (rice)

2. **Qualitative analysis for protein in given food samples**

   a) Albumin (egg)
   b) Casein (milk)

3. **Qualitative analysis for minerals in given food samples.**

   a) Calcium (Ragi)
   b) Iron (Red rice flakes)
   c) Phosphorus (Ragi)
   d) Magnesium (Agathi)

4. Estimation of Moisture content in the given sample. (Hot air oven method)
5. Preparation of ash samples for mineral analysis.
6. Estimation of glucose in grape juice.
7. Estimation of ascorbic acid in raw or cooked cabbage.
8. Estimation of Iron in drumstick leaves – Demonstration only.

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 Kalyana Sundaram, National Institute of Nutrition, 2013, A Manual of Laboratory Techniques, Hyderabad, 500007.

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SEMESTER-II: CORE – III

NUTRITION THROUGH LIFE CYCLE

Course Code	**: 17UND2C3**		**Max. Marks**	**:**	**100**
Hours/Week	**: 6**		**Internal Marks**	**:**	**25**
Credit	**: 5**		**External Marks**	**:**	**75**

Objectives

To enable the students

1. Understand the nutritional demand in various stages of life cycle.
2. Acquire skills in planning adequate meals in different stages of life cycle.

UNIT-I **18 hours**

RDA and Basic Principles of Meal Planning:

1.1 RDA – Definition, RDA for Indians (2010), General principles of deriving RDA, factors affecting RDA and its uses.

1.2 Principles of meal planning, points to be considered in planning menu.

UNIT-II **18 hours**

Pregnancy and Lactation:

2.1Nutrition during Pregnancy- Growth and Development during first, second and third trimesters of pregnancy, physiological changes during pregnancy, weight gain, complications of pregnancy, nutritional requirement and dietary guidelines.

2.2 Nutrition during lactation- Physiology of lactation, role of hormone in lactation. Breast Feeding- Composition of breast milk, colostrum, transition milk, foremilk, hindmilk. Advantages of breast feeding to the mother, factors affecting the volume and composition of breast milk, factors responsible for lactation failure. Nutritional requirement and dietary guidelines for a nursing mother.

UNIT-III **18 hours**

Infancy and Pre-school children:

3.1 Nutrition during Infancy- Growth and development, Nutritional factors influencing growth, importance of breast milk to the infant. Merits and demerits of artificial feeding. Weaning foods- Definition, types of supplementary foods,# Factors considered in weaning infants and preparation of weaning foods#. Nutritional requirements of infants.

3.2 Nutrition for Pre-school children- Growth and Development, nutritional and food requirements of preschool children. Factors to be considered while planning meals for preschool children. Nutritional problems of preschool children – PEM and Vitamin A Deficiency.

UNIT-IV **18 hours**

School Children and Adolescence:

4.1Nutrition for School children- Growth and Development, nutritional requirement, meal planning for school children, packed lunch. Nutritional problems (conditions only) - Over Weight, obesity, under weight, iron deficiency anemia and dental caries.

4.2Nutrition during Adolescence - Growth spurt-physiological and secondary sexual characteristics, menarche and nutritional requirements. Nutritional problems in adolescence – Iron deficiency anemia and obesity. Eating disorders - Anorexia nervosa, Bulimia nervosa and Binge eating.

UNIT-V **18 hours**

Adults and Elderly:

5.1Nutritional needs of adults (men and women) – Reference man and woman, Nutritional and work efficiency. Nutritional requirement of adult in relation to activity pattern.

5.2Nutrition during Elderly - Physiological, psychological and socio-economic aspects influencing nutritional intake. Nutritional problems of aged (Osteoporosis, Obesity, constipation) and their management. Nutritional requirements during old age.

#.....# Self - study portion.

TEXT BOOKS

1. B.Srilakshmi,Dietetics, Sixth edition, New Age International Pvt. Ltd (2010).
2. B.Srilakshmi,Nutrition Science, Fourth edition, New Age International Pvt. Ltd (2012).

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

REFERENCE BOOKS

1. E.M. Shills,A.J Olson, Shike, Lea and Febiger, Modern Nutrition in Health and Diseases, Lippincott Williams and Wilkins publishing (2006).
2. L.K Mahan, M.T Arlin, Krause's, Food,Nutrition and Diet Therapy, Eleventh edition, W.B.Saunder Company, London (2000).

SEMESTER-II: CORE – IV

NUTRITION THROUGH LIFE CYCLE PRACTICAL

Course Code	**: 17UND2CP4**		**Max. Marks**	**:**	**100**
Hours/Week	**: 3**		**Internal Marks**	**:**	**20**
Credit	**: 2**		**External Marks**	**:**	**80**

1. Planning, calculation of nutritive value and preparation of balanced meals for different age groups

a. Pregnancy – first, second and third trimester.
b. Lactation.
c. Infancy- weaning foods, low cost supplementary foods.
d. Pre-school age – 1 to 6 years
e. School age – boys 7 to 10 years, girls 10 to 12 years
f. Adolescence – boys 14 to 16 years, girls 16 to 18 years
g. Adult – man and woman in relation to occupation.
h. Elderly.

2. Planning, calculation of nutritive value and preparation of meals for nutritional problems – PEM, Vitamin A and Iron Deficiency Anemia.

3. A mini project on dietary habits followed among all age group – infancy, Pre-school age, School going age, Adolescents and Adults.

4. Visit to an Anganwadi Centre for observation of Mid Day meals programme.

REFERENCES BOOKS

1. Swaminathan,M. Advanced text book on Food and Nutrition, , An mol Publication Pvt,Ltd, Second Edition.2004.
2. Mahtab S.Bamji, Prasad Rao, N.Vinodini Reddy. Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt .Ltd, Second Edition, 2003.
3. Srilakshmi, B. Nutrition Science, New Age International [p] ltd, New Delhi, 2002.
4. Bahasahe and B. Dosa, Hand book of nutrition and diet.
5. Nutrient Requirement and Recommend Dietary Allowances for Indians by Indian council of Medical research, National Institute of nutrition, Hyderabad, 2010.
6. Dietary Guidelines for Indians, National Institute of Nutrition, Hyderabad, 2004.

SEMESTER-II: ALLIED – III

HUMAN PHYSIOLOGY

Course Code	**: 17UND2A3**		**Max. Marks**	**:**	**100**
Hours/Week	**: 4**		**Internal Marks**	**:**	**25**
Credit	**: 3**		**External Marks**	**:**	**75**

Objectives:

To enable the students to

1. Understand the structure and physiology of various organs in the body.
2. Obtain a better knowledge on the principles of nutrition and dietetics through physiological aspects.

UNIT-I **12 hours**

Blood and Lymph:

1.1 Blood- Composition and functions, RBCs, WBCs, Platelets - structure and Functions. Coagulation of blood **-** coagulation time. Blood grouping and Rh factors.

1.2 Lymph and Lymphatic system - Structure and functions.

UNIT –II **12 hours**

Respiratory and Cardiovascular System:

2.1 Respiratory system – structure and functions of respiratory tract, process of respiration, transport and exchange of oxygen and carbon dioxide.

2.1 Heart- structure and functions. Cardiac cycle, cardiac output, heart rate, pulse rate. Blood pressure- Measurement and # Factors affecting blood pressure#, ECG.

UNIT –III **12 hours**

Digestive and Excretory System:

3.1 Digestive system – Structure and functions of gastrointestinal tract, physiology of digestion- Functions of saliva, gastric juices, bile, pancreatic juice and intestinal juice, movements of the intestine. Liver - structure and its function.

3.2 Excretory System

a) Kidney - Structure and functions of kidney, structure of nephron, formation of urine, factor affecting formation of urine, micturition.

b) Skin- Structure and functions.

UNIT-IV **12 hours**

Reproductive and Endocrine System:

4.1 Reproductive system: structure and functions of the male and female reproductive system, spermatogenesis, oogenesis and menstrual cycle.

4.2 Endocrine System – structure of pituitary, thyroid, parathyroid, pancreas and adrenal glands and functions of the hormones secreted by the same glands.

UNIT –V **12 hours**

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 and functions.

5.2 Ear, Eye, Nose and Tongue- structure and physiology of hearing, vision, smell and taste.

#.....# Self - study portion.

TEXT BOOKS

1. K. Sembulingam, and Prema Sembulingam Essentials of Medical Physiology, Second Edition, Jay Pee Brothers Medical Publishes (p) Limited, New Delhi.2 (2010).
2. Ross and Wilson, Anatomy and Physiology in Health and Illness, Eleventh Edition, Library Cataloging in Publication (2010).

UNIT I Text Book- 1 Chapter- VI-XXVII
Text book -2 Chapter- VI

UNIT II Text Book- 2 Chapter-V, X

UNIT III Text Book- 2 Chapter- XII, XIII

UNIT IV Text Book- 2 Chapter-IX, XVIII

UNIT V Text Book- 2 Chapter-VII, VIII

REFERENCE BOOKS

1. S.M .Subramanian and Mathavan kutty, Text book of Physiology, Chand and Company, New Delhi (2001).
2. K. Sembulingam and Prema Sembulingam, Essentials of Medical Physiology, Second Edition, Jay Pee Brothers Medical Publishes (p) Limited, New Delhi (2000).
3. Vidya Tatna, Hand book of Human physiology, Seventh Edition Jay Pee Brothers, Medical Publishers (p) Limited, New Delhi (1993).
4. C.C. Chatterjee, Human physiology, Medical allied agency, Volume I &II, 82/1 Mahatma Gandhi road, Calcutta(1998).

SEMESTER-II: ALLIED – IV

HUMAN PHYSIOLOGY PRACTICAL

Course Code	**: 17UND2AP4**		**Max. Marks**	**:**	**100**
Hours/Week	**: 3**		**Internal Marks**	**:**	**20**
Credit	**: 2**		**External Marks**	**:**	**80**

1. Histology of tissues- columnar, cubical, ciliated, squamous and stratified squamous.
2. Microscopic structure of organs- stomach, liver, ovary and pancreas.
3. Histology of muscles- cardiac, striated and non-striated.
4. Estimation of haemoglobin by Shali's method.
5. Measurement of blood pressure using Sphygmomanometer.
6. Determination of pulse rate.
7. Determination of blood group.
8. Bleeding time, clotting time and enumeration of Red Blood Cells - Demonstration.
9. Enumeration of White Blood Cells - Demonstration.
10. Visit to a clinical laboratory.

REFERENCES:

1. Applied Physiology – S. Wright.

SEMESTER-III: CORE – V

DIETETICS - I

Course Code	**: 17UND3C5**		**Max. Marks**	**:**	**100**
Hours/Week	**: 4**		**Internal Marks**	**:**	**25**
Credit	**: 4**		**External Marks**	**:**	**75**

Objectives

To enable the students to

1. Understand the principles of diet and diet therapy.
2. Understand the modifications of normal diet for therapeutic purposes.
3. Develop skills and techniques in the planning and preparation of therapeutic diets for febrile conditions and gastrointestinal disorders
4. Develop capacity and attitude for taking dietetics as a profession.

UNIT – I **12 hours**

Basic Concepts about Dietitian and principles of diet therapy

1.1 Definition of dietetics, dietitian, goals of diet therapy. Types of dietitian, role and responsibilities of dietitians, qualification, qualities and professional code of ethics.

1.2 Therapeutic adaptations of the normal diet, Routine hospital diets – Regular, soft, full fluid, clear fluid diet. Specially modified therapeutic diet- High fibre diet, High calorie low calorie, High and low protein, bland, high and low residue diets and sodium restricted diet.

UNIT- II **12 hours**

Special feeding methods and diet in deficient, febrile condition

2.1 **Special feeding methods** – Enteral feeding – methods- nasogastric, gastrostomy and jejunostomy, types of food, infusion techniques. Parenteral feeding – principles, TPN-formula and complications. Pre and post operative diet.

2.2 **Febrile condition -** Etiology, types, dietary management, diet planning and counselling measures for febrile conditions - Fevers of long duration and short duration.

2.3 **Deficient condition-** Dietary modification, diet planning, and preventive measures for- PEM, Iron deficiency anaemia and Vitamin A deficiency.

UNIT- III **12 hours**

Energy modifications and nutritional Care for weight management

4.1 **Obesity** - etiology, assessment, theories, grades of obesity, Complications, dietary management, #diet planning and counselling measures#.

4.2 **Underweight** – etiology, signs and symptoms, dietary management, diet planning and counselling measures.

UNIT- IV **12 hours**

Diseases of the Gastro Intestinal Tract

4.1 **Upper gastro intestinal tract disorders–** etiology, symptoms, diagnosis, dietary management, diet planning and counselling measures for gastritis and peptic ulcer.

4.2 **Lower gastro intestinal tract disorders –** etiology, types, dietary management, diet planning and counselling measures in constipation, diarrhoea and dysentery.

UNIT- V **12 hours**

Disease of the liver and gall bladder

5.1 **Liver**- Etiology, signs and symptoms, dietary management, diet planning and counselling measures for fatty liver, hepatitis, cirrhosis, hepatic coma.

5.2 **Gall bladder** – Etiology, signs and symptoms, dietary management for Cholecystitis , Cholelithiasis

#.....# Self - study portion.

TEXT BOOKS:

1. Antia, F.P, Clinical dietetics and Nutrition ,4th Edition, Oxford University Press, Delhi,2002.
2. Joshi, S.A, Nutrition and Dietetics, 2nd edition, TATA McGraw Hill publications, New Delhi.2008.
3. Srilakshmi. B, Dietetics, 5th Edition, New Age International (P) Ltd. Publishers, Chennai, 2005.
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

UNIT I Text book –1 Chapter – XXIV
Text book –2 Chapter – VII
Text book –4 Chapter – VIII

UNIT II Text book –1 Chapter – XII
Text book –2 Chapter – VII
Text book –4 Chapter – VIII

UNIT III Text book –1 Chapter – XIV
Text book –2 Chapter – VIII

UNIT IV Text book – 1 Chapter – XVI
Text book – 2 Chapter – XII
Text book – 4 Chapter – VIII

UNIT V Text book –1 Chapter –XXVI
Text book - 2 Chapter – XVI
Text book –4 Chapter – VIII

REFERENCE BOOKS:

1. Williams,S.R.,Nutrition and Diet Therapy, 6th Edition,Times Mirror / Mosby College Publishing, St. Louis, 1989.
2. Raheena Begum, A Text Book of Foods, Nutrition and Dietetics, Sterling Publishers, New Delhi.1989.

SEMESTER-III: CORE – VI

DIETETICS – I PRACTICAL

Course Code	**: 17UND3CP6**		**Max. Marks**	**:**	**100**
Hours/Week	**: 3**		**Internal Marks**	**:**	**20**
Credit	**: 2**		**External Marks**	**:**	**80**

1. Planning, Nutritive value calculation and preparation of diet

a. Soft, clear and full fluid diet.
b. Low and medium cost diets for PEM, Vitamin A and Iron deficiency.
c. Obesity and underweight conditions.
d. Fevers – typhoid , tuberculosis
e. Diarrhea , dysentery ,constipation
f. Peptic ulcer.
g. Liver disorder- Hepatitis, Cirrhosis

REFERENCE BOOKS:

1. Antia, F.P, Clinical dietetics and Nutrition ,4th Edition, Oxford University Press, Delhi,2002.
2. Srilakshmi. B, Dietetics, 5th Edition, New Age International (P) Ltd. Publishers, Chennai, 2005.
3. Swaminathan, M. Essentials of Food and Nutrition Vol. I and II BAPPCO.,The Bangalore Printing and Publishing co., ltd., No.88, Mysore Road, Bangalore
4. Nutrient Requirement and Recommend Dietary Allowances for Indians by Indian council of Medical research, National Institute of nutrition, Hyderabad, 2010.
5. Dietary Guidelines for Indians, National Institute of Nutrition, Hyderabad, 2004.

SEMESTER-III: ALLIED – V

NUTRITIONAL BIOCHEMISTRY

Course Code	**: 17UND3A5**		**Max. Marks**	**:**	**100**
Hours/Week	**: 4**		**Internal Marks**	**:**	**25**
Credit	**: 3**		**External Marks**	**:**	**75**

Objectives:

To enable the students to

1. Understand the mechanisms adopted by the human body for the regulation of metabolic pathways.
2. Get an insight into interrelations between various metabolic pathways.
3. Become proficient for specialization in nutrition.

UNIT-I **12 hours**

Carbohydrate metabolism

1.1 **Carbohydrate –** Classification**.** Metabolism of Carbohydrate - Glycolysis, Glycogenesis, glycogenolysis, Tricarboxylic acid Cycle (TCA cycle), Hexose Monophosphate Shunt, Gluconeogenesis.

1.3 **Disorder of carbohydrate metabolism**-Diabetes Mellitus-Types and metabolic changes of Diabetes Mellitus.

1.3 #Role of liver in Carbohydrates Metabolism#.

UNIT-II **12 hours**

Protein metabolism

2.1 Protein - Classification. Metabolism of Protein - General pathway of Protein metabolism.

2.2 **Metabolism of amino acid**- Deamination, Transamination, Decarboxylation, Urea Cycle, Fate of deaminated amino acids.

2.3 Disorder of Protein metabolism.

UNIT-III **12 hours**

Lipid metabolism

3.1 **Metabolism of Lipid**-Beta Oxidation of Fatty acid, Synthesis of Triglycerides, Fatty acids and Cholesterol. Role of fat in Lipid metabolism.

3.2 **Plasma Lipoproteins**: Functions and metabolism of Lipoprotein.

3.3 **Disorder of Lipoproteins**- Hyperlipoproteinemias and Hypolipoproteinemias.

UNIT-IV

Liver and Kidney function test **12 hours**

4.1 **Formation of Bile acid-**Formation and functions of Bile acids and bile salts - bile pigments. Jaundice

4.2**Liver Function Test-** Test for bile pigment and bile salts in blood and urine-Van den Bergh reaction, Serum alkaline phosphatase estimation, Fouchet's test, Hay's test. Test for Urobilinogen- Schlesinger's test. Test for altered protein fraction production- Cephalin – cholesterol flocculation test and Thymol turbidity test.

4.3 **Renal Function Tests**: Inulin clearance test, Urea Clearance test, Endogenous creatinine Clearance, Concentration test, Addis test, Mosenthal test, Urea concentration Text and Dye test.

UNIT-V

Inborn error of carbohydrates, protein and Lipid metabolism 12hours

5.1 **Inborn errors of Carbohydrates metabolism-**Essential pentosuria,Fructosuria,Galactosemia.

5.2 **Inborn errors of aminoacid metabolism**- Albinism, Phenylketonuria, Hurtnup Disease, Cystinuria,Homoystinuria,,histidinuria and Maple syrup disease.

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

#.....# Self - study portion.

TEXT BOOKS

1. Ambika Shanmugam, Fundamentals of Biochemistry for Medical Students, Seventh Edition, New Age Publishing Pvt.Ltd, New Delhi (1986).
2. A.C. Deb, Fundamentals of Bio chemistry, Fifth Edition , New Central Book Agency(P)td., (1992).
3. U. Sathyanarayana and U. Chakrapani, Textbook of Biochemistry, Third Edition, Books and Allied (P) Ltd, Kolkata (2010).

UNIT-I Text book I- Chapter -XVII

UNIT-II Text book I- Chapter -XXI

UNIT-III Text book I- Chapter -XIX

UNIT-IV Text book I- ChapterXXVII, XXVIII

UNIT-V Text book I- Chapter XVII, XIX, XXI

REFERENCE BOOKS

1. E.S. WestTodd, W.R. Mason and J.T. Van Bruggen, Text book of Biochemistry, Fourth Edition, Amerind Publishing Co Pvt Ltd., (1974).
2. T.M. Devlin, Text Book of Biochemistry (with Clinical corrections), Second Edition, John Wiley and sons (1986).
3. S. Ramakrishnan, K.G. Prassanan and R. Rajan, Text book of Medical Biochemistry, Second Edition, Orient Longman limited (1989).

SEMESTER-III: ALLIED – VI

NUTRITIONAL BIOCHEMISTRY PRACTICAL

Course Code	**: 17UND3AP6**		**Max. Marks**	**:**	**100**
Hours/Week	**: 3**		**Internal Marks**	**:**	**20**
Credit	**: 2**		**External Marks**	**:**	**80**

1. Qualitative analysis of Urine for Sugar , Protein, Bile salts & Bile pigments

2. Estimation of Urine Glucose (Benedict's Method)

3. Estimation of Urine Urea (DAM Method)

4. Estimation of Blood Glucose (Benedict's Method)

5. Estimation of Blood Urea (DAM Method)

6. Estimation of serum cholesterol (Zak's Method)

BOOK REFERENCES:

1. Practical Biochemistry(Laboratory manual) for pharmacy students,Ritu Mahajan,Vayu education of India, New Delhi, First Edition,2009.
2. Biochemistry & Clinical pathology (Theory & Practical),K.K.Pillai&J.S.Qadry,CBS Publishers& Distributors, New Delhi, First edition(Reprint)(2008) .
3. Varley's Practical Biochemistry, Alan H Gowenlock, CBS Publishers& Distributors, New Delhi, Sixth edition(2008) .

SEMESTER-III: NON-MAJOR ELECTIVE – I

FOOD AND HEALTH

Course Code	**:**	**17UND3N1**	**Max. Marks**	**:**	**100**
Hours/Week	**:**	**2**	**External Marks**	**:**	**100**
Credit	**:**	**2**			

Objectives

To enable non-major students

1. Understand the importance of food and health
2. Know changing health scenario
3. Learn healthy food pattern

UNIT-I **6 hours**

Health and its Promotion:

1.1 **Health -** Definition of Health, **Dimension of health**-physical, mental, emotional, social and spiritual.

1.2 **Definition**- Food, nutrition, optimum nutrition.

1.3 **Functions of foods**- Physiological, psychological and social functions.

UNIT-II **6 hours**

Factors affecting Health:

2.1 **Factors affecting health**- Physical, psychological, heredity and social environment.

2.2 **Stress** – Types, stress related diseases and control measures.

UNIT-III **6 hours**

Health and Diet:

3.1 Basic five food groups.

3.2 **Balanced diet**- Definition and objectives, food guide pyramid and its uses. Meal planning- Definition, principles involved, Points to be considered while planning menu.

3.3**Health hazards**- Consequence of junk food over health, carbonated beverages, #healthy eating habits #.

UNIT-IV **6 hours**

Role of Food and Exercise in health:

4.1 **Fiber –** Types, Sources and beneficial effects of dietary fiber. Antioxidants – Sources, role in treating diseases.

4.2 Impact of physical exercise on health.

UNIT-V **6 hours**

Health Education:

5.1 Health education- Definition, importance of health education.

5.2 Food Sanitation and Hygiene.

#.....# Self - study portion.

TEXT BOOKS

1. Park, Social and Preventive Medicine,Twentieth edition,Banarsidas Bhanot Publishers (2009).
2. B. Srilakshmi,Dietetics, Fifth edition, New Age International Pvt. Ltd (2010).
3. B. Srilakshmi,Nutrition Science, Fourth edition, New Age International Pvt. Ltd (2010)

UNIT I Text book – 1 Chapter – II
UNIT II Text book –1 Chapter – II
UNIT III Text book –1 Chapter – XI
Text book –2 Chapter – I
UNIT IV Text book – 3 Chapter – XXI
Text book – 2 Chapter – XXIII
UNIT V Text book – 1 Chapter – XX

REFERENCE BOOKS

1. C.Gopalan,Nutritive value of Indian Foods, NIN, Hyderabad (1989).
2. S.R Mudambi and M.V Rajagobal, Nutrition and Therapy, New Age International Pvt. Ltd (2008).
3. E.M Shills,A.J Olson, Shike, Lea and Febiger, Modern Nutrition in Health and Diseases, Lippincott Williams and Wilkins publishing (2006).
4. Mahan, L.K Arlin, M.T Krause's, Food,Nutrition and Diet Therapy, Eleventh Edition, W.B. Saunder Company, London (2000).

SEMESTER – IV: CORE- VII

DIETETICS - II

Course Code	**: 17UND4C7**		**Max. Marks**	**:**	**100**
Hours/Week	**: 5**		**Internal Marks**	**:**	**25**
Credit	**: 5**		**External marks**	**:**	**75**

Objectives:

To enable students

1. Understand the pathogenesis of metabolic diseases, cardiovascular and renal diseases and their dietary modification
2. Appreciate the nutritional care in burns and allergy
3. Develop diet formulations for HIV and Cancer

UNIT- I **15hours**

Diseases of the Pancreas and cardiovascular system

1.1 **Diabetes Mellitus –** Pathogenesis, types, etiology , symptoms, diagnostic tests, complications, dietary modification and diet planning.

1.2 **Cardio vascular diseases -** Pathogenesis , types , etiology, complications, dietary modification and diet planning for the Hypertension, atherosclerosis, hyperlipidemia, ischemic heart disease, congestive cardiac failure.

UNIT- II **15hours**

Diseases of the Kidney

2.1 Kidney- Pathogenesis, etiology , symptoms, nutritional modification, diet planning and dialysis for kidney diseases - Nephritis , Nephrosis ,Urinary calculi , Renal failure – Acute and Chronic.

UNIT-III **15hours**

Modifications of Diet in Burns, Allergy and diseases of musculoskeletal system

3.1 **Burns –** Types, assessment, physiological changes in burns, degree of burns and dietary treatment.

3.2 **Allergy -** Definition, types, symptoms, diagnostic tests and elimination diet.

3.3 Nutritional care in diseases of the musculoskeletal system- arthritis, osteoporosis, Gout

UNIT- IV **15hours**

Nutrition Care in Cancer and AIDS

4.1 **Nutritional Care for patients with cancer –** Etiology, types, mechanism of cancer formation, nutritional requirement and nutritional problems of cancer therapy.

4.2 **Nutritional Care in HIV -** Pathophysiology, etiology, stages of HIV infection, #mode of transmission#, clinical manifestation and dietary management.

UNIT- V **15hours**

Role of functional foods in treating degenerative diseases and dietary counselling

5.1 Functional foods – Definition, classification, uses of functional foods in the prevention and treatment of – Obesity, Diabetes mellitus, Cardiovascular diseases, Cancer.

5.2 Dietary counselling – Clients and counselors, client responsibility, attributes of a successful counselor, steps in counselling process, counselling guidelines.

#.....# Self - study portion.

TEXT BOOKS

1.Antia, F.P, Clinical dietetics and Nutrition ,4th Edition, Oxford University Press, Delhi,2002.

2. Joshi, S.A, Nutrition and Dietetics,2nd edition, TATA McGraw Hill publications, New Delhi.2008.

3. Srilakshmi. B, Dietetics, 5th Edition, New Age International (P) Ltd. Publishers, Chennai, 2011.

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

UNIT I Text book – 1 Chapter – XVIII
Text book – 2 Chapter – IX
Text book – 4 Chapter – VIII

UNIT II Text book –1 Chapter – XV
Text book – 2 Chapter – X
Text book – 4 Chapter – VIII

UNIT III Text book –1Chapter – XIX
Text book –2Chapter – XI
Text book –4 Chapter – VIII

UNIT IV Text book – 1 Chapter – XVII
Text book – 2 Chapter – XIII
Text book – 4 Chapter – VIII

UNIT V Text book – 1 Chapter –XXII
Text book – 2 Chapter – XV, XVI

REFERENCE BOOKS

1. Williams,S.R.,Nutrition and Diet Therapy, 6th Edition,Times Mirror / Mosby College Publishing, St. Louis, 1989.
2. Raheena Begum, A Text Book of Foods, Nutrition and Dietetics, Sterling Publishers, New Delhi.1989.
3. Maimum Nisha, Diet Planning for diseases, Kalpaz Publishers,2006

SEMESTER – IV: CORE- VIII

DIETETICS - II PRACTICAL

Course Code	**: 17UND4CP8**		**Max. Marks**	**:**	**100**
Hours/Week	**: 3**		**Internal Marks**	**:**	**20**
Credit	**: 2**		**External marks**	**:**	**80**

a) Planning, Nutritive value calculation and preparation of diets for

1. Diabetes mellitus- Type I (Insulin specific), Type II (Using food exchange list)
2. Hypertension
3. Atherosclerosis
4. Coronary Heart disease
5. Nephritis
6. Nephrosis
7. Nephrolitiasis
8. Osteoporosis
9. Gout

b) Identification of functional foods and relating them to specific diseases

REFERENCE BOOKS

1. Antia, F.P, Clinical dietetics and Nutrition ,4th Edition, Oxford University Press, Delhi,2002.
2. Srilakshmi. B, Dietetics, 5th Edition, New Age International (P) Ltd. Publishers, Chennai, 2005.
3. Swaminathan, M. Essentials of Food and Nutrition Vol. I and II BAPPCO.,The Bangalore Printing and Publishing co., ltd., No.88, Mysore Road, Bangalore
4. Nutrient Requirement and Recommend Dietary Allowances for Indians by Indian council of Medical research, National Institute of nutrition, Hyderabad, 2010.
5. Dietary Guidelines for Indians, National Institute of Nutrition, Hyderabad, 2004.

SEMESTER- IV: ALLIED – VII

FOOD MICROBIOLOGY

Course Code	**: 17UND4A7**		**Max. Marks**	**:**	**100**
Hours/Week	**: 5**		**Internal Marks**	**:**	**25**
Credit	**: 3**		**External marks**	**:**	**75**

Objectives:

To enable students to

1. Learn about morphological characteristics of different micro-organism associated to food.
2. Learn about the spoilage and factors affecting the growth of microorganisms in food .
3. Impart the knowledge about the role of micro-organisms in fermentation of foods.
4 Create awareness about hygiene and sanitation in food industry.

UNIT-I **15 hours**

Introduction to Bacteria and Virus:

1.1 **Microbiology**: Definition**,** Food microbiology – Definition, History of Food microbiology.

1.2 **Bacteria**- Morphological characteristics- structure, size, classification based on shape, motility, nutrition**,** reproduction, respiration and growth curve of bacteria. Economic importance of bacteria in food industries. Bacterial diseases and its prevention- Cholera, typhoid.

1.3 **Virus:** Morphological characteristics- size, classification, structure, host specificity, replication, Viral diseases and its prevention- Hepatitis, poliomyelitis.

UNIT – II **15 hours**

Introduction to Mould, Yeast and Protozoa

2.1 **Mould:** Morphological characteristics – Classification, reproduction. Economic importance of mould in food industries.

2.2 **Yeast:** Morphological characteristics – Size, sources, shapes, classification, reproduction. Economic importance of yeast in industries.

2.3 **Protozoa:** Morphological characteristics- structure, motility, reproduction. Protozoal diseases- #Amoebic dysentry, malaria#.

UNIT – III **15 hours**

Factors affecting growth of micro-organism:

3.1 **Intrinsic parameters** - Nutrient content, pH, buffer capacity, redox- potential (Eh), antimicrobial barriers, water activity

3.2 **Extrinsic parameters** - Relative humidity, temperature, gaseous atmosphere.

3.**3Implicit factors**- Growth rate , microbial interaction, antagonism, synergism.

UNIT-IV **15 hours**

Food spoilage:

4.1**Spoilage** - Definition**,** causes of spoilage, classification of foods by ease of spoilage.

4.2**Spoilage in Cereals and cereal products**- Flour, bread-mouldiness, ropiness, red bread; Fruit and vegetable products-market diseases.

4.3 **Spoilage in Milk and meat products**- Milk- Gas production, proteolysis, colour and flavor Changes. Meat- Spoilage under aerobic and anaerobic conditions. Fish- Factors influencing the spoilage. Egg- Changes caused by micro-organisms.

UNIT-V **15 hours**

Food fermentation and Sanitation in Food industry

5.1 **Food fermentation-** Fermentation in different food stuffs- Bread, vinegar, cheese.

5.2 **Sanitation in food industry-** Bacteriology of water supplies, Potability of water-Test for E.coli.

5.3BOD (Biochemical oxygen demand), HACCP (Hazard Analysis Critical Control Point)- Definition, approach and components.

#.....# Self - study portion.

TEXT BOOKS

1. Joshua A.k (2001), Microbiology, Fourth Edition, Popular Book Depot Chennai.
2. Fazier W.C (2014), Food Microbiology, Fifth Edition, Tata McGraw Hill Book Company,New Delhi.
3. Pelczar and Krieg,(2006), Microbiology, Fifth Edition, Tata-McGraw Hill Book Co., London .
4. Adams M.R and Moss M.O(2003),Food microbiology second edition, New Age International (P) Ltd., Publishers, New Delhi.
5. Chris bell,et al.,(2006),Food microbiology and laboratory practice, Black well publishing professionals,2121 state avenue, ames, Iowa, UK.

UNIT I	Text book – 1 Chapter – I,
	Text book – 3 Chapter – I, II, III
UNIT II	Text book – 2 Chapter – II
UNIT III	Text book – 4 Chapter- III
	Text book –5 Chapter- II
UNIT IV	Text book – 2 Chapter – XI,XII,XIV,XV,XVI,XVII,XVIII.
UNIT V	Text book – 2 Chapter – XXII,XXVII

REFERENCE BOOKS

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

SEMESTER- IV: ALLIED - VIII

FOOD MICROBIOLOGY PRACTICAL

Course Code	**: 17UND4AP8**		**Max. Marks**	**:**	**100**
Hours/Week	**: 3**		**Internal Marks**	**:**	**20**
Credit	**: 2**		**External marks**	**:**	**80**

Objectives:
To enable students to
1. Learn about operational functions of microscope.
2. Examine the movement of live microorganism.
3. Identify the important microorganism present in fermented foods.
4. Study the functions of sterilizing equipments.

1. Demonstration of the different parts of microscope, their use and care.

2. Preparation of Bacterial smears: staining-simple and Gram's staining (food culture- milk and curd).

3. Examination of unstained organisms-Hanging drop technique.

4. Identification of important bacteria, moulds and yeast in food (by using slides/cultures)- E-coli, rhizopus, penicillium, mucor, aspergillus, yeast.

5. Bacterial count in the given sample by using colony counter- Demonstration.

6. Working principles of sterilization equipments – Autoclave, Hot air oven.

Related Experience: Visit to a microbiology lab and present a report on it.

REFERENCE BOOKS:
1.Chris bell,et al.,(2006),Food microbiology and laboratory practice, Black well publishing professionals,2121 state avenue, ames, Iowa, UK.
2.Bisen P.S, et al.,(2009),Hand book of Microbiology, CBS publishers and distributors Private limited, New Delhi

SEMESTER- IV: NON MAJOR ELECTIVE- II

NUTRITION FOR THE FAMILY

Course Code	**:**	**17UND4N2**	**Max. Marks**	**:**	**100**
Hours/Week	**:**	**2**	**External Marks**	**:**	**100**
Credit	**:**	**2**			

Objectives:

To enable the non major students

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

UNIT I **6 hours**

1.1. **Food -** Basic five food groups, Nutritional classification of foods - Energy yielding, Body Building and protective foods.

1.2. **Basic principles of Meal planning** – Basic principles of meal planning, balanced diet- Meaning and Food guide pyramid.

UNIT II **6 hours**

2.1. **Nutritional needs during Pregnancy** – Physiological changes, Nutritional need, dietary guidelines, general dietary problems, complications.

2.2. **Nutrition during Lactation** – Nutritional need, dietary guidelines for lactating women, Nutritional components of colostrum and mature milk.

UNIT III **6 hours**

3.1. **Nutrition during Infancy-** Nutritional need, dietary guidelines for infants, advantages of breast feeding, disadvantages of bottle feeding; Weaning foods (definition) and #types of supplementary food#.

3.2. **Nutritional needs of Pre-school children (1-6 years)** - Factors to be considered while Planning meals for pre-school children. PEM – types, symptoms, Dietary guidelines.

UNIT IV **6 hours**

4.1. **Nutrition for School children** - Dietary guidelines, factors considered in planning packed lunch.

4.2. **Nutrition during Adolescence –** general dietary guidelines; causes, complications & dietary guidelines for nutritional anaemia- (Iron, Folic acid, Vitamin B12 deficiency), obesity and underweight.

UNIT V **6 hours**

5.1. **Nutritional needs of Adults** (men and women) - dietary guidelines for adults.

5.2. **Nutrition during Old age** - physiological changes in ageing, psycho-social factors affecting food intake. Nutritional problems of aged and their management.

#.....# Self - study portion.

TEXT BOOKS

1. Srilakshmi.B, "Dietetics", 7th edition, New Age International Pvt. Ltd., (2014).
2. Joshi.A.S, "Nutrition & Dietetics", 3rd edition, Tata McGraw Hill Education Pvt. Ltd., New Delhi, (2010).

UNIT I Text Book 1 Chapter I
Text Book 2 Chapter I
Text Book 2 Chapter IV
Text Book 2 Chapter V
UNIT II Text Book 1 Chapter VII & VIII
Text Book 2 Chapter V
UNIT III Text Book 1 Chapter III & IV
Text Book 2 Chapter V
Text Book 2 Chapter XVIII
UNIT IV Text Book 1 Chapter V & VI
Text Book 2 Chapter V
Text Book 2 Chapter VIII
UNIT V Text Book 1 Chapter II & IX
Text Book 2 Chapter V

REFERENCE BOOKS

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

SEMESTER- V: CORE – IX

DIETETICS INTERNSHIP

Course Code	**:**	**17UND5C9I**	**Max. Marks**	**:**	**100**
Hours/Week	**:**	**6**	**Internal Marks**	**:**	**25**
Credit	**:**	**5**	**External marks**	**:**	**75**

The Practical work consists of internship in a multispeciality hospital for 10-15 days

.

1. Visits to the different wards to observe patients requiring special diets.
2. Experience in calculating and planning modified diets.
3. Supervising and handling the food preparation and service in the dietary department of the hospital
4. Case study- Selecting and observing 5 patients requiring a therapeutic diet in relation to Patient's dietary history - income, occupation, food habits and social factors.
5. Calculating the diet according to medical prescription..
6. Accompanying the doctor while visiting the patient.
7. Counselling and patient education

Preparation of the report should include

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

SEMESTER-V: CORE – X

FOOD SERVICE MANAGEMENT- I

Course Code	**: 17UND5C10**		**Max. Marks**	**:**	**100**
Hours/Week	**: 5**		**Internal Marks**	**:**	**25**
Credit	**: 5**		**External marks**	**:**	**75**

Objectives:

To enable the students to

1. Gain knowledge about various types of food service.
2. Gain knowledge about the Principles and functions of Management.
3. Understand about personnel Management, financial management and legal aspects of catering.
4. Realise the importance of sanitation and hygiene in food service institutions.

UNIT-I **15 hours**

Food service industry

1.1 Review of different types of institutional food service in operation- classification based on Functional – i.e., profit oriented, service oriented and public health facility oriented, with their objective.

UNIT-II **15 hours**

Management and organization

2.1 Management – Definition, Principles and functions of Management; Leadership- Qualities of a good Leader, styles of leadership.

2.2 **Organization-**Definition, process, principles, types of organization, Tools of Management- organization of chart, Job description, Job specification, Work schedule and Job analysis.

15 hours

UNIT-III

Personnel management

3.1 **Personnel management-** Definition, Sources of personnel, Criteria for selection of personnel orientation, training, motivation, supervision, importance of good human relations.

3.2 **Employee facilities -** fringe benefits, Labour policies and legislation – labour laws governing food service establishments; Performance appraisal of employees.

15 hours

UNIT-IV

Financial management

4.1 **Definition, aspects of financial management**- Financial accounting and management accounting, application of management accounting in catering operations.

4.2 **Accounting system** – Accounting techniques-single and double entry system, advantages. Types and Book of accounts.

UNIT –V **15 Hours**

Fuel management, Hygiene, Sanitation and safety in food service institution

5.1 **Fuels** - Types, advantages of fuel in relation to economy in quantity cookery, fuel saving economy in food service institutions.

5.2 **Safety:** #Accidents in food service establishments, safety procedure#.

5.3 **Hygiene and sanitation** - Definition, importance, environmental hygiene and sanitation, hygiene in food handling, personnel hygiene; importance of pest and rodent control in food service units.

#.....# Self - study portion.

TEXT BOOKS

1. Mohini Sethi and Malham-Catering Management and integrated approach, JohnWiley & Sons, eastern limited, New Delhi, Reprint 2007.
2. MohiniSethi,.Institutional Food Management, New age international (p) limited Publishers New Delhi, reprint 2005.
3. West's and Woods 'Introduction to food service'2nd Edition, mac millan Publishing, New York, 1998.
4. Sudhir Andrews,"Text Book of Food and Beverage Management,"Tata Mcgraw-Hill Publishing Company Limited, New Delhi,2008.

UNIT I Text Book- 1 Chapter I

UNIT II Text Book- 1 Chapter X

UNIT III Text Book- 1 Chapter XI

Text Book- 1 Chapter XXIX

UNIT IV Text Book- 2 Chapter XXI

UNIT V Text Book- 2 Chapter XXX

REFERENCE BOOKS

1. Bhushan, V.K. "Business organization and management", Sultan Chand and Co., 1973.
2. Longree, K and Balaker, B.C. "Sanitary techniques in food service", Johy Wiley and sons, New York, 1979.
3. Bobby George,Sandeep chatterjee,"Food and Beverage Service and Management",1st edition,Jaico Publishing House New Delhi,2008.
4. Vikas Ahlluwalia,"Food hygiene and toxicology",Paragon international Publishers,New Delhi,2007.

SEMESTER-V: CORE – XI

FOOD PRESERVATION AND BAKERY

Course Code	**: 17UND5C11**		**Max. Marks**	**:**	**100**
Hours/Week	**: 5**		**Internal Marks**	**:**	**25**
Credit	**: 5**		**External marks**	**:**	**75**

Objectives:

To enable the students to

1. Develop the knowledge on various methods of food preservation.
2. Train the students in the science of bakery
3. Gain knowledge about principles and methods of food packaging.

UNIT-I **15 hours**

1.1. **Principles of food preservation:** Definition, Basic principle and methods of food preservation. Food spoilage- definition, types, preventive methods.

1.2. **Preservation of fruits as Sugar concentrates:** Jam, Jelly, marmalade, preserves, candies, crystallized and glaced fruits, factors affecting jelly formation.

1.3. **Pickling** - Principles, #types and spoilages encountered in pickles#.

UNIT-II **15 hours**

2.1. **Preservation by drying and dehydration:** Principle, Methods, Pre-treatment of foods Factors affecting preservation by drying and dehydration.

2.2. **Preservation by use of low temperature:**

a) **Refrigeration-** Principle working system; cold storage defects.

b) **Freezing –** Principle of freezing, methods of freezing, advantage and disadvantage.

1.3. **Preservation by use of high temperature:** Canning -Principle, basic process, types of spoilage in canned foods and aseptic canning. Pasteurization methods.

UNIT-III **15 hours**

3.1 **Preservation by using Chemicals:** Mechanism of microbial inhibition, Inorganic and organic preservatives, antibiotics and other developed chemical preservatives.

3.2 **Preservation by use of radiation: -** Principles, kinds of ionizing radiations, units of measurement, dosage.

3.3.**Food Packages:** Definition of packaging, package functions, packaging materials and specific uses, requisites of food packages- attractiveness (Colour, Label, printed literature), protective strength/durability, consumer convenience and economy

UNIT-IV **15 hours**

4.1. **Introduction of bakery -** Definition, Principles and Classification of baked products, major and minor equipments required for starting a small bakery unit.

4.2. **Role of major and minor ingredients in baking:**

a) Role of flour (gluten), fat and egg in baking

b) Leavening agents- Definition, types (physical, biological and chemical) and role in baking

c) Sugar- sources, types and role in baking

d) Role of minor ingredients- milk, water, salt, flavors, and colours

UNIT-V **15 hours**

5.1**. Bakery items:**

a) **Bread:** Types, methods, faults, and improvers. Prevention of bread spoilage.

b) **Cake*:*** Ingredients, types, methods, faults and icing or cake decorations.

c) **Biscuits and cookies**: Ingredients, types, various methods.

#.....# Self - study portion.

TEXT BOOKS:

1. V.W. Desrosier, The Technology of Food Preservation, AVU Publishing co., West Port, Conneticut(1967).
2. V.A .Vaclavik & E.W. Christian, Essentials of food Science, 2nd edition, Springer New Delhi-1 (2003).
3. S.R. Mudambi, S.M Rao & M.V. Rajagopal, "Food Science", New Age International Pvt. Ltd. Publishers New Delhi(2007).
4. B. Sivasankar, Food Processing & Preservation, Prentice hall of India Pvt.Ltd, New Delhi(2002).
5. Yogambal Ashok kumar, " Theory of Bakery and confectionery", PHI Learning private Limited, New Delhi, (2009).
6. John Kingslee, "A Professional text to Bakery and Confectionary". New age international (p) Limited, publishers, New Delhi, (2006).

UNIT I Text Book 1 Chapter I
Text Book 3 Chapter I, XVI

UNIT II Text Book 1 Chapter IV, V & VI
Text Book 2 Chapter XVII
Text Book 1 Chapter VII & XIII
Text Book 2 Chapter XVII
Text Book 4 Chapter XVI 53

UNIT III Text Book 1 Chapter VIII, XI & XII
Text Book 3 Chapter XVII
Text Book 4 Chapter VIII, XVII
Text Book 2 Chapter XVIII & XIX

UNIT IV Text Book 5 Chapter I
Text Book 6 Chapter I, XVI

UNIT V Text Book 5 Chapter I
Text Book 6 Chapter I, XVI

REFERENCE:

1. Lal.B.Siddappa, G.G.&Tandon, G.N. "Preservation of fruits and Vegetables" ICAR,
2. New Delhi, 1967.
3. Dearosier, V.W3.,"The Technology of food preservation", AVU Publishing co., West Port, Conneticut. 1967.

SEMESTER-V: CORE – XII

FOOD PRESERVATION AND BAKERY PRACTICAL

Course Code	**: 17UND5CP12**		**Max. Marks**	**:**	**100**
Hours/Week	**: 5**		**Internal Marks**	**:**	**20**
Credit	**: 5**		**External marks**	**:**	**80**

FOOD PRESERVATION

1. Preparation of selected jams, jellies, marmalades, preserves, Squashes, ketchup and sauce. Use refractor meter to check the sugar concentration for the prepared recipes.
2. Pickling: Preparation of Lemon, Tomato, Mango, Garlic pickles.
3. Preparation of dehydrated products vathals, vadams, chutney powder.
4. Knowing the functions of different packages by using Bottling , Aluminium Foil and Polyethylene materials for packing the above prepared products. Analysis the gauze thickness of selected packaging materials.
5. Visit and submission of report to a well established bottling unit.

BAKERY

1. Bread - Plain bread, Fruit bread Croissants, Pizza, Sweet bun, spice bun
2. Cakes – Sponge cake, Eggless cake, Christmas cake, Muffin cake, Birthday cake with Icing.
3. Pastry –Puff pastry, Danish pastry
4. Biscuits –Ginger biscuits, Ragi biscuits
5. Cookies – butter cookies, melting moments, Dutch cookies,
6. Visit and submission of report to a well established bakery.

TEXT BOOKS

1. Yogambal Ashok kumar, " Theory of Bakery and confectionery", PHI Learning private Limited, New Delhi, (2009).
2. John Kingslee, "A Professional text to Bakery and Confectionary". New age international (p) Limited, publishers, New Delhi, (2006).

SEMESTER-V: MAJOR BASED ELECTIVE-I

FOOD CHEMISTRY

Course Code	**: 17UND5M1**		**Max. Marks**	**:**	**100**
Hours/Week	**: 5**		**Internal Marks**	**:**	**25**
Credit	**: 4**		**External marks**	**:**	**75**

Objectives:

To enable the students to

1. Develop the scientific attitude of the students towards the principle of food chemistry.
2. Study the physico-chemical changes occurring in foods during cooking

Unit-I **15 hours**

Physico-chemical properties of foods

1.1.Definition of food chemistry, Moisture in Foods, Hydrogen Bonding, Bound Water, Water Activity in Foods, True Solutions, Dispersions.

1.2 **Chemistry of Carbohydrates & Starch**

Classification- Monosaccharide, disaccharides, oligosaccharides, polysaccharides. Starch-amylase, amylose and amylopectin. Changes of carbohydrates on cooking.

1.3**. Pectin-** Classification, gel formation of pectin, Food applications of pectin

Unit-II **15 hours**

Chemistry of Proteins

2.1 Classification of protein, Physical and Chemical properties. Ionic properties of protein.Pure proteins from some foods (plants, milk and egg).

Unit-III **15 hours**

Chemistry of Fats and Lipids

3.1 **Lipids-** Introduction, classification of lipids, Physical and Chemical properties.

3.2 **Flavor changes in fats and oils**- Rancidity & Reversion. Hydrogenation, Changes in Fats and Oils during Heating.

Unit-IV **15 hours**

Chemistry of Vegetables and Fruits

4.1 Classifications, Pigments in fruits and vegetables- Carotenoids, chlorophylls, anthocyanins, anthoxanthins , flavones and tannins. #Enzymatic Browning in Fruits and Vegetables#.

Unit-V **15 hours**

Food Additives

5.1 Food Additives-Introduction,definition,chemistry of sweeteners, types-Intense sweeteners, Bulk sweeteners.

5.2Food Colours- Chemistry of food colours, Types-Natural colours, Synthetic colours and safety. Flavouring agents, Antioxidants & its uses.

5.3Emulsifiers, Colloids (sols, gels), Foams - Definition, types, characteristics, properties-physical and chemical and uses.

#.....# Self - study portion.

TEXT BOOKS

1.Lillian Hoagland Meyer , "Food chemistry", CBS publishers & distributors PVT.LTD(2004)
2.B.Srilakshmi, "Food Science", New age international (P) limited, publishers(2015)
3.Ion C. Baianu, "Physical Chemical of food process", Vol 1 fundamental aspects, CBS publishers & distributors PVT.LTD(2004)
4.H.K.Chopra, P.S.Panesar ," Food chemistry", Narosa Publishing House (2010)
5.Alex V Ramani ,"Food chemistry", mjp publishers.,Trichirappalli(2009)

UNIT I Text Book 1 Chapter I, III Text Book 3 Chapter I, III

UNIT II Text Book 1 Chapter IV, Text Book 4 Chapter III

UNIT III Text Book 1 Chapter II, Text Book 4 Chapter III, Text Book 5 Chapter IV

UNIT IV Text Book 1 Chapter VII, Text Book 4 Chapter VI,Text Book 2 Chapter VIII

UNIT V Text Book 2 Chapter XVI, Text Book 3 Chapter VII

REFERENCE:

1. Shakuntala Manay, Shadaksharaswamy. M (2000) Foods, Facts and Principles, New Age International Pvt Ltd Publishers, 2nd Edition
2. Chandrasekhar, U. Food Science and applications in Indian Cookery (2002) Phoenix Publishing House, New Delhi
3. Swaminathan, M. Food Science, (2005) Chemistry and Experimental Foods, Bappco Publishers, Bangalore.

SEMESTER-V: MAJOR BASED ELECTIVE-I

FOOD BIOTECHNOLOGY

Course Code	**: 17UND5M1**		**Max. Marks**	**:**	**100**
Hours/Week	**: 5**		**Internal Marks**	**:**	**25**
Credit	**: 4**		**External marks**	**:**	**75**

Objectives:

To enable the students to

1. Understand the basic principles of biotechnology
2. Apply the knowledge of biotechnology for the development of new food products

UNIT-I **15 hours**

Introduction to Biotechnology.

Genetically modified foods- Definition, examples of GM foods, advantages, disadvantages and safety aspects of foods produced by genetic engineering.

UNIT- II **15 hours**

Food fermentation- Concept of microbial fermentation and its uses; fermentation - process: Dual and multiple fermentation, continuous fermentation and batch fermentation; factors controlling fermentation.

UNIT- III **15 hours**

Fermented food products- Process of manufacturing beer, wine, vinegar, sauerkraut, temph, soya sauce, cheese and bread.

UNIT-IV **15 hours**

Enzymes in food processing industries- Enzymes – classification, types of enzymes and applications in food industries. Enzyme immobilization – Advantages and disadvantages, methods of immobilization. Immobilized enzymes in food industries.

UNIT-V **15 hours**

Functional foods and Nutraceuticals- Introduction and definition; Classification and therapeutic #role of Nutraceuticals in cardio vascular diseases, gastro intestinal diseases and obesity#.

#.....# Self - study portion.

TEXT BOOKS

1. Frazier and West Hoff, Food Microbiology, Tata Mc Graw Hill Publishing Company Ltd, New Delhi, 1995.
2. Sri Lakshmi, B**,** Food Science, Fifth edition, New Age International, 2010.

UNIT I - Text Book - 2, Chapter – XIX
UNIT II - Text Book - 1, Chapter – XXII
UNIT III - Text Book - 1, Chapter – XXII
UNIT IV - http://www.easybiologyclass.com/enzyme-cell-immobilization-techniques/
http://www.namrata.co/classification-of-enzymes/
http://www.amfep.org/content/enzymes-food-processing
UNIT V - Text Book - 2, Chapter – XIX

REFERENCE BOOKS

1.Mary, k. Schmidl and Theodre, P. Labuza, Essentials of functional foods, Culinary and Hospitality Industry Publication Services, 2000.

2. **Israel Goldberg**, Functional foods, Pharma foods and Nutraceuticals, Culinary and hospitality Industry Publication Services, 2001.

3. **Robert Easy Wildman**, Handbook of Nutraceuticals and functional foods, Culinary and Hospitality Industry Publication Services, 2001.

4. **Owen Pward**, Fermentation Biotechnology Principles, Processes and Products, Prentice H New Jersey, 1989.

5. **Dubey, R.C**. Text book of Biotechnology, S.Chand and Co. Ltd, New Delhi, 2001.

SEMESTER-V: SKILL BASED ELECTIVE -II

BASICS IN COMPUTER

Course Code	**:**	**17UND5S2**	**Max. Marks**	**:**	**100**
Hours/Week	**:**	**2**	**External Marks**	**:**	**100**
Credit	**:**	**2**			

Objectives:

To enable the students to

1. Gain knowledge on computer operations and applications
2. Facilitate students to design and use computer based projects and programs.
3. Enable utilization of existing health and nutrition based software.

UNIT I **6 hours**

1.1 **Basic concepts on computer** - History, definition of computer, Types of computers, Input and Output devices, Definition of software and hardware.

1.2**Ms Windows** -Basic components of window, start window, changing desktop background, change the screen saver, change screen appearance, and change the mouse setting, change the date and time, installing the program.

1.3 Applications- Control panel.

UNIT II **6 hours**

Ms Word – Introduction,strating a window& customizing word, creating documents and saving, Edit menu, Format menu, View menu,spelling & grammar mistakes,intenting a paragraph, working with tables , file printing, mail merge, word art.

UNIT III **6 hours**

Ms Excel – Basic concepts of spread sheet, creating work sheet,menu bar,entering data,switching between a worksheet, formatting a work sheet,entering a formula& function basic Operations on data, sorting, total, working with charts, printing worksheets.

UNIT IV **6 hours**

Ms PowerPoint – features of PowerPoint, creating, opening, saving presentations, working with different views, working with slides – make a new slide, move, copy, layout, adding and Formatting text, adding clipart and other pictures, #designing slide show, inserting sound or music on a slide, adding a clip art image#.

UNIT V **6 hours**

5.1 Ms Access – Introduction to Access, working with tables, forms, reports, macros and charts.

5.2 Computer in management of Nutrition Practice-Communication in patient care, Nutritional service and nutrition education, Nutrition on web.

5.3 Internet – Basics of internet, basics of e mail, browsing.

#.....# Self - study portion.

TEXT BOOKS

1. Sanjay Saxena, MS Office 2000 for Every one, Second Edition,Vikas Publishing house Pvt Ltd., (2009).
2. V. Rajaraman, Fundamentals of computers, Fourth Edition, Practice- Hall of India Private Limited New Delhi (2004).
3. B.Srilakshmi, Nutrition Science, Third Edition, New Age International, New Delhi (2008).
4. K.L. James, The Internet-The user guide, Second Edition, PHI Learning Private Limited, New Delhi (2008).
5. Davinder Singh Minhas,Dynamic memory computer course,Fusion, Books New Delhi (2007)

UNIT-I Text book V- Chapter –I, II, VI

UNIT-II Text book I- Chapter -III

UNIT-III Text book I- Chapter -IV

UNIT-IV Text book I- Chapter -V

UNIT-V Text book I- Chapter –VI

Text book III- Chapter –IV

REFERENCE BOOKS

1. Harshad Kotecha, Windows 98, Dreamtech Press, New Delhi (2001).
2. R.K. Taxali, PC Software for windows 98 (made simple) - Tata McGraw Hill Publishing company Limited New Delhi (2001).
3. K. Pradeep Sinha and Priti sinha, Computer Fundamentals-Concepts, systems and applications, Third Edition, BPB Publications, New Delhi (2003).
4. L.Kathleen Mahan, Sylvia Escott-Stump, Krause's Food Nutrition and Diet Therapy, Eleventh Edition (2001).
5. Peter Norton, Introduction to computers, Sixth Edition, Tata McGraw Hill Education Private Limited New York (2008).

SEMESTER-V: SKILL BASED ELECTIVE -II

NUTRITION FOR PHYSICAL FITNESS

Course Code	**:**	**17UND5S2**	**Max. Marks**	**:**	**100**
Hours/Week	**:**	**2**	**Internal Marks**	**:**	**100**
Credit	**:**	**2**			

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 **6 hours**

Body composition and fitness

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

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

UNIT -II **6 hours**

Assessment and benefit of exercise

2.1 **Benefit of exercise**- #physiological, psychological and sociological#.

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

UNIT – III **6 hours**

Energy systems and Electrolyte Balance

3.1 **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, effect of dehydration, sports drinks.

UNIT-IV **6 hours**

Nutrition for sport persons

4.1 Nutrition needs of sports persons-macro and micronutrient .

4.2 Nutrition supplement and ergogenic aids.

UNIT-V **6 hours**

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.

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

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

UNIT I 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

1. E.N. Whitney & S.R. Rolfes, Understanding Nutrition, Eight Edition, West/Wadsworth, an International Thomson publishing Co(1999).
2. M. C. Ardle, W. Katch and V. Katch, Exercise Physiology Energy Nutrition and Human Performance, Fourth Edition, Williams and Wilkins Philadelphia (1996)
3. Barbak Ann Dushman, Complete Guide to Fitness and Health,American College of Sports Medicine Library and Congress Catalogin Publication Data (2011).
6. L.K. Mahan & S. Ecott-Stump, Krause's Food Nutrition and Diet Therapy, Tenth Edition, W.B. Sunders Ltd (2000).

SEMESTER-V: SKILL BASED ELECTIVE -III

FOOD AND NUTRITION

Course Code	**:**	**17UND5S3**	**Max. Marks**	**:**	**100**
Hours/Week	**:**	**2**	**External Marks**	**:**	**100**
Credit	**:**	**2**			

Objectives

To enable non-major students

1. Understand the importance of food and meaning of nutrition
2. Understand the role of nutrition in human life
3. Increase the ability to overcome deficiency

UNIT-I **6 hours**

Food and its Importance:

1.1 Definition-food, nutrition, optimum nutrition.

1.2 **Functions of foods**- physiological, psychological and social functions.

1.3 Basic five food groups.

1.4 **Balanced diet**- definition and objectives, food guide pyramid and its uses, meal planning- principles involved, RDA – ICMR

UNIT-II **6 hours**

Definition – Nutrition, Nutrients, Nutritional Status, Health

2.1 Carbohydrates –Nutritional classification, Function, Digestion and Absorption, effects of deficiency, sources and requirements

2.2 Fibre- Definition, Types, Role of fibre in health.

2.3 #Recommended dietary allowance for all age groups#.

UNIT-III **6 hours**

Protein

3.1 **Protein- Nutritional Classification**, Functions, Digestion and Absorption, Sources and Requirements, Deficiency.

3.2 **Lipids -** Classification- Functions, Digestion and Absorption, Sources and Requirements, Deficiency. Essential fatty acids – Functions, Sources.

3.3 **Water**- Distribution, functions, sources, requirements, dehydration and intoxication

UNIT-IV **6 hours**

Energy

4.1 **Energy** - Units of energy - Calorie, Joule, Determination of energy content of foods: Basal Metabolic rate (BMR),Determination of BMR (Benedict's oxy calorimeter),Factors affecting BMR.

4.2 Thermic effect of food, Factors affecting Thermic effects of food.

UNIT-V **6 hours**

Vitamins and Minerals

5.1**Vitamins –**

(i) Fat Soluble Vitamins (A, D, E, K): Functions, Sources, Requirements, Deficiency and Excess

(ii) Water Soluble Vitamins (B_1, B_2, B_3, B_4, B_6, B_{12} & C): Functions, Sources, Requirements, Deficiency and Excess

5.2 **Minerals** – Functions, sources, requirements and Effects of deficiency of Calcium, Phosphorous, Sodium, Potassium, Iron

#.....# Self - study portion.

TEXT BOOKS

1. B. Srilakshmi, Nutrition Science, Fifth Edition, New Age International (P) Ltd, New Delhi (2008).
2. Ambika Shanmugam, Fundamentals of Biochemistry for Medical Students, Seventh Edition, New Age Publishing Pvt.Ltd., New Delhi (1986).

UNIT I Text book 1 Chapter – II

UNIT II Text book –1Chapter – VII
Text book –1 Chapter – VIII
Text book –2 Chapter – III, XXI

UNIT III Text book –1Chapter – XX, IV
Text book –2Chapter – II, XIX

UNIT IV Text book – 1Chapter – V
Text book – 2Chapter – XXIII

UNIT V Text book – 1Chapter – IX, X, XI, XII
Text book – 2 Chapter – V, XXV

REFERENCE BOOK

1. Gopalan, C., Nutritive value of Indian Foods, NIN, Hyderbad, 1989.

SEMESTER-V: SKILL BASED ELECTIVE - III

BASICS IN NUTRITION

Course Code	**:**	**17UND5S3**	**Max. Marks**	**:**	**100**
Hours/Week	**:**	**2**	**External Marks**	**:**	**100**
Credit	**:**	**2**			

OBJECTIVES

The enable the students to

1. Gain knowledge about basics in nutrition.
2. Acquire knowledge about their functions, RDA, food sources of nutrients

UNIT – I: Introduction **6 hours**

Definitions - Nutrition, Health, Nutritional Status, Balanced diet – definition, Importance, Food pyramid.

UNIT – II: Energy **6 hours**

2.1 Energy- Definition, Energy value of food-Bomb calorimeter, Thermic effect of foods.

2.2 Energy balance - Definition, food sources.

UNIT – III: Carbohydrates and Protein **6 hours**

3.1 Definition of Carbohydrate, classification, food sources. Dietary fibre - Definition. #Role of dietary fibre in human nutrition#.

3.2 **PROTEIN:** Definition, classification, function, RDA, food sources.

UNIT – IV: Minerals **6 hours**

Classification, Minerals (Calcium, Phosphorous, iron, zinc, magnesium) and their functions, RDA and food sources

UNIT – V: Vitamins **6 hours**

5.1 Vitamins – Classification, Fat soluble vitamin - A,D,E,K. Water soluble Vitamin- B1, B2, B3, B6, B12 Folic acid and their functions, RDA, food sources.

5.2 **WATER:** Functions, requirements, Water Balance, Sources.

#.....# Self - study portion.

TEXT BOOK

1.B. Srilakshmi, Nutrition science, Seventh Edition, New Age International (P) Ltd. Publishers, Chennai(2011).

2. S. A. Joshi, Nutrition and Dietetics, Second Edition, Tata Mc. Graw Hill Publication, New Delhi (2008).

UNIT- I Text book- 1
UNIT-II Text book- 1
UNIT-III Text book- 2
UNIT-IV Text book- 2
UNIT-V Text book- 1

REFERENCES

1. Gopalan, C.et. al,Nutritive value of Indian Foods, ICMR(1991).
2. Swaminathan, M. ,Essentials of Food & Nutrition. Vols I & II Ganesh & Co., Madras(1985).
3. Robinson, C.H., et. al (1986) Normal & Therapeutic Nutrition, 17th ed. MacMillan Publishing Co., (1986)
4. Williams. S.R. Basic Nutrition & Diet Therapy, 11th ed., Mosby, Inc. St. Louis(2001).

SEMESTER-V: EXTRA CREDIT – I

FOOD PACKAGING

Course Code	**:**	**17UND5EC1**	**Max. Marks**	**:**	**100***
Credit	**:**	**4***	**External Marks**	**:**	**100***

Objectives:

To enable the students to-

1. Know different packing materials available.
2. Aware of new advances and State-of the art in food packing.
3. Select appropriate packaging materials for varied food products.

UNIT – I

Importance of Packaging

Functions of Packaging. Primary elements of package forms, material and decoration.

UNIT – II

Various Package Forms - Products, tubes, tetra packs, cans, bottle.

UNIT-III

Packaging Materials- Their properties, advantages and limitations - aluminum, glass, tinned steel plate, carton board, paper, flexible, films, laminates and others.

UNIT-IV

Packaging methods and Performances- Including restorable plastic packaging, asetic packaging, modified atmosphere packing.

UNIT–V

Food and food packing interaction. #Biodegradable packaging materials#.

#.....# Self - study portion.

TEXT BOOKS

1. Niir Board, Hand Book on Modern Packaging Industries, Asia Pacific Business Press Inc.
2. Doney Sun Lee, Food Packaging Science and Technology, CRC Press (2008).

UNIT I Text book 1 Chapter – VII
UNIT II Text book 1 Chapter – VIII
UNIT III Text book 1 Chapter – III
UNIT IV Text book 1 Chapter – IV
Text book 1 Chapter – V
UNIT V Text book 1 Chapter – II
Text book 1 Chapter – IX

REFERENCE BOOKS

1. Fuller and John, Modern Restaurant Service, Hutchinson, London (1983).

SEMESTER-VI : CORE – XIII

FOOD SERVICE MANAGEMENT- II

Course Code	**: 17UND6C13**		**Max. Marks**	**:**	**100**
Hours/Week	**: 5**		**Internal Marks**	**:**	**25**
Credit	**: 5**		**External marks**	**:**	**75**

Objectives:

To enable the students to

1. Gain knowledge on ideal food service layout
2. Gain knowledge in handling equipment and maintenance
3. Develop skills in menu planning for quantity preparation
4. Gain knowledge on systems, types and styles of food service in catering establishments.

UNIT-I **(13 hours)**

Ideal food plant layout:

1.1 **Layout of food plants**- space allocation for the various areas, work simplification.

1.2 **Kitchen space**- size and type of kitchen, layout of kitchen, work centres in the kitchen layout.

1.3 **Storage space**- types of storage, planning

1.4 Service **area**- location and planning.

UNIT-II **(12 hours)**

Equipments and Materials:

2.1 **Equipments**- Classification of equipments, factors involved in selection of equipment, care and maintenance of equipment.

2.2 **Materials used** – Strength and limitation of base materials used in the manufacture of equipment- Aluminium, iron, steel, stainless steel, copper, brass, and glass, plastic.

2.3 **Finishes**- Mechanical and applied.

UNIT-III **(11 hours)**

Quantity food purchase, receiving and storage

3.1 **Purchase** – food buyer, duties of purchasing officer, Purchasing procedure, objectives of food specification, methods of purchasing, forms used in purchasing control.

3.2 **Receiving-** procedures and forms.

3.3 **Storing and issuing-** objectives, types of store records and store issues.

UNIT-IV **(10 hours)**

Quantity food preparation:

4.1 **Menu planning**- menu origin, functions of menu, menu planning, qualities of menu planner, principles involved in planning menu.

4.2 **Menu**- types of menu, Indian – south and north Indian . western menu

4.3 **Quantity Food production:** Standardization of recipes, portion control, and #utilization of left over foods#.

UNIT-V **(14 hours)**

Quantity food service and cost control:

5.1 **Food service system-**Types of food service – Conventional systems, Commissary systems, cook chill and cook freeze system, assembly line service system.

5.2 **Styles of service** – Formal and Informal styles of service.

5.3 **Cost control, elements of cost** – food cost, labour cost and overhead expenses, why food cost control ; factors responsible for losses in a food service industry, methods of controlling food cost control leading to profit ; costing of dishes and meals, methods of pricing items.

#.....# Self - study portion.

TEXT BOOKS

1. Mohini Sethi and Malham-Catering Management and integrated approach, JohnWiley & Sons,eastern limited, New Delhi, Reprint 2007.
2. MohiniSethi,.Institutional Food Management, New age international (p) limited Publishers New Delhi, reprint 2005.
3. West's and Woods 'Introduction to food service'2nd Edition, mac millan Publishing, New York, 1998.

UNIT I Text Book- 1 Chapter I, II
Text Book- 3 Chapter VIII

UNIT II Text Book- 2 Chapter VII, VIII, IX
Text Book- 1 Chapter IX

UNIT III Text Book- 2 Chapter XIII, XIV

UNIT IV Text Book- 2 Chapter XV
Text Book- 1 Chapter II, V

UNIT V Text Book- 1 Chapter II, VI
Text Book- 3 Chapter XIX
Text Book- 2 Chapter XX, XXI

REFERENCE BOOKS

1. Kotschevar LH and Terrell ME, Food Service Planning Layout and Equipment, 2nd Edition, John Wiley and sons, New York, 1977.
2. Kinton, R and Ceserani, V.The Theory of catering, Arnold – Heinemam, 1985.
3. Jag Mohan Negi, Food and beverage management and cost control, knanishka Publishers, New Delhi, 2009
4. Sudhir Andrews, Text book of Food and Beverage Management, Tata Mc Graw- Hill Publishing company limited, New Delhi, 2008.

SEMESTER- VI: CORE – XIV

COMMUNITY NUTRITION

Course Code	**: 17UND6C14**		**Max. Marks**	**:**	**100**
Hours/Week	**: 5**		**Internal Marks**	**:**	**25**
Credit	**: 5**		**External marks**	**:**	**75**

Objectives

To enable the students to

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

UNIT-I **15 hours**

Health and Malnutrition:

1.1 **Definition** – Health, Community, Family and Village. Meaning of Optimum nutrition.

1.2 **Malnutrition**- under nutrition and over nutrition.

1.3 **Causes of malnutrition**– Factors contributing of malnutrition in the community – food habits, customs and practices, availability of food, socio-economic factors, ignorance, social-cultural factors, housing and hygienic conditions. #Food fads and fallacies#.

UNIT-II **15 hours**

Assessment of nutritional status of the community:

2.1 **Direct and Indirect Assessment**- anthropometry, biochemical, clinical and diet survey.

2.2 **Characteristics of community**- demography, vital statistics, Infant Mortality Rate (IMR), Maternal Mortality Rate (MMR), morbidity and mortality.

UNIT-III **15 hours**

Nutritional problems confronting the community:

3.1**Protein Energy Malnutrition**- Etiology, prevalence, classification- kwashiorkor and marasmus, symptoms, dietary suggestion to overcome kwashiorkor and marasmus.

3.2 **Iron Deficiency Anemia**- prevalence, etiology, symptoms, prophylaxis programme.

3.3 **Iodine Deficiency Disorder**- etiology, prevalence, symptoms, prophylaxis programme.

3.4 **Fluorosis**- etiology, prevalence, symptoms.

3.5 **Vitamin A deficiency**- etiology, prevalence, symptoms, prophylaxis programme.

UNIT-IV **15 hours**

Role of national and international organizations:

4.1**State level Feeding Programme** – School Lunch Programme, CMNMP – a review, ICDS, TINP organized by the government for vulnerable sections of the population.

4.2 **National organizations**- ICMR, NIN, NNMB, CFTRI, DFRL, and NIPCCD.

4.3 **International organizations**- WHO, FAO, UNICEF, UNESCO, CARE and World Bank.

UNIT-V **15 hours**

Nutrition education:

5.1 Meaning, nature and importance of nutrition education to the community.

5.2 Channels of Nutrition education, principles of planning, executing and evaluating nutrition education programmes, Problems in conducting nutrition education programmes.

#.....# Self - study portion.

TEXT BOOKS

1. Park, Social and Preventive medicine, Twentieth edition,Banarsidas Bhanot Publishers (2009).
2. N Swaminathan, Essentials of Food and Nutrition,Vol I, The Bangalore Printing and Publishing Co, Ltd (2008).
3.N Swaminathan, Essentials of Food and Nutrition, Vol II The Bangalore Printing and Publishing Co, Ltd (2008).
4.B.Srilakshmi, Nutrition Science, Fourth edition, New Age International Pvt. Ltd (2010).

UNIT I Text book – 1 Chapter – XI
Text book – 1 Chapter – XII
Text book – 2 Chapter – XVII
UNIT II Text book –2 Chapter – XXII
UNIT III Text book – 4 Chapter – IX
Text book – 4 Chapter – XI
Text book – 4 Chapter – XII
Text book – 4 Chapter – XIII
Text book – 4 Chapter – IV
UNIT IV Text book – 4 Chapter – XXIV
UNIT V Text book – 4 Chapter – XXV

REFERENCE BOOKS

1. P.K.Shukla , Nutritional problems of India, Prentice hall, India (1982).
2. H.K. Senha, Challenges in rural development, Discovery publishing (2014).

SEMESTER-VI: COURSE CORE - XV

FOOD SERVICE MANAGEMENT PRACTICAL

Course Code	**:**	**17UND6CP15**	**Max. Marks**	**:**	**100**
Hours/Week	**:**	**5**	**Internal Marks**	**:**	**20**
Credit	**:**	**5**	**External marks**	**:**	**80**

1. Common ingredients for Indian – south and north Indian menu, western menu

2. Planning, compiling and preparation of menus for different regions

   a) Indian-south and north Indian - Thali meal and mini meal.

   b) Western-breakfast, dinner menu

3. **Quantity cookery:**

   a) Standardization of selected recipes and their preparation, calculation of cost and serving size per yield.
   b) Quantity cookery: preparation of south Indian, north Indian menu for 10 members.

4. Visits to any one of the well- organized food service units a) Hostel b) Hotel c) Industrial canteen d) Hospital

REFERENCE BOOKS

1. MohiniSethi,.Institutional Food Management, New age international (p) limited Publishers New Delhi, reprint 2005.
2. West's and Woods 'Introduction to food service'2nd Edition, mac millan Publishing, New York, 1998.

SEMESTER-VI: CORE-XVI

FOOD STANDARDS AND QUALITY CONTROL

Course Code	**: 17UND6C16**		**Max. Marks**	**:**	**100**
Hours/Week	**: 5**		**Internal Marks**	**:**	**25**
Credit	**: 5**		**External marks**	**:**	**75**

Objectives:

To enable the students to

1. Know about the basic concepts involved in the standard and quality factors of food.
2. Educate types of evaluations involved in food
3. Gain knowledge on food safety and food laws.
4. Study about quality control and common food standards.
5. Learn about the importance of quality assurance in food industries.

UINT-I **15 hours**

Introduction:

1.1**. Food standard:** Meaning, importance in food industry.

1.2**. Food safety and standards authority of India (FSSAI):** Introduction, highlights, legislation- Prevention of food adulteration act(PFA), Fruit products order(FPO), Meat product order (MPO), Milk and milk product regulation(MMP), Food safety and standard act regulations.

1.3 **Food standards with legal aspects:** Bureau of Indian standards, Agriculture marketing (AGMARK), Export inspection council, Consumer protection act.

1.4. **Patent:** Definition, requirements, advantages.

UNIT-II **15 hours**

Quality control:

2.1 **Quality control:** Definition of quality control, principles of quality control, quality control departments.

2.3 **Hazards Analysis critical control point (HACCP)-**principles, steps in hazard analysis, identification and establishment of critical control points, monitoring procedure, verification, record keeping.

2.3 **Quality systems** - BS5750 and ISO9000series.

2.4. **Food adulteration**: Definition, adulterants, types of adulterants-intentional, incidental, other incidental and new adulterants;# adverse effects of adulterants on health#.

UNIT-III **15 hours**

Quality factors of foods:

3.1. **Appearance factors:** size, shape, colour, gloss.

3.2. **Textural factors:** brittleness, tenderness, consistency, astringency.

3.3. **Flavour :** sensation of flavor, taste, odour, feel; flavor intensifiers-mono sodium glutamate; flavouring extracts-vanilla.

UNIT-IV **15 hours**

Sensory evaluation:

4.1. **Criteria's for sensory tests:** Reasons for testing food quality ,trained panel members-selection of panel, types of panels, testing laboratory, preparation of samples, evaluation card.

4.2 **Types of Sensory tests**:

a) **Difference tests-** paired comparison test, duo-trio- test.

b) **Rating tests**-Ranking test, single sample (monadic) test, two-sample difference test, multiple sample difference test, hedonic rating test, numerical scoring test, composite scoring test.

c) **Sensitivity test**-sensitivity-threshold test, Dilution test.

d) Descriptive flavor profile method. Limitations of sensory evaluation.

UNIT-V **15 hours**

Objective evaluation:

5.1. **Objective evaluation:** Definition, advantages, disadvantages, basic guidelines.

5.2. **Tests**

a) chemical

b) physico-chemical tests -pH, percentage of salt, concentration of sugar, analysis of sugar, butyrometer. Microscopic examination

c) physical methods-weight, volume, specific volume, index to volume, specific gravity, moisture, wettability, cell structure, measurement of colour.

5.3. **Textural evaluation**-percent sag

a) Instruments used for liquids and semi-solids, viscometer, Penetrometer

b) Instruments used for solids-pressure tester, Succulometer, Tenderometer, Fibrometer, Shortometer, Texturometer.

#.....# Self - study portion.

TEXT BOOKS

1. M. R. Adams and M. O. Moss, Food microbiology, New Age International Publishers ,New Delhi ,2003.
2. B. Srilakshmi , Food Science, New Age International Publishers, New Delhi ,2010.
3. Lillian Hoagland Mayer, Food Chemistry, Affiliated East West press Pvt. Ltd., New Delhi, 2002
4. Norman.N. Potter and Joseph. H. Hotchkiss, Food Science - CBS Publishers, 1996.
5. Desrosier and Desrosier, Technology of food preservation - CBS Publishers, Fourth edition, 1999.

UNIT I	Text book –3 Chapter – XIV
	Net Ref www.fssai.gov.in/
UNIT II	Text book –3 Chapter – XIII
	Text book –4 Chapter – V
UNIT III	Text book –3 Chapter – XIII
UNIT IV	Text book – 3 Chapter – XIII
UNIT V	Text book – 1 Chapter – VI
	Text book – 2 Chapter – XI

REFERENCES:

1. A.Y.Sathe, A first course in food analysis - New Age Publications, 1999.
2. Ranganna S, Handbook of Analysis and Quality Control for Fruit and Vegetable products. 2nd Ed. Tata-McGraw-Hill, 2001.

SEMESTER – VI: MAJOR BASED ELECTIVE – II

HUMAN DEVELOPMENT

Course Code : 17UND6M2 **Max. Marks: 100**
Hours/Week : 5 **Internal Marks : 25**
Credit : 4 **External Marks : 75**

Objectives
To enable students to
1. To introduce the student to the field of human development: concepts, scope, dimensions and interrelations.
2. To sensitize the student to social and cross-cultural contexts in human development.
3. To sensitize the student to interventions in the field of human development.

UNIT I **15 hours**
Child development and Maternal prenatal health

a) **Principles and Stages** – Continuous development – Development is sequential – Stages of growth and development – Maturation and learning – Direction of growth.
b) **Prenatal development** –signs of pregnancy, conception, periods of prenatal development, test tube baby, management of normal pregnancy – hygiene, diet and medical supervision and hazards during pregnancy.

UNIT II **15 hours**
Labour and Neonate

a) **Labour**- signs of labour, stages of labour, types of birth, multiple pregnancy, prevention of gynecological problems.
b) **Neonate** - Adjustment of the newborn to temperature, breathing, feeding and elimination.

UNIT III **15hours**
Infancy

a) **Infancy (birth to 2 years)** – Development – physiological and motor, social, emotional cognitive and language, minor ailments.
b) **Effect of stimulation** – care of infants, feeding, toilet training, bathing, clothing, sleep, immunization, prevention of accidents-importance of psychological needs.

UNIT IV **15 hours**
Early and late childhood

a) **Early childhood (preschool stage 2-6 years)** – physiological and motor development, emotional, social, cognitive and language development, creativity, importance of play, importance of family relationship, #behavior problems – causes and treatment#.
b) **Importance of preschool education**.
c) **Late childhood (elementary school period 6-12 years)** – developments – physiological, social, emotional, cognitive and language.
d) **Children with special needs** – identification and rehabilitation.

UNIT V **15 hours**

5.1.Adolescence (12 – 18 years) – physiological, emotional, intellectual and motor development, personal adjustment and maladjustment. Juvenile Delinquency – causes, prevention and rehabilitation. Drug addiction and alcoholism – rehabilitation. Sex education.

5.2.Adulthood (18-60 years) – characteristics and development tasks. All aspects of development and vocational development.

5.3.Old age (60 years and above) – physiological and psychological changes, problems of the aged, family attitude towards the aged, place of the aged in Indian society.

#.....# Self - study portion.

TEXT BOOKS

1. Sushila srivastava and K. Sudha Rani, Text Book of Human development A life span developmental approach, First Edition, S. Chand & company pvt (2014).

UNIT- I - Text book – 1 Chapter – I, III
UNIT –II - Text book – 2 Chapter – IV, V
UNIT-III - Text book – 2 Chapter – VI
UNIT - IV- Text book – 2 Chapter – VII, VIII, IX
UNIT –V - Text book – 2 Chapter – X, I, XII, XIII

REFERENCE BOOKS

1. A.C.Harris, Child development. St. Paul: West Pub. (1986)
2. R.M. Lerner, and F. Hultsch, Human development: A life-span perspective (pp.247-253), New York: McGraw Hill Book Co. unit VI, Unit VII (1983).
3. P. Mussen, J.J. Conger, J.Kagan, and A.C. Huston, Child Development and Personality. New York: Harper and Row. Unit I pp 12-18 (1990).

SEMESTER- VI: MAJOR BASED ELECTIVE – II

BASICS IN FOOD SAFETY

Course Code : 17UND6M2 **Max. Marks : 100**
Hours/Week : 5 **Internal Marks : 25**
Credit : 4 **External Marks : 75**

Objectives
To enable the students
1. Understand the Food regulation Acts in India.
2. Acquire skills in Food Sanitation and Safety.

UNIT I **15 hours**
History of food regulations in India. Legislations- Prevention of Food Adulteration act 1954, Food product order (1955), Solvent Extracted Oil, De-oiled Meal and Edible Flour (Control) Order, 1967, Meat Food Products Order (1973),Edible Oils Packaging, 1998, Edible Oils Packaging, 1998, Vegetable Oil Products Order, 1998, Milk & Milk Product Amendment Regulations – 2009.

UNIT II **15 hours**
Food Sanitation and safety: Factors contributing to physical, chemical and biological contamination in food chain, prevention and control of food borne hazards, definition and regulation of food sanitation, sources of contamination, personal hygiene-food handlers, cleaning compounds, sanitation methods, waste disposal strategy (solid and liquid waste) and pest control

UNIT III **15 hours**
Food adulteration: common adulterants, simple tests for detection of adulteration. Food additives-classification, functional role and safety issues, types of adulteration and recent trends in food adulteration.

UNIT IV **15 hours**
Food Safety and Quality Assurance: quality control of raw materials, in –process food control, quality control of finished products, #quality assurance of therapeutic, functional, nutraceutical and novel foods#.

UNIT V **15 hours**
Food Quality Indices: Meat and meat products, fish and fish products, milk and dairy products, vegetables , fruits and their products, grain , pulses and oil seeds, coffee, tea and spices.

#.....# Self - study portion.

TEXT BOOKS
1. Early, R. (2006) Guide to Quality Management Systems for the Food Industry, Blackie, Academic and professional, London.
2. Gould, W.A and Gould, R.W. (2005) Total Quality Assurance for the Food Industries, CTI Publications Inc. Baltimore.
3. FAO (2006) Manuals of Food Quality Control. 2-Additives Contaminants Techniques, Rome.

4. Bryan, F.L. (2007) Hazard Analysis Critical Control Point Evaluations A Guide to Identifying Hazards and Assessing Risks Associated with Food Preparation and Storage. World Health Organization, Geneva.

REFERNCE BOOKS

1. Kirk, R.S and Sawyer, R. (2005) Pearson's Composition and Analysis of Foods, Longman Scientific and Technical. 9th Edition, England.
2 . Pomeraz, Y. and MeLoari, C.E. (2008) Food Analysis: Theory and Practice, CBS publishers and Distributor, New Delhi.

SEMESTER-VI: MAJOR BASED ELECTIVE- III

COMMUNITY DEVELOPMENT

Course Code : 17UND6M3 **Max. Marks : 100**
Hours/Week : 4 **Internal Marks : 25**
Credits : 4 **External Marks : 75**

Objectives:
To enable students to,
1. Understand the principles of Extension and Community development in our country.
2. Understand the problems and needs of rural community.
3. Prepare for higher studies in Extension Education.
4. Offer effective leadership in the community.

UNIT-I **12 hours**
Extension education and community development
1.1. Introduction of extension education and community development.
1.2. Philosophy and principle of extension education.
1.3. Organization and functions of community development and Extension service in India.

UNIT-II **12 hours**
Study of rural india
2.1. Characteristics of rural life in India, family life- religion and caste
2.2. Panchayat Raj administration.

UNIT-III **12 hours**
Home science extension
3.1 . The home science extension- concept and objectives.
3.2 .Home science extension workers- qualities and activities.
3.3 . Nutrition extension services by food & nutrition board.

UNIT-IV **12 hours**
Principles and methods of extension work
4.1. **The learning and teaching process –** effective teaching through different methods – individual, group and mass approach.
4.2. Cone of experience.
4.3. **Audio visual aids in extension work –** motion pictures, radios, slides, flannel graphs, flash cards, graphs and puppet shows.

UNIT-V **12hours**
5.1. Communication – meaning, needs, types and # barriers of communication#.
5.2. Program planning- meaning and importance, steps involved in programme planning. Welfare programmes for Rural development: IRDP (Integrated Rural Development Programme),Rashtriya krishi vikas yojana, Swarnajayanthi gram swarozgar yojana - a short review, Mahatma Gandhi National Rural Employment Guarantee Scheme, Central government health scheme, Pradhan Mantri Gramin Awaas Yojana (PMGAY), Dr. Muthulakshmi reddy maternity benefit scheme.

#.....# Self - study portion.

Visit: A visit to a rural community or a school to disseminate nutrition concepts using audio visual aids.

TEXT BOOKS

1. A.Reddy, Extension Education, 1st edition, Sree lakshmi press, Andrapradesh (1971).

2. A.Chandra, A.Shah and U.Joshi, Fundamentals of Teaching Home Science, Sterling Publishers Pvt Ltd., NewDelhi (1989).

UNIT I Text Book 1 Chapter I

UNIT II Text Book 1 Chapter VI

UNIT III Text Book 1 Chapter V
Text Book 2 Chapter XVIII, XIX

UNIT IV Text Book 1 Chapter II
Text Book 2 Chapter VII, VIII, XI, XII

UNIT V Text Book 2 Chapter XX
http://**nrega**.ap.gov.in
http://www.pmawasyojana.co.in/gramin/
http://kpmbphc.blogspot.in/2012/01/new-dr-muthulakshmi-reddy-maternity.html

REFERENCE BOOKS

1. Food and Nutrition Board, Community Food and Nutrition Extension Unit, Rajaji Bhavan,Chennai.

2. Food and Nutrition Board, Department of Women and Child Development Ministry of Human Resources Development, Government of India,Shastri Bhavan, New Delhi.

3. R.P. Devadas., Introduction to Home Science, Saradhalaya press, Coimbatore.

4. O.P. Dahama and O.P. Bhat Nagar, Extension and communication for development, Oxford and IBH Publishing company New Delhi(1985).

SEMESTER-VI: MAJOR BASEDE ELECTIVE –III

NUTRITION IN CRITICAL CARE

Course Code	**:**	**17UND6M3**	**Max. Marks**	**:**	**100**
Hours/Week	**:**	**4**	**Internal Marks**	**:**	**25**
Credit	**:**	**4**	**External Marks**	**:**	**75**

Objectives To enable the students to

1. Gain knowledge in handling hospitalized patients
2. Know the nutritional assessment of ill patients

UNIT-I **12 hours**

Nutritional care of hospitalised patients

1.1Hospital malnutrition, screening and nutritional assessment, nutritional care plan, implementation of nutritional care.

1.2 Metabolic response and adaptation to starvation, infection, trauma and surgery- (carbohydrate protein and fat metabolism)

UNIT – II **12 hours**

Assessing the nutritional status in critically ill patients: Anthropometry, Biochemical, Clinical and Dietary.

UNIT – III **12 hours**

Medical nutrition therapy

3.1 **Enteral nutrition:** Types, routes, composition of feeds, precautions while feeding

3.2 **Parenteral nutrition:** Types modes and composition of feeds and precautions while feeding. Complications of parenteral and enteral therapy, refeeding syndrome. Palliative care and rehabilitation diets in stages.

UNIT: IV **12 hours**

Nutrition in critical care:

4.1 HIV/AIDS, mechanical ventilation, hepatic insufficiency, trauma, sepsis.

4.2 MOF (multiple organ failure) other life saving measures for the critically ill.

4.3 Role of immunonutrition,

UNIT: V **12 hours**

Nutritional support system in relief and rehabilitation

5.1 Surviellance of nutritional status in emergency relief situations such as Flood, cyclone, earthquake, drought, war.

5.2 Assessment of food needs, food distribution strategy, mass and supplementary Feeding, special foods/ rations for nutritional relief, organizations for mass feeding/food distribution, transportation and storage, feeding centres, #sanitation and hygiene #.

#.....# Self - study portion.

TEXT BOOKS

1. Nutrition , Monitoring & Assessment Tara Gopala Das & Subadra Seshadari Oxford Uni. Press Latest
2. Nutrition Counseling Skills for the Nutrition Care Process, Linda Sretselaar Jones and Bartlett Pub. 1997
3. Nutrition in major metabolic diseases, Gopalan., Kamala Krishna swamy Oxford University

UNIT I Text Book 1
UNIT II Text Book 1
UNIT III Text Book 1, Text Book 2
UNIT IV Text Book 1, Text Book 2
UNIT V Text Book 2

REFERENCE BOOKS

1. Williams,S.R.,Nutrition and Diet Therapy, 6th Edition,Times Mirror / Mosby College Publishing, St. Louis, 1989.
2. Raheena Begum, A Text Book of Foods, Nutrition and Dietetics, Sterling Publishers, New Delhi.1989.

SEMESTER-VI: EXTRA CREDIT COURSE-II

PRINCIPLES OF RESOURCE MANAGEMENT AND INTERIOR DESIGN

Course Code : 17UND6EC2 **Max. Marks: 100***
Credits : 4* **External Marks:100***

Objective

1. To enable the students to understand concepts and principles and functions of management.
2. To recognise the importance of wise use of resources to achieve ones 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 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, organising.

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, intensity / chroma). The prang 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, possessions).
2.4.Application of art principle in the use of colours for a room (balance, proportion, harmony, rhythm, emphasis).

UNIT-III

3.1. **Lighting:** Sources 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, non-production 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.

TEXT BOOKS

1. Graig. H.T., And Rush, C.H. "Homes with Character", D.C. Health and Company, Boston, 1965.
2. Alexander, 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