

# THIRUVALLUVAR UNIVERSITY

## BACHELOR OF SCIENCE B.Sc. NUTRITION, FOOD SERVICE MANAGEMENT AND DIETETICS UNDER CBCS

(With effect from 2020 - 2021)

### Programme Specific Outcomes

1. Understand the importance of foods and nutrition in promotion of health and prevention of diseases
2. Learn the skill based education to apply in food industries
3. Gain knowledge to pursue higher education and research in academic and research institutions
4. Promote career opportunities in personal and corporate life
5. Enable to become Entrepreneurs in the field of Food and Nutrition

### The Course of Study and the Scheme of Examinations

S. No.	Part	Study Components		Ins. Hrs / week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
<b>SEMESTER I</b>									
1.	I	Language	Paper-1	6	4	Tamil/Other Languages	25	75	100
2.	II	English (CE)	Paper-1	6	4	<b>Communicative English I</b>	25	75	100
3.	III	Core Theory	Paper-1	6	4	Food Microbiology	25	75	100
	III	Core Practical	Practical-1	4	0	Food Microbiology	0	0	0
4.	III	Allied -1	Paper-1	4	3	Chemistry I	25	75	100
	III	Allied- 1	Practical-1	2	0	Chemistry	0	0	0
<b>5.</b>	<b>III</b>	<b>PE</b>	<b>Paper 1</b>	<b>6</b>	<b>3</b>	<b>Professional English I</b>	<b>25</b>	<b>75</b>	<b>100</b>
6.	IV	Environmental Studies		2	2	Environmental studies	25	75	100
		<b>Sem. Total</b>		<b>36</b>	<b>20</b>		<b>150</b>	<b>450</b>	<b>600</b>
<b>SEMESTER II</b>									
7.	I	Language	Paper-2	6	4	Tamil/Other Languages	25	75	100
8.	II	English (CE)	Paper-2	6	4	<b>Communicative English II</b>	25	75	100
9.	III	Core Theory	Paper-2	5	4	Human Physiology	25	75	100
10.	III	Core Practical	Practical-1	3	2	A. Food Microbiology B. Human Physiology	25	75	100
11.	III	Allied-1	Paper-2	4	3	Chemistry II	25	75	100
12.	III	Allied Practical - 1	Practical-1	2	2	Chemistry Practical	25	75	100
<b>13.</b>	<b>III</b>	<b>PE</b>	<b>Paper 1</b>	<b>6</b>	<b>3</b>	<b>Professional English II</b>	<b>25</b>	<b>75</b>	<b>100</b>
14.	IV	Value Education		2	2	Value Education	25	75	100
15.	IV	Soft Skill		2	1	Soft Skill	25	75	100
		<b>Sem. Total</b>		<b>36</b>	<b>25</b>		<b>225</b>	<b>675</b>	<b>900</b>

S. No.	Part	Study Components		Ins. Hrs / week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
<b>SEMESTER III</b>									
16.	I	Language	Paper-3	6	4	Tamil/Other Languages	25	75	100
17.	II	English	Paper-3	6	4	English	25	75	100
18.	III	Core Theory	Paper-3	5	5	Food Science	25	75	100
	III	Core Practical	Practical	3	0	Food Science	0	0	0
19.	III	ALLIED-2	Paper-3	4	3	Nutritional Biochemistry	25	75	100
	III	Allied Practical	Practical	2	0	Nutritional Biochemistry	0	0	0
20.	IV	Skill based Subject	Paper-1	2	2	Bakery and Confectionery	25	75	100
21.	IV	Non-major elective	Paper-1	2	2	Health and fitness	25	75	100
		<b>Sem. Total</b>		<b>30</b>	<b>20</b>		<b>150</b>	<b>450</b>	<b>600</b>
<b>SEMESTER IV</b>									
22.	I	Language	Paper-4	6	4	Tamil/Other Languages	25	75	100
23.	II	English	Paper-4	6	4	English	25	75	100
24.	III	Core Theory	Paper-4	5	4	Human Nutrition	25	75	100
25.	III	Core Practical	Practical -2	3	3	A. Food Science B. Human Nutrition	25	75	100
26.	III	ALLIED-2	Paper-4	4	3	Food Preservation	25	75	100
27.	III	Allied Practical-2	Practical-2	2	2	A. Nutritional Biochemistry B. Food Preservation	25	75	100
<b>28.</b>	<b>IV</b>	<b>NMSDC : Digital Skills for Employability</b>	<b>Paper-2</b>	<b>2</b>	<b>2</b>	<b>Office Fundamentals</b>	<b>25</b>	<b>75</b>	<b>100</b>
29.	IV	Non-major elective	Paper-2	2	2	Nutrition for the Family	25	75	100
				<b>30</b>	<b>24</b>		<b>200</b>	<b>600</b>	<b>800</b>
<b>SEMESTER V</b>									
30.	III	Core Theory	Paper-5	6	5	Dietetics - I	25	75	100
31.	III	Core Theory	Paper-6	6	5	Nutrition Through Life Cycle	25	75	100
32.	III	Core Theory	Paper-7	6	5	Community Nutrition	25	75	100
	III	Core Practical	Practical	4	0	Nutrition through Life Cycle	0	0	0
	III	Core Practical	Practical	4	0	Dietetics - I	0	0	0
33.	III	Internal Elective	Paper-1	4	3	Hospital Food Service Administration	25	75	100
34.	IV	Skill based Subject	Paper-3	-	2	Internship	100	-	100
				<b>30</b>	<b>20</b>		<b>200</b>	<b>300</b>	<b>500</b>

S. No.	Part	Study Components		Ins. Hrs / week	Credit	Title of the Paper	Maximum Marks		
		Course Title							
<b>SEMESTER VI</b>									
35.	III	Core Theory	Paper-8	4	4	Dietetics - II	25	75	100
36.	III	Core Theory	Paper-9	3	3	Food Service Management	25	75	100
37.	III	Core Theory	Paper-10	4	4	Human Development and Counselling	25	75	100
38.	III	Core Practical	Practical-3	3	3	A. Nutrition through Life Cycle B. Dietetics - I	25	75	100
39.	III	Core Practical	Practical-4	3	3	A. Food Service Management B. Dietetics - II	25	75	100
40.	III	Core Project	Paper-11	5	5	<b>Individual / Group Project</b>	25	75	100
41.	III	Internal Elective	Paper-2	3	3	Food Standards and Quality Control	25	75	100
42.	III	Internal Elective	Paper-3	3	3	Nutraceuticals and Nutrigenomics	25	75	100
43.	IV	Skill based Subject	Paper-4	2	2	Perspectives of Home Science	25	75	100
44.	V	Extension Activities		0	1		100	0	100
45.	-	<b>NMSDC : Employability Readiness</b>		-	-	(choose any one) • Naandi • Unnati • Quest • Izpay • IBM Skills build	-	-	-
				<b>30</b>	<b>31</b>		<b>325</b>	<b>675</b>	<b>1000</b>
					<b>140</b>				<b>4400</b>

Part	Subject	Papers	Credit	Total Credits	Marks	Total Marks
Part I	Languages	4	4	16	100	400
Part II	Communicative English & English	4	4	16	100	400
Part III	Allied (Odd Semester)	2	3	6	100	200
	Allied (Even Semester)	2	3	10	100	200
	Allied Practical	2	2		100	200
	Electives	3	3	9	100	300
	Core	10	(3-5)	43	100	1000
	Core practical	4	(2-3)	11	100	400
	Professional English	2	3	6	100	200
	Compulsory Project (Group/Individual Project)	1	5	5	100	100
Part IV	Environmental Science	1	2	2	100	100
	Soft skill	1	1	1	100	100
	Value Education	1	2	2	100	100
	Lang. & Others /NME	2	2	4	100	200
	Skill Based	4	2	8	100	400
Part V	Extension Activities	1	1	1	100	100
	<b>Total</b>	<b>44</b>		<b>140</b>		<b>4400</b>

## **SEMESTER III**

### **PAPER - 3**

#### **FOOD SCIENCE**

#### **COURSE OBJECTIVES**

##### **To enable students to**

Define basic 5 food Groups.

- Understand changes during cooking.
- Classify various method of cooking.
- Compare and contrast the nutritive values of Milk, Meat and Poultry.
- Determine stages of sugar cookery.

#### **UNIT - I**

Definition, classification , functions of foods- functions of food in relation to health - classification of foods based on nutrients, food groups- types; application of food groups in planning adequate diets, healthy eating plate.

#### **UNIT - II**

Preliminary preparation of foods prior to cooking with special reference to conservation of nutrients and palatability, Different methods of cooking -dry methods - frying, broiling, parching, and baking. Moist methods - boiling, stewing, cooking under pressure. Solar cooking, Micro-wave cooking - advantages and disadvantages.

#### **UNIT - III**

Cereal and Cereal products - Nutritive value of Rice, Wheat and locally available millets. Effect of cooking on the nutritive value of cereals. gelatinization, dextrinization and gluten formation - Pulses and nuts - Composition, Nutritive value of grams, dhals - some common nuts - substitutes - soya products. Effect of soaking, germination, cooking on pulses, toxic constituents of pulses. Textured Vegetable Protein (TVP) - Vegetables and Fruits - Classification, composition and Nutritive value - methods to minimize the loss of nutrients, types of pigments.

#### **UNIT - IV**

Milk and milk products - Composition and Nutritive value, Principles of milk cookery, Milk protein, coagulation, problems in milk cookery. Effect of cooking and processing on milk - Meat - Nutritive value, methods of cooking, factors affecting

tenderness - organ meat - Fish - Classification, Nutritive value - selection, Methods of cooking - Poultry - Nutritive value, economic aspects. Principles and methods of cooking poultry - Eggs - Structure, composition, Nutritive value, selection - principles of egg cookery - uses of eggs in cookery, methods of cooking eggs.

## **UNIT - V**

Fats and Oils - Types - saturated, MUFA, PUFA, Hydrogenation - Invisible fats - uses of fat in cookery - factors affecting absorption of fats - smoking point - Rancidity - Spices and Condiments - Importance, composition and classification. Uses in Indian cookery - Sugar and Sugar Products - Jaggery - uses in Indian cookery - Stages of sugar cookery - Beverages - Classification, Nutritive value and uses - coffee, tea, cocoa.

## **COURSE OUTCOMES**

- Understand the food groups and their functions
- Acquire knowledge on different methods of cooking
- Apply process of different foods
- Use combination of foods in the development of food products
- Understand the principles of sensory analysis

## **REFERENCES**

1. Srilakshmi. B; Food Science, 6th edition, New Age International (P) Limited Publishers, 2015.
2. Shakunthala Manay. N; Shadakshara Swamy.M; Foods Facts and Principles, 3rd edition, New Age International (P) Limited Publishers, 2014.
3. Lillian Hoagland Meyer, Food chemistry, CBS Publishers and Distributors, 2004.
4. Arindam Ramaswamy, Elements of Food Science, Oxford Book Company, 2010.
5. Norman. N Potter, Joseph H. Hotchkiss, Food Science, 5th edition, CBS Publishers and Distributors, 1996.
6. Sivasankar. B; Food Processing and Preservation, PHI Learning Private Limited, 2011.

**ALLIED - 2**  
**PAPER - 3**  
**NUTRITIONAL BIOCHEMISTRY**

**COURSE OBJECTIVES**

- **To enable students to:**
- Define biochemistry and relation to Nutrition.
- Classify the protein based on amino acid.
- Outline the biosynthesis of fatty acid
- Describe the inborn errors of Metabolism.

**UNIT - I**

Introduction to biochemistry and relation to nutrition, carbohydrates - structural classification, metabolism of glucose - Glycolysis, krebs cycle, gluconeogenesis, glycogenesis, glycogenolysis, blood glucose maintenance and its regulation.

**UNIT - II**

Proteins - classification based on amino acid, primary, secondary and tertiary structure of proteins, hydrolysis of proteins, denaturation, precipitation and coagulation, deamination, transamination, decarboxylation - urea cycle.

**UNIT - III**

Lipids - chemical composition of fats, classification, metabolism - beta oxidation of fatty acids & bio-synthesis of fatty acids - ketone bodies, Ketogenesis and ketosis, cholesterol-biosynthesis.

**UNIT - IV**

Enzymes - classification, factors affecting enzyme activity, mechanism of enzyme action, enzyme inhibition, coenzymes and prosthetic group, isoenzymes,

**UNIT - V**

Elementary knowledge on inborn errors of metabolism with reference to carbohydrate - Fructosuria, Pentosuria, Galactosemia and Glycogen storage disease. Protein -albinism, phenylketonuria, alkaptonuria, maple syrup urine disease, Lipids - Gaucher's disease, Niemann - pick disease, Tay - sach's disease, Fabry's disease,

## **Course Outcomes**

- Understand the basic concepts of biochemistry
- Gain knowledge on metabolism of carbohydrate, protein and lipids
- Know the mechanism of enzyme action
- Understand the inborn errors of metabolism

## **References**

1. Lehninger, A.L, Biochemistry, worth publishers INC, New York, 2000.
2. Nutritional Biochemistry, 2nd edition Tom Bridt, Academic press 2006.
3. Ranganatha Rao, K, Text book of Biochemistry, Prentice Hall of India, New Delhi, (2000). .
4. Sathyanarayanan, U.,Chakrapani, U., Textbook of biochemistry, 3<sup>rd</sup> edition, books and allied (p) ltd kolkata, 2010.
5. Lehinger's Principle of Biochemistry (2000), Nelson and Cox.
6. Harper's Biochemistry - Rober K. Murray, Daryl K.Grammer, McGrawHill, Lange Medical Books ,2010

**SKILL BASED SUBJECT**  
**PAPER - 1**  
**BAKERY AND CONFECTIONERY**

**OBJECTIVES**

To enable the students to

- Understand basic concepts of baking.
- Discuss with the role of various major and minor ingredients in bakery products.
- Explain baking process and operation.
- Determine quality parameters of baking products.
- Formulate the icing and pasturing preparation.

**UNIT - I**

Introduction of bakery-definition, principles, types of baked and confectionary products. Major and minor equipment - required to start a small bakery unit. Major and minor ingredients-types, role in bakery

**UNIT - II**

Principals involved in the yeast products preparation, methods, Processing. Faults and remedies in baked bread, types of bread improvers.

**UNIT - III**

Principles and Methods involved in the preparation of cake, types of cake. Faults and remedies in baked cakes

**UNIT - IV**

Principles involved in cookies preparation, methods for mixing cookies, types, different between biscuits and cookies , Faults and remedies in baked biscuits and cookies

**UNIT - V**

Types and Preparation Methods Butter cream - royal icing - almonds paste (or) marzipan - fondant icing - gum paste (or) patellae - American frosting - water icing (or) glace icing - Types and preparation Methods Pastries -, short crust pastry - puff pastry - flaky pastry - philo (or) filo pastry - chore pastry - punish pastry , faults and their causes in making pastry .



### **Course Outcomes**

- Understanding about ingredients used for baking
- Gain knowledge about the appropriate preparation and presentation of baked products
- Understand preparation , type of icing and pastries products
- Able to plan to set up a bakery unit

### **REFERENCES**

1. Wayne Gisslen, The Professional Baking, Sixth Edition, Publishers John Wiley & Sons (2012).
2. Pat Sinclair, Basic Baking, Publisher Agate (2006).
3. John Kingslee, Professional Text to Bakery and Confectionary, First Edition, New Age International (P) Limited Publishers (2006).
4. Yogambal Ashokkumar, Theory of Bakery and Confectionery, Fifth Edition, PHI Learning Private Limited, New Delhi(2009).
5. William C, Practical in baking, 2000

## **NON-MAJOR ELECTIVE**

### **PAPER - 1**

#### **HEALTH AND FITNESS**

#### **OBJECTIVES**

To enable the students to

- Understand the importance of health and wellness.
- Outline the significance of nutrition and exercise.
- Gain knowledge related to sports nutrition
- Attain insight on the basic components of physical activity.
- Understand the principles of yoga and fitness.

#### **UNIT - I**

Definition of health and wellness - Factors affecting health and wellness. Physiological, psychological and social health.

#### **UNIT - II**

Definition, parameters of fitness, cardiovascular endurance, muscular strength, muscular endurance, physical fitness tests- for flexibility.

#### **UNIT - III**

Principles of yoga therapy, social skills and living value based education. Yogic concepts in various diseases like diabetes, CVD, digestion and immune system.

#### **UNIT - IV**

Simplified physical exercises and body stretching practices. Basic asanas, suryanamaskar, breathing exercise- pranayama

#### **UNIT - V**

Basic knowledge on sports nutrition, Basic and special nutritional needs for sea voyage, military and space

#### **Course Outcomes**

- Apply behavior change theories to assess and self -reflect on health and fitness status
- Apply and evaluate wellness concepts that promote health and wellness
- Explore activity options to maintain and/or improve lifelong health and fitness

## References

1. Werner W. K Hoejer (1989), Life time Physical Fitness and Wellness, Morton Publishing Company, Colorado.
2. Greenberg, S. J and Pargman, D (1989) Physical Fitness - A Wellness Approach Prentice Hall International (UK) Limited, London
3. Swaminathan T, (2018) Essentials of Food and Nutrition Bangalore Printing Publishing Co.
4. McArdle, W. D, Frank I. Katch, F. I and Victor L. Katch (1996) Exercise Nutrition: Energy Nutrition and Human Performance. William & Wilkin Publishing USA.
5. Mahan, K and Stump, E. S (1996) Krause Food and Nutrition and Diet Therapy W.B Saunders Company, USA.

**SEMESTER IV**  
**CORE PAPER - 4**  
**HUMAN NUTRITION**

**Course Objectives**

To enable the students to:

- Define dietary fibre and its role in human nutrition
- Determine the Energy requirement by various age groups.
- Understand the effect of lipid on health status.
- Classify the protein based on the quality.
- Describe the Role of vitamins and minerals.

**UNIT - I**

Basic concepts of Nutrient, Carbohydrates - Definition, Sources, requirements, Digestion and absorption and metabolism . Dietary fibre definition ,types-soluble and insoluble fibre, sources of fibre, physiological effects of dietary fibre, role of fibre in human nutrition, requirements. Water -functions, water compartment, regulation ,water balance, and disorders of water balance.

**UNIT - II**

Energy units , determination of energy value of foods using Bomb calorimeter, gross calorific values, Physiological energy value of foods, determination of energy requirement using direct calorimetry.RQ,SDA of food, indirect calorimetry - Basal metabolism - definition, determination, factors affecting BMR - determination of energy metabolism during work - energy requirements for various types of activities, recommended dietary allowances for energy for various age groups.

**UNIT - III**

Lipids - Definition, sources, requirements and functions. Digestion ,absorption and metabolism Essential Fatty Acids (EFA) - definition, functions, sources and effects of deficiency. , Protein - Definition, , sources, requirements and functions. Amino acids - Indispensable and dispensable amino acids - special function of amino acids - protein deficiency - Evaluation of protein quality - PER, BV, NPU, NPR, chemical score, mutual and amino acid supplementation of proteins.

**UNIT - IV**

Fat soluble vitamins and Water soluble vitamins - functions, deficiency, sources, requirements and hyper-vitaminosis.

## **UNIT-V**

Macro, Micro and Trace elements - functions, sources, requirements and deficiency.

Selenium and Vitamin E relationship, Chromium and glucose tolerance factor.

### **Course Outcomes**

- Apply knowledge of biochemistry and physiology to human nutrient metabolism
- Gain knowledge on the role of nutrition for health and wellness
- Able to find the functions of specific nutrients in maintaining health

### **References**

1. Shubhangini. A. Joshi; Nutrition and Dietetics III edition, McGraw Hill Education (India) private limited ,2015.
2. Srilakshmi.B; Nutrition Science, 15th edition, New Age International (P) Limited, Publishers, 2016.
3. Swaminathan. M; Advanced Text-Book on Food and Nutrition, Volume I 2nd edition. The Bangalore Printing and Publishing Co., LTD, Reprint 2015.
4. Sunetra Roday; Food Science and Nutrition, 2nd edition, Oxford University Press, 2013
5. Carol Byrd - Bredbenner; Wardlaw's perspectives in Nutrition, 9th edition MCGraw - Hill International Edition 2013

**CORE PRACTICAL II**  
**FOOD SCIENCE AND HUMAN NUTRITION**

**Course Objectives**

**To enable the students to:**

- Acquire knowledge on the techniques used in measurement of food stuff.
- Gain knowledge to Formulate different recipes using basic 5 food groups.
- Ability to prepare different types of beverages.
- Acquire skills to analyze the reducing sugar and Minerals present in the food materials

**A. FOOD SCIENCE RELATED PRACTIALS**

1. Technique in measurement of food stuff - use of standard measuring cups and spoons.
2. Different recipes from cereals, pulses, vegetables, fruits, fleshy foods, egg, milk and milk products.
3. Beverages - preparation of stimulating, nourishing and refreshing beverages
4. Fats and oils - preparation of shallow and deep fried foods.
5. Sugar cookery - preparing recipes at different stages of sugar cookery.

**EXPERIMENTAL COOKERY PRACTICAL**

1. Cereals

Microscopic study of different starches

- a. Methods of combining starch and boiling water
  - b. Study of effects of moist heat on starch
  - c. Preparation of white sauces and soups
  - d. Gluten formation
2. Pulses - Effect of hard and soft water, alkali and acid. Cooking time of grams and dhals.
  3. Vegetables - Effect of acids, alkali, covering, steaming and pressure cooking on the different pigments and acceptability of vegetables.
  4. Fruits - Study of different methods of preventing enzymatic browning of cut fruits, pectin content of fruits.
  5. Eggs - Coagulation of egg protein - factors. Egg white foam - effect of beating, sugar, acid and temperature.
  6. Milk cookery - Coagulation of milk protein, paneer, cooking of vegetables in milk
  7. Fats and oils - comparison of smoking temperature of some fats and oils.

8. Sugar and Jaggery - Different stages of crystallization of sugar.
9. General visit to food Industry and Factories

## **B.HUMAN NUTRITION**

1. Quantitative estimation of reducing sugar by Benedict's method
2. Quantitative estimation of calcium
3. Quantitative estimation of phosphorous.
4. Quantitative estimation of vitamin C.
5. Demonstration Experiments.
  - Estimation of total nitrogen in foods (Micro or Macro
  - kjeldahl method)
  - Lipid extraction
  - Demonstration of Iodine value
  - Estimation of Iron

### **Course Outcomes**

- Gain knowledge on various food groups, role of food items in Indian cookery
- Understand the changes taking place in nutrients while cooking
- Understand the techniques to minimize the nutrients losses while cooking
- Gain knowledge on qualitative and quantitative analysis on nutrients present in the given solution.

### **References**

- Varley, H., Gowenlak, A.H. and Hill, M. Practical Clinical Biochemistry, William Itinmaon Medical Books, London, 2000.
- Oser, B.L., Harke's Physiological Chemistry XIV Edition Tata McGraw Hill Publishing Company Ltd., Bombay, 2001
- Sadasivam, S. and Manickam, A. Biochemical Method, Second Edition, New Age International P. Ltd., Publishers, New Delhi, 2003.
- Raghuramulu, N., Madhavannair, K. and Kalyana Sundaram, National Institute of Nutrition, 2013, A Manual of Laboratory Techniques, Hyderabad, 500007

**ALLIED - 2**  
**PAPER - 4**  
**FOOD PRESERVATION**

**COURSE OBJECTIVES**

To enable the students to:

- Understand the principles of preservation.
- Acquire knowledge on the preservation by high osmotic pressure and concentration of salt.
- Understand various types preservation by using high and low temperature.  
Learn various types of preservation using chemicals and food irradiation.
- Compare and contrast the drying and dehydration.

**UNIT - I**

Principles and importance of food preservation, need for preservation, types of spoilage, role of micro organism in food spoilage, prevention of food spoilage, shelf life of food products, factors affecting shelf life.

**UNIT - II**

High concentration of sugar, Procedure for fruit jelly and jam, fruit preserves, failure to jelly and jam to set. Pickling and Curing of meat. Fermentation-.types, advantages and factors affecting.

**UNIT - III**

Factors affecting heat resistance, canning procedures, spoilage of canned foods, heat sterilization, pasteurization. Refrigeration - Advantages, factors to be considered, common spoilage - Difference between refrigeration and freezing, methods of freezing, steps involved in freezing, common food spoilage. Basic concepts of hurdle technology and membrane technology.

**UNIT - IV**

Chemical preservatives - definition, classification, mode of action, mechanism. Properties and safety of irradiation, advantages, mechanism permitted doses.

**UNIT - V**

Home drying, methods of dehydration, factors in the control of drying, treatment of foods before drying, procedures after drying, intermediate moisture foods, merits and demerits, factors affecting drying.

**Course Outcomes**

- Apply major food preservation techniques and principles
- Classify the various types of food spoilage
- Analyze and evaluate novel food processing methods



- Distinguish between chemical preservation and fermentation
- Identify and evaluate the suitability of processing for various foods

## REFERENCES

1. Srilakshmi. B; Food Science, 6th edition, New Age International (P) Limited Publishers, 2015.
2. Shakunthala Manay. N; Shadakshara Swamy.M; Foods Facts and Principles, 3<sup>rd</sup> edition, New Age International (P) Limited Publishers, 2014.
3. Subbulakshmi. G and Shobha. A.U; Food processing and preservation, New Age International (P) Limited Publishers, 2014.
4. Norman. N Potter, Joseph H. Hotchkiss, Food Science, 5th edition, CBS Publishers and Distributors, 1996.
5. Sivasankar. B; Food Processing and Preservation, PHI Learning Private Limited, 2011.

# ALLIED PRACTICAL

## NUTRITIONAL BIOCHEMISTRY AND FOOD PRESERVATION (Allied) Practical

### COURSE OBJECTIVES

#### To enable the students to:

- Determination of carbohydrates, protein and minerals - Qualitative tests.
- Classify the class I and class II food preservatives.
- Explain the Traditional methods of food preservation.

### A. NUTRITIONAL BIOCHEMISTRY

1. Identification of carbohydrates (Qualitative Tests)
2. Identification of proteins (Qualitative Tests)
3. Qualitative tests for minerals.

### B. FOOD PRESERVATION

1. Preservation of food items by the use of high and low temperatures.
2. Traditional methods of food preservation a) Drying b) Salting c) Changes during drying
3. Preservation of foods by the use of class I and class II Preservatives
4. Use of sorbic acid and sulphurdioxide as an antimicrobial preservatives.
5. Visit to Preservation Unit.

## **SKILL BASED SUBJECT**

### **PAPER - 2**

## **FOOD PRODUCT DEVELOPMENT AND MARKETING STRATEGY**

### **COURSE OBJECTIVES**

To enable the students to

- Develop new marketable, nutritionally and economically viable food products.
- Create entrepreneurship skills for setting up small scale food industries.
- Understand packaging of different food products.
- Analyze financial management and marketing food products.

### **UNIT - I**

Trends in Food Consumption pattern. Economical, Psychological and Sociological Dimensions of Food Consumption patterns. Trends in Social Change as a Base for New Product Development

### **UNIT - II**

Food Components, Types of Food Processing, Status of Food Processing Industry in India and Scope of Growth in Future ,Principles and Purpose of New Product Development, Product Design and Specifications.

### **UNIT - III**

Traditional Foods, Weaning Foods, Convenience Foods, RTE, RTS, Extruded foods, IMF Foods, Specialty Products, Health foods, Nutritional Supplements, Functional Foods, Nutraceuticals and Designer Foods, Sports Foods, Foods for Defence Services, Space foods.

### **UNIT - IV**

Standardization, Portion size, Portion Control, Quantity Cooking, Shelf Life Evaluation- Sensory and Microbial Testing of Processed Foods, Nutrient Analysis. Suitable Packaging Materials for Different Foods, SWOT Analysis

### **UNIT - V**

Institutional Support (Training and Finance) for Entrepreneurship Development. Financial Institutions (Central and State Government) banks/Funding Agencies, Financial Accounting Procedures, Book Keeping, Market Research, Marketing Strategies, Cost Calculation , Advertising Methods, Product sales, Product License, Legal specifications, Consumer Behaviour and Food Acceptance.

## **REFERENCES**

1. Sudhir Gupta (2007) Handbook of Packaging Technology, Engineers India Research Institute, New Delhi
2. Khanaka, S.S., Entrepreneurial Development, S. Chand and Company Ltd, New Delhi, 2006.
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4. Hmacfie,(2007) Consumer led Food Product Development, Weedhead Publishing Ltd., UK
5. Fuller, Gordon, W( 2005) New Food Product Development, 2<sup>nd</sup> Edition, CRC Press, Boca Raton, Florida.
6. Schaffner .D,J, Schroder , W.R.(2000)Food Marketing and International Perspectives, Web/McGraw Hill Publication

## **COURSE OUTCOME**

1. Apply the principles of quality assurance, and food safety to a food product design
2. Gain skills to develop a new food product
3. Produce elements of HACCP-based food safety program that is applicable to the production of a new food product
4. Work collaboratively with others on a major investigative project

**NON-MAJOR ELECTIVE  
PAPER - 2  
NUTRITION FOR THE FAMILY**

**COURSE OBJECTIVES**

To enable the non major students to:

- Understand the Classification of basic 5 food groups.
- Study the nutritional needs for special physiological conditions.
- Understand the types of supplementary foods

**UNIT - I**

Food groups - basic five, nutritional classification of foods - energy yielding, body building and protective foods - Basic principles of Meal planning - balanced diet - meaning, food guide pyramid.

**UNIT - II**

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

**UNIT - III**

Nutritional needs of pre-school children, factors to be considered while planning meals for pre-school children, food habits of preschool children.

**UNIT - IV**

Nutrition for School children and Adolescence - dietary guidelines, factors considered in planning packed lunch. School lunch feeding problems. Nutrition during Adolescence - general dietary guidelines; Dietary Problems (Eating Disorders)

**UNIT - V**

Nutritional needs of Adults and Old Age - dietary guidelines for adults. Nutrition during Old age - physiological changes in ageing, psycho-social factors affecting food intake. Nutrition modification in Diet.

**Course Outcomes**

- Able to classify food groups based their functions
- Understand weaning and supplementary foods for infants
- Able to plan and prepare packed lunch

## References

1. Mahan,L.K &Arin.M.T, “Krause’s Food,Nutrition and Diet Therapy”, 11th Edition, W.B. Saunder Company, London, (2000).
2. Seleststein. 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. .ICMR-Nutritive value of Indian Foods, National Institute of Nutrition, Hyderabad, (2019).

**SEMESTER V**  
**CORE PAPER – 5**  
**DIETETICS - I**

**COURSE OBJECTIVES**

To enable the students to:

- Understand the role of modified diet for prevention of diseases
- Understand the principles menu planning and serving therapeutic diet.
- Develop a skill to Calculate nutritive values of Therapeutic diet
- Develop a capacity to Plan and prepare therapeutic diet for ill health conditions.

**UNIT - I**

Definition, purpose and principles of a therapeutic diet, factors to be considered in the modification of normal diet into therapeutic diets. Types of hospital diet - Clear fluid, full fluid, soft, light, bland and regular diet. Special feeding methods - tube feeding, parenteral nutrition. Role of dietitian in managing hospital dietary.

**UNIT - II**

Prevalence, Types - Type-I, Type-II, Malnutrition Related Diabetes Mellitus, Gestational Diabetes Mellitus, Etiology, symptoms, nutritional requirements and dietary management of Diabetes Mellitus - (Glycemic Index, Food exchange list) and complications.

**UNIT - III**

Prevalence, Pathogenesis, Symptoms, risk factors and modification of diet in cardiovascular disease - Atherosclerosis, Hypertension and Hypercholesterolemia .

**UNIT - IV**

Host defense mechanisms causes and general dietary conditions of fevers - Symptoms and signs of Typhoid, Influenza, Malaria, Tuberculosis and pneumonia.

**UNIT - V**

Causes, Symptoms and Dietary management of Gastritis, Peptic ulcer, diarrhea, constipation, Ulcerative colitis, diverticulosis, Irritable Bowel Syndrome, malabsorption syndrome - Crohns Disease, Sprue/ Tropical Sprue, hemorrhoids, ulcerative colitis.

**Course Outcome**

1. Able to understand principles of diet therapy
2. Able to modify normal diet for therapeutic purpose

3. Understand the role of dietitian
4. Gain knowledge about etiology, risk factors and clinical features of various disease conditions

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### **References**

1. Shubhangini. A. Joshi; Nutrition and Dietetics, 3rd edition, McGraw Hill Education (India) Private Limited.
2. Srilakshmi . B; Nutrition Science, 15th edition, New Age International (p) Limited, publishers, 2016.
3. Swaminathan. M; Advanced Text-Book on Food and Nutrition, Volume I and II 2nd Edition, The Bangalore printing and publishing co., LTD, Reprint 2015.
4. Sunetra Roday; Food Science and Nutrition, 2nd edition, Oxford University press, 2013.
5. Carol Byrd - Bredbenner; Wardlaw's perspectives in Nutrition, 9th edition McGraw - Hill International Edition, 2013.



**CORE PAPER - 6**  
**NUTRITION THROUGH LIFE CYCLE**

**OBJECTIVES**

To enable the students to:

- Understand the importance of nutrition during life span.
- Develop a skill to plan and prepare a diet for various age group.
- Study the nutritional needs for physiological conditions.
- Develop a skill to prepare infant feeding formulas.

**UNIT - I**

Basic concepts of RDA for Indians, Purposes and requirement,. General concepts about growth and development through different stages of life and their energy and other nutrients for their growth and development.

**UNIT - II**

Rate of growth, weight as the indicator, Nutrition allowances for the infants. Breast feeding. Weaning foods for infants. Premature infant and their feeding, formulas. Lactose intolerance..Growth and development of preschool children, Food habits and nutrient intake of preschool children. Dietary allowances and supplementary foods. Malnutrition in pre school children. Feeding programmes for pre school children.

**UNIT - III**

Physical development, Nutritional status of school children, school lunch program, factors to be considered in planning a menu, food habits and nutritional requirement, packed lunch..Changes of growth characteristics of adolescents. Nutritional needs and nutritional problems of the adolescents (eating disorders).

**UNIT - IV**

ICMR Nutrient allowances, Dietary guidelines. Nutrition for adults. Basis for requirement - Common nutrition related problem of pregnancy, food plan for pregnant women. Lactation- physiology, hormonal control and reflex action, efficiency of milk production, composition of breast milk and problems encountered during breast feeding. Current scenario in the field of Nutrition in pregnancy and Lactation.

## **UNIT - V**

Nutrition allowances - Dietary Guidelines - Nutrition and work efficiency modifications in diet. Physiological changes in aging - psycho-social and economical factors affecting eating behavior. Effects of ageing on nutritional health.

### **Course Outcomes**

- Know about growth and development from infancy to adolescent
- Understand nutrition requirement during pregnancy and lactation
- Able to plan and prepare a menu for different age group based on RDA
- Able to fulfill the nutritional needs of various age groups

### **References**

1. Mahtab S.Bamji, Prasad Rao, N.Vinodini Reddy; Textbook of Human Nutrition, Second Edition Oxford and IBH Publishing Co. Pvt .Ltd, 2003.
2. Judith E. Brown., Nutrition Now, 2nd edition, West / Wadsworth west / Wadsworth, An International Thomson publishing company, 1998.
3. Nutrient Requirement and Recommend Dietary Allowances for Indians by Indian council of Medical research, National Institute of nutrition, Hyderabad.
4. Gordon. M. Wardlaw et.al; Contemporary Nutrition, 2nd edition, Publishing by Mosby, 2004.
5. William's; Nix; Basic Nutirrtion and Diet therapy, 14th edition, Publishing by Mosby, 2013.
6. Srilakshmi. B; Dietetics, 7th edition,New Age International (P) Limited Publishers, 2014.

**CORE PAPER - 7**  
**COMMUNITY NUTRITION**

**COURSE OBJECTIVES:**

**To enable the students to:**

- Understand role of Community Nutrition to maintain the health status
- Understand nutrition problems existing in the community.
- Develop a skill to assess nutritional status of the community
- Knowledge to apply nutrition policy and programs in alleviating nutritional problems.
- Inculcate the skills to deliver nutrition services.

**UNIT - I**

Nutrition and Health in National Development. Concept of Community, Types of Community, Factors affecting the health of community. Malnutrition - Etiology, symptoms, Prevalence of malnutrition, factors contributing to malnutrition - Under nutrition and Over nutrition, balance between food and population growth.

**UNIT - II**

Nutritional problems confronting our country - PEM - Prevalence, classification - Kwashiorkor and Marasmus - etiology, symptoms, pathological changes, biochemical changes. Prevalence, etiology, symptoms, prophylaxis programmes - Anaemia, IDD and Vitamin A deficiency

**UNIT - III**

Methods of assessment of Nutritional status - sampling techniques - identification of risk group. Direct methods- anthropometry, biochemical estimation, clinical, and diet survey. Indirect methods- Food balance sheet, Ecological parameter and vital statistics, use of growth chart.

**UNIT - IV**

Nutrition policy and programmes - National Nutrition policy - need for nutrition policy, policy strategies and their implementation - ICDS, Noon Meal Programme, FAO, WHO, UNICEF, CARE, ICMR, ICAR, CSIR, NIN, CFTRI, NGOs, National Nutrition surveillance system, National prophylaxis programmes for IDA, VAD and IDD,.

**UNIT - V**

Strategies to combat Nutritional problems- fortification, enrichment, supplementation and Immunization programmes. Nutrition Education - Meaning, Scope, Methods - Planning, conduct and evaluation of Nutrition education Programme.

## Course Outcomes

- Understand the role of interventions to enhance wellness in diverse individuals and groups
- Skills to develop an educational program for a target population
- Capable to formulate new food products for a target group
- Evaluate impact of nutritional awareness program on Nutritional and health status

## References

1. Park J.E. and park K. Text book of preventive and social medicine, Publications, 2014.
2. B. Srilakshmi, Nutrition Science New Age International (CP) Ltd, New Delhi, 2019.
3. Mahtab, S. Bamji, N. Pralhad rao, Vinodini Reddy, Text book of Human Nutrition, Oxford and IBIT Publishing co Pvt. Ltd, New Delhi, reprint 2009.
4. Dietary guidelines for Indians, ICMR, NIN, Hyderabad 2010.
5. Bamji, M.S, Prahalad Rao N, Reddy V, Textbook of Human Nutrition II Edition, Oxford and PBH publishing Co. Pvt. Ltd, New Delhi 2014.
6. Jelliffe, and Jelliffe D.B: Assessment of Nutritional Status of the community. World Health Organization.1986

**INTERNAL ELECTIVE**  
**PAPER - 1**  
**HOSPITAL FOOD SERVICE ADMINISTRATION**

**COURSE OBJECTIVES:**

To enable the students to:

- Define role of hospital food service administration.
- Develop skills to maintain medical records.
- Understand the management of resources in hospitals.
- Describe the principles of hospital management.
- Design hospital diets and housekeeping department.

**UNIT - I**

Hospital based health care and its changing scenario, Effects of globalization on health care, concepts of corporate hospitals in developing countries, infrastructure and lay out of an ideal corporate hospital, functioning of modern hospital and changing needs of patients.

**UNIT - II**

Patient Care Services, Patient Admission / discharge, cafeteria and dietary services, front office services, housekeeping services, blood bank, diagnostic services, lab, physiotherapy, pharmacy operation theatre, outpatient and inpatient ward -admission

**UNIT - III**

Principles of hospital management, managerial activities for effective hospital functioning duties and responsibilities of hospital managers, qualities of office managers, effective inter and intra departmental co-ordination, understanding functioning of corporate multi specialty hospital

**UNIT - IV**

Marketing and Material management, Human resource management, managerial accounting and financial management, importance of material management, principles of material management, inventory management. Types of computer systems used for reservation systems, point of sale systems (POS) and property management systems. (PMS)

**UNIT - V**

Hospitality in hospital care- management of dietary department, diet planning for hospital diets, purchasing, storage and quantity food production, patient compliance, food production, serving to patient- tray and trolley service, plate, waste management, washing and garbage disposal.

## **COURSE OUTCOME**

- Planning of menu to accommodate the nutritional, dietary and medical needs, cultural and religious requirements and personal preferences of clients
- Manage nutritional needs of diverse clients in healthcare and other food service settings in collaboration with or under the direction of health care professionals
- Promote food and nutrition services and healthy living to support marketing plans and the general well-being of clients

## **REFERENCES:**

1. Sudhir Andrews, Front Office Management and Operations, 2008, Tata Mc Graw - Hill Publishing Company Ltd.
2. Sakharka B M, Principles of Hospital Administration and Planning, 2009, 2nd Edition, Jaypee Brothers Medical Publishers (p) Ltd.
3. Sherry Glied and Peter Smith, The Oxford Handbook of Health Economics, 2011
4. Jan Abel Olsen, Principles in Health Economics and Policy, 2009, Oxford University Press.
5. Mohinder Chand, Managing Hospitality Operations, 2009, 1st Edition, Anmol Publications Pvt. Ltd. New Delhi.
6. Goel S.L, Health Care System and Hospital Administration, 2009, Vol.7, Deep and Deep Publications Pvt. Ltd.

# SKILL BASED SUBJECT

## PAPER - 3

### INTERNSHIP

#### OBJECTIVES

##### To enable the students to:

- Identify the nutrition related problems
- Understand the principles of menu planning
- Skills to Calculate nutritive value for planned diet
- Understand role of dietitian in planning, preparing and distribution of therapeutic diet.

#### Internship:

A phase of training where in a graduate is expected to conduct actual practice in a hospital industry for a period of 30 Days so as to acquire job oriented skills

#### Assessment:

Interns shall maintain a record book which shall be verified and certified by the training authority under whom he or she works during his/her internship period.

An objective evaluation of his/her knowledge, skills and attitude during training will be recorded by the center in-charge and monitored by faculty in-charge and marks shall be allotted accordingly.

Hospital authority	-	75
Internal Assessment & Viva Voce	-	25

#### Course Outcomes

- Gain skill in planning therapeutic diets
- Ability to be a health professional
- Apply the knowledge for diet counseling
- Competent to manage catering outlet
- Skills to imitate an entrepreneurship venture

**SEMESTER VI**  
**CORE PAPER - 8**  
**DIETETICS - II**

**COURSE OBJECTIVES**

To enable students to

- Knowledge to classify the principles of diet therapy and types of therapeutic diets.
- Develop attitude for taking up dietetics as a profession.
- Understand the concepts of food sensitivity and genetic disorder.
- Ability to classify the stages of HIV infections and medical nutritional therapy.
- Compare and contrast the modification of diet in obesity and underweight.
- Outline the disease of liver, gall bladder and pancreas.

**UNIT - I**

Etiology, clinical symptoms and modification of diet in disease of Liver and Gall bladder.

a) Hepatitis , b) Cirrhosis, c)Hepatic Encephalopathy d)Cholecystitis e) Cholelithiasis f) Pancreatic Surgery - Causes and Dietary Management.

**UNIT - II**

Etiology, Assessment of Obesity and modification of diet in Obesity and Underweight.

**UNIT - III**

Etiological factors, Etiology and modification of diet in disease of the Kidney- Glomerulonephritis, Nephrosis ,Acute and Chronic Renal Failure ,Dialysis ,Urinary Calculi.

**UNIT - IV**

Risk factors ,symptoms ,Nutritional problems of cancer therapy and modification of diet in cancer ,role of antioxidants in cancer. Stages of HIV Infections, Medical Nutritional Therapy.

**UNIT - V**

Types of reaction, symptoms, Diagnosis and treatment of food sensitivity. Symptoms and management of diet in phenylketonuria, Galactosemia , Fructosuria.

**Course Outcomes**

- Gain knowledge on the role of diet therapy for various disease conditions
- Apply the knowledge in planning preparation and distribution of therapeutic diets



for various disease conditions

- Enable to counsel related to the dietary management
- Equip to become a dietitian on hospital industries.

## References

1. Antia, F.P, Clinical dietetics and Nutrition ,4th Edition, Oxford University Press, Delhi,2012.
2. Joshi, S.A, Nutrition and Dietetics,2<sup>nd</sup> edition, TATA McGraw Hill publications, New Delhi.2018.
3. Mahan,L.K.,Arlin.M.T.,Krause's,Food,NutritionandDietTherapy,11<sup>th</sup>edition, W.B.Saunders Company, London ,2010..
4. Raheena Begum, A Text Book of Foods, Nutrition and Dietetics, Sterling Publishers, New Delhi.
5. National Institute of Nutrition, Dietary Guidelines for Indians - A Manual, Hyderabad, 2005
6. Srilakshmi. B, Dietetics, 5<sup>th</sup> Edition, New Age International (P) Ltd, Publishers, Chennai, 2018

**CORE PAPER - 9**  
**FOOD SERVICE MANAGEMENT**

**Course Objectives**

**To enable the students to:**

- Explain functioning of different types of food service institutions.
- Able to understand the types of kitchen and kitchen layout
- Understand the space allocation and arrangement of food service units.
- Develop a skill on the concept of quantity food cookery
- skills in effective utilization of resource management in food service industry.

**UNIT - I**

Food service industry- Definition - types of catering- Hotel, Motel, Restaurant, Cafeteria and chain hotels. Welfare - Hospital, School lunch, Residential establishment and Industrial catering - Transport - Air, Rail, Sea and Space, Miscellaneous - Contract and outdoor.

**UNIT - II**

Layout of kitchens, types of kitchens - Planning of Receiving preparation, storage and service area with relevant too spacing Food purchase- Procedures and Factors involved in the selection of food.

**UNIT - III**

Quantity food service- Definition, objectives, styles of service- waiter service, self - service, vending. Mechanics of waiter service. Equipment- Classification, factors involved in selection, use and care of major equipments, traditional and modern equipment - Menu planning- Origin of menu, importance of menu planning. Types of menu- table d'hote menu, a la carte, Dujour, theme, static, cycle. French classical menu. Use of menus, construction of menus, Menu Design, Factors affecting menu planning. Standardisation of Recipes and portion control.

**UNIT - IV**

Management- Definition, principles, Functions and tools of management, qualities of a good leader, styles of leadership - Resource management - Money, Time, Energy, Computer applications in menu planning.

**UNIT - V**

Personnel management- Recruitment, selection and induction. Financial management- Cost control- methods of food cost control, Book- keeping; advantages of the double entry system. Sanitation and safety - Sanitation of Plant and Kitchen Hygiene, Personal Hygiene, First aid principles and practice, Health and Safety at work. Use of fire extinguishers.

## **COURSE OUTCOMES**

- Establish a food service unit
- Manage human resources and solve problems with remedial measures
- Analyze and implement quality control in food service institution
- Promote the product in the market

## **REFERENCES**

1. Kaufman,R. Mega planning- Practical tools for Organisational Success, Sage Publications Inc, 2000.
2. Shring Y, P. Effective Food Service Management, Anmol publications Pvt Ltd,New Delhi, 2001. 3. Stephen, B, , Williams, S, R, “Bill Jardine, and Richard, J, N, Introduction to Catering,
3. Ingredients for Success, Delmar- Thomson learning, 2001.
4. Yadav, C, P. Management of Hotel and Catering Industry, Anmol publications Pvt
5. Ltd and Institute of sustainable development, Lucknow, New Delhi, 2001
6. Mohini Sethi and Surjeet Malham, “ Catering Management - an integrated approach”, 2<sup>nd</sup> edition, Wiley Eastern Limited, New Delhi, Reprint 2007.

**CORE PAPER - 10**  
**HUMAN DEVELOPMENT AND COUNSELLING**

**COURSE OBJECTIVES:**

To enable the students to

- Understand the concept of growth and development
- Acquire knowledge on prenatal development
- Study the prenatal and postnatal care.
- Learn the physical, cognitive and social development
- Develop a skills to outline children with special needs

**UNIT - I**

The concept of development and growth - principles governing growth and development, developmental tasks of different stages. Stages of Life span - conception, infancy, early childhood, late childhood, adolescence, adulthood, middle age and old age.

**UNIT - II**

Prenatal Development - Conception, test tube baby, Periods of prenatal development - signs of pregnancy. Prenatal care - Management of normal pregnancy - hygiene, diet and medical supervision and hazards during pregnancy. Labor - signs of labor, stages of labor - types of birth, multiple pregnancy. Post-natal care, prevention of gynecological complications. Adjustment of the newborn to temperature, breathing, feeding and elimination.

**UNIT - III**

Infancy (Birth to 2 years) - Development - physical and motor, social, emotional, cognitive and language, Minor ailments. Effect of stimulation - care of infants, feeding, toilet training, bathing, clothing, sleeping and immunization, prevention of accidents, importance of mothering and emotional growth. Importance of psychological needs.

**UNIT - IV**

Early childhood (preschool stage 2 - 6 years) - Physical and motor development, emotional, social, cognitive and language development, creativity, importance of play, importance of family relationship, behavior problems - causes and treatment. Importance of preschool education. Late childhood (Elementary school period 6 - 12 years) - Developments - physical, social, emotional, cognitive and language. Sex Education. Children with special needs - identification and rehabilitation.

## **UNIT - V**

Adolescence (12 - 18 years) Physical, emotional, intellectual and motor development, personal adjustment and maladjustment. Delinquency - causes, prevention and rehabilitation. Drug addiction and alcoholism - rehabilitation. Adulthood (18 - 60 years) - Characteristics and developmental tasks. All aspects of development and vocational development. Old age (60 years and above) - Physical and psychological changes, problems of the aged, family attitude towards the aged, place of the aged in Indian society.

### **COURSE OUTCOME**

1. Understand the principles of studying growth and development
2. Recognize the eight stages of human life span
3. Know the concept of prenatal and postnatal care
4. Understand the physical and psychological changes in old age

### **REFERENCES**

1. Devadass, R.P; Jaya, N. A Text Book on Child Development, Macmillan Indian Ltd., Delhi, 1996.
2. Mussen et al. Child Development and personality, Harper and Row publishers, New York, 1990.
4. Suriakanthi. A. Child Development, Swagath Fine Auto, Sivakasi, 1991.
5. Suriakanthi, A. A Handbook on Human Development, Gandhigram Rural University, Gandhi gram, 1992.
6. Hurlock, E.B., (1995): Developmental Psychology-A life span approach, 5th Edition, McGraw Hill Book Co., New York.
7. Nanda V.K., (1998): Principles of Child Development, Anmol Publications Pvt. Ltd., New Delhi.

## **CORE PRATICAL - III**

### **DIETETICS-I & NUTRITION THROUGH LIFE CYCLE PRACTICAL**

#### **DIETETICS-I**

Planning and preparing of diets for the following conditions/ stages.

1. Clear fluid, full fluid and soft diet.
2. Diet in fever - Typhoid, tuberculosis.
3. Diet in atherosclerosis and hypertension.
4. Diet in ulcer, diarrhea and constipation.
5. Diet in diabetes mellitus with and without insulin.

#### **NUTRITION THROUGH LIFE CYCLE PRACTICAL**

1. Menu planning and food exchange list.
2. Nutritional and food requirements to meet the needs of the following.
  - a. Infant and Children
  - b. School children
  - c. Adolescent
  - d. Adult
  - e. Old people
3. Nutritional and food requirements to meet the physiological conditions of
  - a. Pregnancy.
  - b. Lactation .

## **CORE PRACTICAL - IV**

### **A. FOOD SERVICE MANAGEMENT**

1. Visit to well-organized food service units  
Hostel, hotel, restaurant, Industry, hospital Transport.
2. Table setting and service-appraising and drawing silver cutlery and crockery Folding of Napkins - Laying of table cloth, table mats - Arrangement of cover and table - appointment according to the menu - serving food at the table clearing of the table.
3. Standardization of any 3 selected quantity recipes and their preparation. Calculation of nutritive value, cost per serving - size of serving.
4. Quantity Cookery: Preparation of South Indian, North Indian and Western menu for 25 members.
5. Organizing, preparing and serving of one special meals for 50 members.

### **B. DIETETICS - II**

Planning and preparing of diets for the following conditions / stages.

1. Diet in obesity and underweight.
2. Diet in hepatitis and cirrhosis of liver.
3. Diet in Nephritis and Nephrosis.
4. Diet in Cancer.
5. Dietary internship program for a month.

**INTERNAL ELECTIVE**

**PAPER - 2**

**FOOD STANDARDS AND QUALITY CONTROL**

**COURSE OBJECTIVES**

To enable the students to:

- Study the government regulation in quality control.
- Enable to classify food standards.
- Know about the consumer protection Act.
- Ability to design the company quality Assurance program.
- Knowledge to describe food hazards and food adulteration.

**UNIT - I**

Quality Control: Objectives, Importance, functions of quality control, stages of quality control in food industry. Food Quality Assurance: Design of company quality assurance program, Microbiological concerns. Managing quality in supply chain and marketing of food products.

**UNIT - II**

Government Regulations In Quality Control: FAO/WHO codex Alimentarius commission, PFA, AGMARK, BIS, FPO, fair average quality (FAQ) specification for food grains, ISO 9000 series. HACCP: Background, current status, structured approach, principles, benefits and limitation. Consumer Protection Act (CPA)

**UNIT - III**

Food Standards: Cereals and products - bread, biscuits, cakes products. Food Packaging: Food packaging and labelling various methods. Recent trends in Packaging and labelling. Fruits Products: Jam, juices, squashes, ketchup, sauce. Oils and Fats: Coconut oil, groundnut oil, palm oil, sunflower oil, vanaspati. Milk and Products: Skimmed milk powder, partly skimmed milk powder, condensed sweetened milk. Other products - coffee, tea, sugar, honey, toffees.

**UNIT - IV**

Food Safety: Meaning of food safety. Importance of Food Quality and safety for developing countries. Patent: Definition, requirements, patent law in India, administrator, need for patent system, advantages, precautions to be taken by applicants, patent procedures, non-patentable.



## **UNIT - V**

Food Hazards: Physical, Chemical, Biological hazards associated with food types. Effect of processing and storage on microbial safety. Food Adulterator: Adulteration of food - common adulterants and tests detect common adulterants.

### **Course Outcomes**

- Understand the specification and standards for different products
- Comprehend the knowledge gained on food laws and food safety regulations at regional and national level
- Monitor and evaluate food laws and standards in food service industry
- Acquire knowledge on food hazards and food adulteration

### **References**

1. Sivasankar, B. (2013) Food Processing and preservation 2<sup>nd</sup> edition, prentice Hall, Pvt, Ltd.
2. Srilakshmi, N., Food Science, New Age International Private Ltd., New Delhi, 2002.
3. Swaminathan, M., Food Science, Chemistry and Experimental Foods, Bappco Publishers, Bangalore, 2014.
4. Chandrasekhar, U, Food Science and Applications in Indian Cookery, Phoenix Publishing House Private Ltd., New Delhi, 2012..
5. Sommers, C.H. and Xveteng Fan, Food Irradiation Research and Technology, Blackwell Publishing, 2016.

**INTERNAL ELECTIVE**

**PAPER - 3**

**NUTRACEUTICALS AND NUTRIGENOMICS**

**COURSE OBJECTIVES**

To enable the students to:

- Learn to define Nutraceuticals and nutrigenomics. Understand the role of dietary supplements and nutraceuticals in health and disease.
- Knowledge to classify the probiotics and prebiotics.
- Acquire knowledge for the application of nutrigenomics in health and disease.

**UNIT - I**

Definition of functional and traditional foods, nutraceuticals, designer foods and pharma foods, history of functional foods, components of functional foods, foods containing nutraceuticals and classification of nutraceuticals - based on plant sources, mechanism of action and chemical nature

**UNIT - II**

Concept of dietary supplements, sources and functions of phytochemicals with suitable examples, FOSHU foods - concepts, regulatory aspects

**UNIT - III**

Human gastrointestinal tract and its microbiota, functions, concept of probiotic, prebiotics and symbiotics; applications of probiotics in human nutrition

**UNIT - IV**

Definition of nutrigenomics, gene expression - transcription, translation, post translational modification, nutrition in the omics era- elementary concepts on epigenetics, transcriptomics, proteomics, metabolomics; genetic variation and nutritional implications

**UNIT - V**

Nutrient control of gene expression - amino acids, nucleotides, basic concepts of nutrigenomics and complex diseases - diabetes, cancer and obesity

**Course Outcome**

- Understand the developments in the field of nutraceuticals and nutrigenomics
- Comprehend the components of functional foods and foods containing nutraceuticals
- Know the importance of probiotics and prebiotics in human health

- Understanding the effects of nutrients in molecular level in the body and the effect of phytochemicals in disease in disease conditions
- Articulate and advocate the principle of nutrigenomics in controlling life style disease

### **References**

1. Mahtab, S, Bamji, Kamala Krishnasamy, G.N.V. Brahmam, Text Book of Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi, 2009.
2. Srilakshmi, B. Second Edition, Food Science, New Age International (P) Limited Publishers, New Delhi, 2010.
3. Simopoulos, A.P. and Ordovas, K.J.M., 2004, Nutrigenetics and Nutrigenomics, Vol. 93, Karger, Switzerland.
4. Watson, David, H., 2003, Performance Functional Foods, CRC Press, Wood Head Publishing Ltd., England  
Narasinga Rao, B.S., 2005, Nutrition Research in India - A Country Report, Published by INSA, New Delhi.
5. Webb, G.P., 2006, Dietary Supplementations and Functional Foods, Blackwell Publishing Ltd., New York.

**SKILL BASED SUBJECT IV**  
**PAPER - 4**  
**PERSPECTIVES OF HOME SCIENCE**

**COURSE OBJECTIVES**

To enable the students to:

- Understand the concept and scope of Home science and its components.
- Explain the job opportunities in home science.
- Create new design in home science.
- Outline balanced diet for various age group.
- Describe human development.

**UNIT - I**

Meaning of Home Science Education- Philosophy of Home and Family- Components of Home Science-Career Perspectives- Its Relation to other Disciplines- Science and Humanities. The Home Science Association of India- History and Objectives, Achievements of the Association- Representation in National Bodies

**UNIT - II**

Concept of Interior Design-Importance of Good Taste, Components of an Artistic Interior- Resource Classification, Methods of Conserving Energy, Importance and Type of Goals, Values- Types, Value to be Imbibed by Youth - Fiber-Classification: Nature. Synthetic, Yarn-Definition, Types- Ply, Cable, Novelty, Fabric: Construction Method- Weaving Basic Steps, Knitting and its Importance, Nonwovens and Types, Clothing: Origin, Clothing Theory, Selection of Clothing, Clothing Budget, Laundering and Storing-Cotton, Wool, Silk and Delicate Fabrics - Basic concepts of Home management and steps - Basic Characteristics of Resources, Decision making, Work simplification.

**UNIT - III**

Meaning, Definition, Objectives, Philosophy, Principles of Extension Education, Extension as the Third Dimension of Higher Education, Home Science Extension Service at Various Levels- Village, Block and District Level, Role of Home Science Extension in Rural And National Development- Welfare Programme- National, Social Assistance Programme (NSAP) - Member of Parliament Local Area Development Scheme (MPLADS), Member of Legislative Assembly Area Development Scheme (MLAADS), Rajiv Gandhi Rehabilitation Package (RGAP), Mahatma Gandhi National Rural Employment Scheme (MNRES)

**UNIT - IV**

Conception-Pre Natal Development, Pre and Post Natal Care, Growth and Development during Childhood and Adolescence, Characteristics of Adulthood, Characteristics and Problems of Elderly and Emerging Trends in Parenting.

**UNIT - V**

Classification of Foods according to Function and Origin, Food Groups- Balanced Diet- Meaning and Importance of Balanced Diet, Meal Planning, Macro and Micro Nutrients of Foods- Introduction of Dietetics- Principles of Diet Therapy - Aims, Objectives and Classification of Commercial and Non Commercial Food Service- Operations and Functioning of Commercial and Non Commercial Food Service, Indian Cuisines and their Features, Setting up a Cover and Simple Service.

**Course Outcomes**

- Identify good design , list their goals and values, set their standards
- Enlist the principles of diet therapy and functioning of food service institution
- Comprehend the key aspects of human growth and development and realize the importance of mastering developmental tasks of each life span stage
- Understand the concept of extension education and its importance

**References**

- Jaliha, K.A and Veerabhadran , V. 2007, Fundamentals of extension education and management in extension , concept publishing company, New Delhi.
- Premalatha, M., 2007, Text book of Home Science, Kalyani Publishers, Chennai
- Pundit, N, 2007, Text book of Fashion Technology - Today, Tomorrow, Mittal publication, New Delhi
- Parker, R. Introduction to food Science, Delmer, Thomson Learning Co., Delma, 2000
- Potter, N. and Hotchkiss, J.H. Food Science, 5<sup>th</sup> Ed., CBS Publications and Distributors, Daryaganji, New Delhi, 1998

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