B. Sc. Food Science & Nutrition

Syllabus

AFFILIATED COLLEGES

Program Code: 22N

2020 – 2021 onwards

BHARATHIAR UNIVERSITY

(A State University, Accredited with "A" Grade by NAAC,
Ranked 13th among Indian Universities by MHRD-NIRF,
World Ranking: Times -801-1000,Shanghai -901-1000, URAP - 982)

Coimbatore - 641 046, Tamil Nadu, India

Program Educational Objectives (PEOs)	
The **B.Sc., Food Science and Nutrition** program describe accomplishments that graduates are expected to attain within five to seven years after graduation	
PEO1	Our graduates will have successful Professional carriers in Food Industry, Hospital Sector, Govt sector and also academicians.
PEO2	Our graduates will be active members ready to serve the society locally and Nationally
PEO3	Being a dietitians graduates involved in social work helps the people to recognize the importance of food and teach them to take the diet foods to get the nutritive value of food
PEO4	Our graduates will continue to learn and do researches through the advanced Technologies
PEO5	Graduates are trained to demonstrate creatively develop innovative ideas and to work in teams to accomplish a common goal

Program Specific Outcomes (PSOs)	
After the successful completion of B.Sc., Food Science and Nutrition program, the students are expected to	
PSO1	Identify and explain nutrients in foods and the specific functions in maintaining health.
PSO2	Know the chemistry underlying the properties and reactions of various foods Components
PSO3	Use the nutrition care process to make decisions, to identify nutrition related problems and determine and evaluate nutrition interventions.
PSO4	Identify equipment required for basic sewing skills.
PSO5	Explain the spoilage and deterioration mechanisms in foods and methods to control deterioration and spoilage.
PSO6	Explain the principles and current practise of processing techniques and the effects of processing parameters on product quality.
PSO7	Discuss basic principles of common food preservation methods.
PSO8	Explain the properties and uses of various packaging material.
PSO9	Apply knowledge of biochemistry and physiology to human nutrition metabolism.
PSO10	Apply the principles of human resource management to different situations.

Program Outcomes (POs)	
On successful completion of the B. Sc. Food Science and Nutrition program	
PO1	**Academic Excellence:** Develop Professional skills in food, nutrition, textiles, product making and human development
PO2	**Scientific Knowledge:** Utilize knowledge from the physical and biological sciences as a basis for understanding the role of food and nutrients in health and disease process
PO3	**Understand:** Understand and appreciate the role of interdisciplinary sciences in the development and well being of individuals, families and communities
PO4	**Thinking Skills:** Ability to critically think, analyze, evaluate and create new knowledge and skills both in the chosen discipline and across other fields like Food Processing and Preservation, Food Packaging, Community nutrition
PO5	**Modern Tool Usage:** Create, Select and apply appropriate techniques resources and modern technology using industry 4.0
PO6	**Communicative Skills:** Communicative effectively on Food Science & Technology activities with society at large and able to write effective reports and documentation and also to participate in public discourse on varied themes.
PO7	**Life Long Learning:** Recognize the need and ability to learn and relearn knowledge in the context of technological change
PO8	**Civic and Social Responsibility:** Ability to function as a matured democratic citizen as a dietitian to formulate their own personalized product, As a public educator and also as a freelancer
PO9	**Professional Development:** The programme provides basic understanding of the correlation between food and health and also understanding the role of food under specific diseased conditions.
PO10	**Quality Research:** Ability to design and carryout independent research, to update oneself with current research trends and to evaluate research contibution

BHARATHIAR UNIVERSITY: COIMBATORE 641 046
B.Sc., FOOD SCIENCE AND NUTRITION Curriculum (University Department)
(For the students admitted during the academic year 2020 – 21 onwards)

Course code	Title of the Course	Credit	Hours		Maximum Marks		
			Theory	Practical	CIA	ESE	Total Marks
FIRST SEMESTER							
11T	Language – I	4	3	-	25	75	100
12E	English – I	4	3	-	25	75	100
13A	Core paper – I Food Science	4	3	-	25	75	100
13B	Core paper – II Chemistry of Foods	4	3	-	25	75	100
13P	Core practical – I Food Science Practical	2	-	3	20	30	50
1AH	Allied A: Chemistry I	3	3	-	20	55	75
	Allied Practical – Chemistry	-	-	-	-	-	-
1FA	Environmental Studies #	2	-	-	-	50	50
	Total	**23**	**15**	**3**	**140**	**435**	**575**
SECOND SEMESTER							
21T	Language – II	4	3	-	25	75	100
22E	English – II	4	3	-	25	75	100
23A	Core paper – III Human Physiology	4	3	-	25	75	100
23P	Core practical – II Human Physiology Practical	2	-	3	20	30	50
23B	Core paper – IV Principles of Nutrition	4	3	-	25	75	100
2AH	Allied A: Chemistry II	3	3	-	20	55	75
2PH	Allied Practical – Chemistry	2	-	3	20	30	50
2FB	Value Education – Human Rights #	2	3	-	-	50	50
	Total	**25**	**18**	**6**	**160**	**465**	**625**
THIRD SEMESTER							
31T	Language – III	4	3	-	25	75	100
32E	English – III	4	3	-	25	75	100
33A	Core paper – V Nutrition in Health	4	3	-	25	75	100
33P	Core practical – III Family Meal Management	2	-	3	20	30	50
3AC	Allied B: Bio Chemistry I	3	3	-	20	55	75
	Allied Practical - Bio Chemistry	-	-	-	-	-	-
3ZA	Skill based subject 1- Textile Science and Basic sewing	3	3	-	20	55	75
3FC	Tamil @/Advanced Tamil# (OR) Non-major elective - 1(Yoga for Human Excellence)#/Women's Rights#	2	3	-		50	50
	Total	**22**	**18**	**3**	**135**	**415**	**550**

FOURTH SEMESTER							
41T	Language – IV	4	3	-	25	75	100
42E	English – IV	4	3	-	25	75	100
43A	Core Paper VI – Clinical Nutrition and Dietetics	4	3	-	25	75	100
43P	Core Practical – IV Dietetics Practical	2	-	3	20	30	50
4AC	Allied B: Paper II-Bio-Chemistry –II	3	3	-	20	55	75
43Q	Allied Practical – Bio-Chemistry	2	-	3	20	30	50
4ZB	Skill based Subject 2 - Interior Design	3	3	-	20	55	75
4FE	Tamil @/Advanced Tamil#(OR) Non-major elective –II (General Awareness)	2	3	-	-	50	50
	Total	**24**	**18**	**6**	**155**	**445**	**600**
Semester V							
53A	Core Paper VII Food Microbiology	4	3	-	25	75	100
53B	Core Paper VIII Post Harvest Technology	4	3	-	25	75	100
53C	Core Paper IX Community Nutrition	4	3	-	25	75	100
53P	Practical V- Nutrition Practical	2	-	3	20	30	50
53Q	Practical VI - Computerized Database Management In Home Science	2	-	3	20	30	50
5EA/ 5EB	Elective I	3	3	-	20	55	75
5ZC	Skill based Subject 3- Food Safety and Quality Control	3	3	-	20	55	75
	Total	**22**	**15**	**6**	**155**	**395**	**550**
Semester VI							
63A	Core Paper X – Food Service Management	4	3	-	25	75	100
63B	Core Paper XI – Food Preservation and Processing	4	3	-	25	75	100
6EA/ 6EB	Elective – II	3	3	-	20	55	75
6EC/ 6ED	Elective – III	3	3	-	20	55	75
63P	Practical VII: Food Preservation and Quality Control	3	-	3	30	45	75
6ZD	Skill Based Subject 4- Health, Fitness and sports nutrition	3	3	-	20	55	75
6ZA	Skill Based Subject 5- Dietary Internship report and viva	2	-	-	50	-	50**
67A	Extension Activities@	2	-	-	50	-	50
	Total	**24**	**15**	**3**	**240**	**360**	**600**
	Grand Total	**140**	**99**	**27**	**985**	**2515**	**3500**

** One month internship in Dietary Department in the summer vacation after II year of study. For Viva: 10 marks and report: 40 marks.

@ No University Examinations. Only Continuous Internal Assessment (CIA) # No Continuous Internal Assessment (CIA). Only University Examinations.

First Semester

Course code	13A	TITLE OF THE COURSE	L	T	P	C
Core I		FOOD SCIENCE	60 hrs			4
Pre-requisite			Syllabus Version			2020 -21

Course Objectives:

The main objectives of this course are to:

1. Obtain knowledge of different food groups and their nutritive value and role in day's diet.
2. Understand the principles underlying Food Preparation.
3. Develop skill and techniques in Food Preparation with conservation of nutrients and Palatability using cooking methods generally employed.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	To gain knowledge on food groups and its function, food pyramid and understanding cooking methods and evaluate sugar cookery.	K2
2	To gain knowledge on nutritive value, understand the cookery concepts involved in cereals and pulses.	K2
3	To get clear ideas about nutritional classification and understand the changes in pigments of fruits and vegetables apply knowledge on preparation of beverages.	K3
4	To have an overview of the composition, nutritive value and develop skills in the preparation of milk and egg product and determine the smoking point of any cooking oil	K5
5	To understand the structure, nutritive value, selection and apply knowledge on methods of cooking fleshy foods and evaluate the uses and abuses of spices and condiments.	K3

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	INTRODUCTION TO FOODS	10 hours

Food group: Basic 4, 5and7 food groups; functional food groups-energy yielding, body building and protective foods (only sources and not properties and functions), food pyramid.

Study of various cooking methods - Boiling, steaming, stewing, frying, baking, roasting, broiling, cooking under pressure.

Sugar Cookery: Stages of sugar cookery, crystallization and factors affecting crystallization.

Unit:2	CEREALS AND PULSES	12 hours

Cereals– Cereals - composition of rice, wheat, effects of cooking on parboiled and raw rice, principles of starch cookery, gelatinization.

Pulses-Varieties of pulses and grams, composition, nutritive value, cooking quality of

pulses, germination and its effect.		
Unit:3	**VEGETABLES, FRUITS AND BEVERAGES**	**12 hours**
Vegetables - Classification, composition, nutritive value, selection and preparation for cooking, methods and principles involved in cooking. **Fruits** -Composition, nutritive value, changes during ripening, methods and effects of cooking, enzymatic browning. **Beverages** - Classification, nutritive value, milk based beverages- methods of preparing tea and coffee, fruit based beverages and preparation of carbonated non – alcoholic beverages.		
Unit:4	**MILK AND EGG PRODUCTS, FATS AND OILS**	**12 hours**
Milk - Composition, nutritive value, kinds of milk, pasteurization and homogenization of milk, changes in milk during heat processing, preparation of cheese and milk powder **Egg** - Structure, composition, selection, nutritive value, uses of egg in cookery, methods of cooking, foam formation and factors affecting foam formation. **Fats and Oils** - Types of oils, function of fats and oils, shortening effects of oil, smoking point of oil, effect of heat on oil absorption and factors affecting absorption of oil.		
Unit:5	**MEAT AND MEAT PRODUCTS, POULTRY ,SPICES AND CONDIMENTS**	**12 hours**
Meat and meat products -Structure, composition, nutritive value, selection of meat, post mortem changes in meat, aging, tenderness, methods of cooking meat and their effects. **Poultry** – Types, composition, nutritive value, selection, methods of cooking Fish - Structure, composition, nutritive value, selection of fish, methods of cooking and effects. **Spices and Condiments** - Uses and abuses.		
Unit: 6	**CONTEMPORARY ISSUES**	**2 hours**
Webinar on milk and dairy products processing with some brief introduction on meat processing		
	Total Lecture hours	**60 hours**

Text Book(s)	
1	Srilakshmi, B., Food Science, (2016), 5th edition, New Age Publishers, India, New Delhi.
2	Many, S and Shadaksharaswami, M. (2008) Food: Facts and Principles, 3rd edition, New Age Publishers
Reference Books	
1	Swaminathan, M., (2012) Food science, Chemistry and Experimental foods, Bangalore Printing and Publishing Company.
2	Potter M,N. and Hotchkiss, J.H. (1998) Food Science 5th edition, CBS Publications and Distributors, Daryaganji, New Delhi.
3	Philip, T., Modern Cookery for teaching and trade, volume I and II, Orient Longmans Ltd.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	www.nal.vsda.gov/fnic/foodcomp
2	www.fda.gov-vegetables

3	http://www.eatforhealth.gov.au-fleshfoods,egg&milk
4	https://www.business.qld.gov.av-sensoryanalysis of food products
5	https://youtu.be/oE8YV2zlO8M
Course Modified By: Dr. G.Suba	

Mapping with Programme Outcomes										
Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	M	M	S	M	M	S	S
CO2	S	S	M	S	M	S	M	M	M	S
CO3	S	M	M	M	M	S	M	M	M	S
CO4	S	M	S	S	M	S	M	M	M	S
CO5	S	M	S	S	M	S	M	M	M	S

*S-Strong; M-Medium; L-Low

Course code	13B	TITLE OF THE COURSE	L	T	P	C
Core – II		CHEMISTRY OF FOODS	45			4
Pre-requisite			Syllabus Version		2020 -21	

Course Objectives:

The main objectives of this course are to:

1. Understand relationship between the structure and functional properties of food
2. Improve the nutritional, safety and organoleptic aspects of food
3. Types of colloids and their nature and properties of water

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Understand the physical and chemical properties and reactions in food	K2
2	To gain knowledge on colloidal systems in food and properties of sols and gels and apply knowledge on gel formation	K3
3	To have a clear idea on meaning, types and analyze properties of emulsion and foams	K4
4	To have an overview on water and its properties	K1
5	Apply knowledge on various methods of heat transfer mechanisms used in cooking.	K3

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	INTRODUCTION TO FOOD COMPONENTS	9 hours

Food components Food**,** nutrients principle components of foods, functions of foods, classification of foods, properties of foods, physical, chemical, functional and kinetic properties. Enzymatic and non-enzymatic browning reactions in foods, rancidity – types and prevention.

Unit:2	COLLOIDAL SYSTEM	7 hours

Colloidal system in foods – meaning, types, properties. Sols – meaning, types, properties: gels – meaning, type, properties, theory of gel formation, factors influencing gel formation.

Unit:3	EMULSION AND FOAM	10 hours

.Food Emulsion – meaning, types, properties, emulsifying agents, natural and synthetic emulsifier, functions of emulsifying agent, Foam: properties – factors influencing foam formation, factors affecting stability of foam.

Unit:4	PROPERTIES OF WATER	10 hours

Properties of Water – forms and types of water, water and ice properties, functions of water in food, intermediate moisture foods, water activity – definition, measurement and control of water activity, estimation of moisture in foods.

Unit:5	HEAT TRANSFER IN FOOD	7 hours

Heat transfer operation in foods – conduction, convection, and radiation, principles of microwave cooking and baking - advantages and disadvantages.

Unit: 6	CONTEMPORARY ISSUES	2 hours

Webinar on Viscosity measurement Fundamentals		
	Total Lecture hours	**45 hours**

Text Book(s)	
1	Srilakshmi, B. (2016) Food Science, 7 th edition, New Age Publisher.
2	Many, S and Shadaksharaswami, M. (2015) Food: Facts and Principles, 3rd edition, New Age Publishers.
Reference Books	
1	Swaminathan, M. (2012) Food science, Chemistry and Experimental foods Bangalore printing and publishing company.
2	Potter, N.N. and Hotchkiss, J.H. (1998) Food Science 5th edition, CBS Publications and Distributors, Daryaganji, New Delhi.
3	Chandrasekhar,U.(2002) Food Science and Application in Indian Cookery, Phoenix Publishing House P. Ltd., New Delhi.
4	Vaclacik, Vickie, Christian, Elizabeth W, Essentials of Food Science (2014) 4th Edition, Springer Publication.
5	Chopra H.K, Panesar, P.S, Food Chemistry (2010) Narosa Publishing House, New Delh.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://www.rsc.org
2	www.frontiersin.org
3	https://theconversation.com
4	https://youtu.be/yPFpJC_DxJk
	Course Modified By: Dr. G.Suba

Mapping with Programme Outcomes										
Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	M	M	M	S	S	M	M	M
CO2	S	M	M	M	M	S	M	M	M	M
CO3	S	M	M	M	M	S	M	M	M	S
CO4	S	M	M	M	M	S	M	M	M	M
CO5	S	M	M	M	M	S	M	M	M	M

*S-Strong; M-Medium; L-Low

Course code	13P	TITLE OF THE COURSE	L	T	P	C
Core Practical – I		FOODSCIENCE PRACTICAL			45	2
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to:

1. Understand the measuring techniques
2. Understand the changes during cookery.
3. Enable ways to prevent nutrient losses during cookery.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Apply the scientific principles in food preparation	K3
2	Demonstrate the different methods of cooking	K4
3	Understand the desirable and undesirable changes taken place during cooking of foods	K2
4	Evaluate the basic methods and principles involved in cooking	K5
5	Evaluate the change of pigments during cooking	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Contents: **45 hours**

1. Food group- Grouping of foods, discussion on nutritive value
2. Measuring ingredients Methods of measuring different types of foods – grains, flours and liquids
3. Edible portion Determination of edible portion percentage.
4. Cooking methods Moist heat methods – boiling, simmering, steaming and pressure cooking. Dry heat methods – baking.
5. Fat as a medium for cooking-shallow and deep fat frying.
6. Cereals - Methods of cooking fine and coarse cereals. Examination of starch.
7. Pulses Cooking of soaked and un soaked pulses. Common preparation with pulses.
8. Vegetables Experimental cookery using vegetables of different colours and textures. Preparation of soups and salads. Common preparation with vegetables.
9. Fruits Prevention of darkening in fruits and vegetables. Fruit salad.
10. Milk and milk products Experimental cookery – cream of tomato soup, cheese curry and cooking vegetables in milk. Common preparation with milk, cheese and curd.
11. Fleshy foods Fish, meat and poultry- preparations.
12. Egg Experimental cookery- boiled egg, poached egg. Common preparations with egg.
13. Beverages Preparation of hot beverages- coffee, tea. Preparation of cold beverages- fruit drinks and milk shake.
14. Evaluation Development of score card.
15. Developing value added foods (cereal, millet, pulse and vegetable based) any Four

Second Semester

Course code	23A	TITLE OF THE COURSE	L	T	P	C
Core – III		HUMAN PHYSIOLOGY	60 hrs			4
Pre-requisite			Syllabus Version	2020-21		

Course Objectives:

The main objectives of this course are to:

1. Enable students to understand the structure and functions of various systems in our body.
2. Enable student to understand the function of different organs and system in the human body
3. Obtain a better understanding of the principles of nutrition through the study of physiology

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	To review the structure and functions of cell organelles tissue and gain knowledge on blood and its components and understand about sense organs	K4
2	Understand the structure and functions of digestive system, digestion, absorption and assimilation of food	K2
3	To gain knowledge on circulatory system understands the basic anatomy of respiration and transport of gases.	K2
4	Understand about the reproductive organs and menstrual cycle, structure functions of endocrine glands	K2
5	Obtain a better understanding of excretory system, physiology of muscular action, and about physiology of central nervous system.	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	CELL, TISSUES,BLOOD AND SENSE ORGANS	13 hours

Cell - Structure and functions and Tissues - Structure and functions Blood, RBC,WBC, Platelets and Lymph. Blood coagulation, blood grouping and Rh factor. Sense organs - Structure and function of eye, ear and skin.

Unit:2	DIGESTIVE SYSTEM	9 hours

Digestive system - Anatomical consideration – structure and functions, Brief study of the organization of the digestion, absorption and assimilation of food.

Unit:3	CIRCULATORY SYSTEM AND RESPIRATORY SYSTEM	12 hours

Circulatory system - Heart structure and functions - cardiac cycle. Respiratory system - Basic anatomy of the respiratory system, process of respiration, transport and exchange of oxygen and carbon di oxide in the body.

Unit:4	REPRODUCTIVE SYSTEM AND ENDOCRINE GLAND	12 hours

Reproductive system - Anatomy of the male and female reproductive organs. Menstrual cycle. Endocrine glands - Structure and function of pituitary, thyroid, islets of Langerhans and adrenal gland.

Unit:5	EXCRETORY SYSTEM	12 hours
Excretory system - Excretory organs - structure of kidney and functions, formation of urine, composition of urine. Muscles - physiology of muscular action. Central nervous system - Physiology of the nerve cell, parts of the central nervous system and function.		
Unit: 6	**CONTEMPORARY ISSUES**	**2 hours**
Webinar on Management of Heart Failure		
	Total Lecture hours	**60 hours**

Text Book(s)

1	Chatterjee C.C (2016), Human Physiology 11th Edition, Medical Allied Agency, Kolkata.
2	Sembulingam, K. (2012) Essentials of Medical Physiology, 6 th Edition, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.

Reference Books

1	Best and Taylor, (2011) 13th Edition The Physiological Basis of Medical Practice, Saunders Company.
2	Chaudhri, K. (2016) Concise Medical Physiology, 7th Edition, New Central Book Agency (Parentral) Ltd., Calcutta Fox.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	microbenotes.com/category/human-physiology
2	www.longdom.org/scholarly/human-physiology...
3	https://youtu.be/IYQsinv938g

Course Modified By: Dr. G.Suba

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	M	M	S	M
CO3	S	S	S	M	M	M	M	M	S	M
CO3	S	S	S	M	M	M	M	M	S	M
CO4	S	S	S	M	M	M	M	M	S	M
CO5	S	S	S	M	M	M	M	M	S	M

*S-Strong; M-Medium; L-Low

Course code	23P	TITLE OF THE COURSE	L	T	P	C
Core Practical II		HUMAN PHYSIOLOGY PRACTICAL			30 hrs	2
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to Identify different types of tissue and calculate BMI of individuals and measurements of blood Components.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Identify the different types of tissues	K4
2	Determine the bleeding time and clotting time	K5
3	Identify the blood grouping of the individuals	K4
4	Measure the hemoglobin level, the blood pressure and calculate the pulse rate.	K4
5	Measure the height and weight and calculate the BMI of individuals and to do the physical fitness tests and grade the level of fitness	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Contents: **30 hours**

1. Identification of tissues
2. Bleeding time
3. Clotting time
4. Blood groups – identification
5. Measurement of Hemoglobin
6. Measuring Pulse Rate
7. Measuring Blood Pressure
8. Measurement of height, weight and calculation of BMI

Course code	23B	TITLE OF THE COURSE	L	T	P	C
Core – IV		PRINCIPLES OF NUTRITION	60 hrs			4
Pre-requisite			Syllabus Version	2020-21		

Course Objectives:

The main objectives of this course are to:

1. Function, sources, metabolism and effects of deficiency of nutrition.
2. Understand the vital link between nutrition and health.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	To know the history of nutrition and gain idea on energy and carbohydrates.	K1
2	Understand the role of food and nutrients in health and disease prevention	K2
3	Evaluation nutrition information based on scientific reasoning for clinical and community application	K5
4	To analyze conceptualize, implement and evaluate the functions, metabolism, requirements and effects of deficiency of nutrients.	K4
5	To apply knowledge on functions, distribution of water and regulation of water balance and acid base and electrolyte balance.	K3

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	INTRODUCTION TO NUTRITION	12 hours

Introduction to Nutrition - General introduction, history of Nutrition. Energy - Definition of Kilocalories, Joule, energy value of foods, determination, physiological fuel values, SDA of foods, basal metabolic rate- definition, factors influencing BMR. Recommended Dietary Allowances for energy. Carbohydrates - Classification, functions, source,
digestion, absorption and utilization, dietary fibre and health.

Unit:2	PROTEIN, FATS AND LIPIDS	12 hours

Protein - Classification, functions, sources and requirements, digestion, absorption and utilization, Protein quality – PER, BV, NPU, digestibility coefficient, -definition and calculation Reference protein, essential amino acids and mutual supplementation of dietary protein .Fats and Lipids - Classification, functions, sources, requirement, importance of
essential fatty acids, their requirements and deficiency.

Unit:3	VITAMINS	12 hours

Vitamins – Fat soluble vitamins –A, D, E and K- functions, source, requirements, deficiency disorders. Water soluble vitamins –The B-complex vitamins – Thiamine, Riboflavin, Niacin, Folic acid, Biotin, Pantothenic acid and Vitamin C - functions, source,
requirements and deficiency disorders.

Unit:4	MINERALS	12 hours
Minerals - General functions in the body, classification- macro and micro minerals. Micro minerals – Iron, Fluorine, Zinc, copper, Iodine -functions, absorption, utilization, requirements, deficiency and toxicity. Macro minerals – Calcium and phosphorus - functions, absorption and utilization of iron requirements, deficiency and toxicity.		
Unit:5	**WATER BALANCE**	**10 hours**
Water Balance – Functions of water, water distribution, maintenance of water and regulation of acid-base balance in the body. Electrolyte balance.		
Unit: 6	**CONTEMPORARY ISSUES**	**2 hours**
Vitamin D Nutrition Biochemistry		
	Total Lecture hours	**60 hours**

Text Book(s)

1	Srilakshmi, B. (2017) Nutrition Science, New Age International (P) Ltd., New Delhi.
2	Mahtab, S, Bamji, Kamala Krishnasamy, G.N.V. Brahmam (2015) Text Book of Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., NewDelhi.
3	Swaminathan, M. (2012) Advanced Textbook on Food and Nutrition, Vol. 1, Second Edition, Bangalore Printing and Publishing Co. Ltd., Bangalore.

Reference Books

1	Dietary Guidelines for Indians, ICMR (2013) National Institute of Nutrition, Hyderabad.
2	Gordon M. Wardlaw, Paul M.Insel. (2015) Perspectives in nutrition, 3rd Edition, Mosbyyear Book,Inc.St.Louis,Missouri.
3	Krause, M.V. and Hunesher, M.A. (2013) Food, Nutrition and Diet Therapy, 14th Edition, W.B. Saunders Company, Philadelphia, London.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	study.com/…/basic-principles-of-nutrition.html
2	ocw.jhsph.edu/index.cfm/go/viewCourse/course/..
3	www.britannica.com/science/human-nutrition
4	https://youtu.be/ljbBjlw0Xis

Course Modified By: Dr. G.Suba

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	S	M	S	S	M
CO3	S	S	S	S	M	S	S	S	S	M
CO3	S	S	S	S	M	S	S	S	S	S
CO4	S	S	S	S	M	S	S	S	S	S
CO5	S	S	S	S	M	S	S	S	S	S

*S-Strong; M-Medium; L-Low


EDUCATE TO ELEVATE

Third Semester

Course code	33A	TITLE OF THE COURSE	L	T	P	C
Core – V		NUTRITION IN HEALTH	75 hrs			4
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to:

1. Gain knowledge on the nutritional needs of individuals at different age level.
2. Gain expertise in planning and preparing normal diets.
3. Understand the required dietary allowances of an individual.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Understand the dietary guidelines in meal planning and acquainted with meal planning for all age groups.	K2
2	Evaluate the nutrition demands in various stages of life cycle.	K5
3	Analyze and explain the physiological changes taking place in pregnancy, lactation and old age.	K4
4	Discuss the impact of socioeconomic, cultural and physiological factors on food habits of school going children.	K1
5	Identify socioeconomic and cultural barriers to meat nutrient needs of adolescence and adults.	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	MEAL PLANNING	12 hours

Basic Principles of Meal Planning –Basic Principles and factors to be consider while planning menu for different age groups Recommended allowance-RDA for Indians, basis for requirement, energy allowance for different growth pattern of children, energy allowance for various activities.

Unit:2	PREGNANCY AND LACTATION	16 hours

Nutritional needs during Pregnancy – Stages of pregnancy Normal growth and weight change, complications, Nutritional requirements, and meal planning Nutrition during Lactation - physiology of lactation, hormonal control and relaxation, nutritional components of colostrum and mature milk. Nutritional requirements of lactating women.Meal planning.

Unit:3	INFANCY, PRESCHOOL AND SCHOOL GOING CHILDREN	15 hours

Nutrition during Infancy - Growth and development- advantages of breast feeding, factors to be considered in bottle feeding. Weaning foods. Growth chart, Problems of feeding in normal and premature infants. Nutritional needs of toddlers (1-5 year) and School going children - Nutritional requirements of toddlers.

Unit:4	NUTRITION DURING ADOLESCENT	15 hours

Factors to be considered while planning meals for going children. Eating problems of children and their management, packed lunch. Nutrition during Adolescence - Physical Growth- changes, Nutritional requirements and problems in adolescence- anemia, obesity, anorexia nervosa and bulimia nervosa.

Unit:5	**NUTRITIONAL NEEDS OF ADULT AND OLD AGE**	**15 hours**

Nutritional needs of adults (men and women) – In relation to occupation, Nutrition in Menopausal women, hormonal changes, Low cost balanced food. Nutrition during Old Age - Physiological changes in ageing- psycho-social and economic factors affecting eating behaviour. Nutritional problems of aged and their management.

Unit: 6	**CONTEMPORARY ISSUES**	**2 hours**

Webinar on Covid-19 and world Breastfeeding week, Health of pregnant women & Children Webinar on WHO Theme Support Breast feeding for healthier Planet on 0408

	Total Lecture hours	**75 hours**

Text Book(s)

1	Manay,S. and Shadaksharaswamy. M (2017) Foods, Facts and Principles, New Age, 2nd Edition, International Pvt Ltd Publishers.
2	Srilakshmi,B. (2016) Dietetics, New Age International Pvt. Ltd.
3	Swaminathan, M. (2015) Food Science, Chemistry and Experimental Foods, Bangalore Publishers, Bangalore.

Reference Books

1	Vinodhini Reddy, Prahlad Rao, Govmth Sastry and Kashinath (1993) Nutrition Trends in India, NIN, Hyderabad.
2	Shills, E.M. Olson, A.J. and Shike, Lea and Febiger (2001) Modern Nutrition in Health and Diseases, 9th Edition,
3	Chandrasekhar, U. (2002) Food Science and applications in Indian Cookery Phoenix Publishing House, New Delhi
4	Krause, M.V. and Hunesher, M.A. (2013) Food, Nutrition and Diet Therapy, 14th Edition, W.B. Saunders Company, Philadelphia, London.
5	Davidson S Passmore R, Brock JP (1999) Human Nutrition and Dietetics-, 10th Edition, ELBS and Churchill, Livingstone.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	www.four-h.purdue.edu/foods/Nutrition through the...
2	https://main.icmr.nic.in/guidelines
3	https://www.nutrtion.org.uk- pregnancy
4	https://www.who.int- infants nutrition
5	https://youtu.be/ZF4aNuttc3g
6	https://youtu.be?S0_ZipHXW1A

Course Modified By: Dr. G.Suba

Mapping with Programme Outcomes

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	S	M	S	S	S	S	S

CO3	S	S	S	S	M	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	S
CO4	S	S	S	S	M	S	S	S	S	S
CO5	S	S	S	S	M	S	S	S	S	S

Course code	33P	TITLE OF THE COURSE	L	T	P	C
Core Practical- III		FAMILY MEAL MANAGEMENT			45 hrs	2
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to:

Menu planning, preparation and nutrient calculation during different stages of life

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Prepare and serve the planned menu	K3
2	Explain the need for including each food group in the menu	K3
3	Determine the nutrient content of the menu per meal and per portion	K5
4	Analyze the menu planning for infants, preschool children, school going children and adolescent	K4
5	Express on the planning and preparing of low, medium, and high cost food items for sedentary, Moderate and heavy worker adults. Plan and justify the planned menu for elderly.	K3

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Contents: **45 hours**

1. Food groups
2. Planning a menu for a pregnant mother and display prepared items
3. Planning a menu for a lactating mother and display prepared items and calculate nutritive value for the prepared menu.
4. Preparation of low cost supplementary and weaning foods
5. Planning and preparing diet for infants and preschool children
6. Planning and preparing diet for school going children and adolescent girls and boys
7. Planning and preparing diet for low, medium, high income groups and based on sedentary, moderate and heavy workers – Adult (Men and Women).
8. Planning and preparing diet for old age.

Course code	3ZA	TITLE OF THE COURSE	L	T	P	C
SBS-I		TEXTILE SCIENCE AND BASIC SEWING	45 hrs			3
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to:

1. Gain knowledge on fibres and its properties
2. Enable skills in sewing techniques

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Acquire knowledge about fundamentals of fibre.	K1
2	Understand the basics of fabrication.	K2
3	Apply knowledge on dyeing and printing techniques.	K3
4	Gain knowledge about the basics of sewing techniques.	K2
5	Understand the garment construction process.	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	FIBRE	9 hours

Fibre – Fibre classification – Natural fibres – vegetable fibres – cotton and jute, animal fibres- wool and silk, mineral fibres-Asbestores.

Unit:2	FABRICATION	9 hours

Fabrication methods – Woven fabrics- Parts and functions of loom, basic weaves – plain, jwill and satin weaves, knitted fabrics- definition and types –wrap knits and neft knits.

Unit:3	DYING AND PRINTING	9 hours

.Dyeing and printing – dyeing – meaning and classification- direct dyes, reactive dyes, vat dyes, sulphur dyes and natural dyes. Printing - meaning, methods - block printing, roller printing, stencil printing and screen printing.

Unit:4	BASICS OF SEWING	8 hours

Basics of sewing – sewing machine, parts and functions. Basic stitches - functional and decorative stitches.

Unit:5	**SEAMS**	**8 hours**
Seams – types, plain, flat feel, slot, welt, piped and flapped. Fullness- pleats and gathers.		
Unit: 6	**CONTEMPORARY ISSUES**	**2 hours**
Webinar on Impact of Covid-19 on the Indian and International Home Textile Markets		
	Total Lecture hours	**45 hours**

Text Book(s)	
1	Deepali Rastogi and Sheetal Chopra (2017) Textils Science, Direct Black swan private lte, Hydrabad.
2	CorbmanB.P and Potter.M.D. (1983) Textiles fiber to fabric, , International Edition, McGraw-hill book Co, New York.
3	Chakarborty, J.N. (2010) Fundamentals and practices in colouration of Textiles, Wood head publishing India, pvt. Ltd. New Delhi.
Reference Books	
1	E.P.G. Gohl and L.D. vilensky, Textile Science, 1983, 2nd Ed., Publishers, New Delhi.
2	Spencer, D.J. (2005) Knitting Technology, : A comprehensive text book and practical guide, 4th Edition, Wood head, Cambridge.
3	W.D. Klein , A Practical Guide to Ring Spinning Textile Institute, Manchester.
4	Mark and Robinson, Principles of weaving, Textile institute Manchester
5	N.N. Banner.J.I, Mechanism of Weaving, Vol – I and II, Textile Institute
6	Joseph J Pretal, Fabric Science, 1990, 5th edition , Fairchild Publications Newyork.
7	Practical Clothing Construction – Part I and II, Mary Mathews, Cosmic Press, Chennai (1986)
8	Sewing and Knitting – A Readers Digest, step- by – step guide, Readers Digest Pvt Ltd, Australia.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://www.hindawi.com
2	Natural dyes- nptelhrd
3	Introduction to textile materials and different types of seams- Vidya-mitra
4	https://youtu.be/w2W6XYYPFao
Course Designed By: Dr.G.Suba	

APPAREL DESIGNING AND TEXTILE SCIENCE PRACTICAL (No practical exam)

1. Types of embroidery and surface ornamentation
   - Hand embroidery
   - Machine embroidery
   - Applique (machine / hand)
   - Bead Work
   - Mirror work –Shapes (Round, square, diamond)
   - Fixing the stones.
2. Planning and preparation of colour charts
3. Different types of dying
4. Different types of fullness
5. Identification of fibres
6. Flower arrangement

Mapping with Programme Outcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	M	M	M	M	M	M	M	M
CO3	S	S	M	M	M	M	M	M	M	M
CO3	S	S	S	S	S	M	S	M	M	S
CO4	S	S	M	M	M	M	M	M	M	M
CO5	S	S	M	S	M	M	M	M	M	M

*S-Strong; M-Medium; L-Low

Fourth Semester

Course code	43A	TITLE OF THE COURSE	L	T	P	C
Core –VI		CLINICAL NUTRITION AND DIETETICS	60 hrs			4
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to:

1. Obtain knowledge on role of diet in disease conditions.
2. Gain experience in planning, preparing and serving therapeutic diet.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Gain knowledge about principles of diets therapy and different therapeutic diets.	K2
2	Develop aptitude for taking up dietetics as a profession.	K3
3	Understand the pathology of diseases and apply nutritional principles to discuss dietary management.	K3
4	Gain knowledge on the ethiological factor and treatment and dietary modification of obesity, underweight, disease of liver and gall bladder.	K2
5	Learn about the causes, types, biochemical changes, glycemic index of diabetes and disease of kidney.	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	OBJECTIVES OF DIET THERAPY	10 hours

Objectives of diet therapy - Role of a dietician. Principles of diet preparation and counseling. Normal diet in the hospitals –, liquid, semi liquid, light , soft diet, bland diet and regular diet Different types of Feeding - Basic concepts of oral feeding, tube feeding, IV feeding, gastrostomy feeding.

Unit:2	THERAPEUTIC DIETS	11 hours

Therapeutic diets for the following disorders- Under weight - definition, etiology, treatment Obesity - definition, etiology, treatment. Diseases of the gastro intestinal tract- ulcer, constipation and diarrhoea. Diverticular Diseases, Crohn's Disease and Ulcerative Colitis

Unit:3	DISEASE OF LIVER.GALL BLADDER AND HEART	12 hours

Diseases of the liver and gall bladder (risk factors and diet therapy) jaundice, hepatitis, cirrhosis, fatty liver and Diet Therapy Diseases of the cardio vascular system (risk factors and diet therapy), atherosclerosis, arteriosclerosis, hypertension and congestive heart failure.

Unit:4	**DIABETES MELLITUS**	**12 hours**

Diabetes mellitus – Types, causes, symptoms, bio-chemical changes, insulin, hypo- glycemicdrugs, types only, food exchange list, dietary management Diseases of the kidney and urinary tract - Acute and chronic nephritis, Nephrotic syndrome, Renal failure, Urinary calculi Causes and dietary treatment of kidney diseases and dialysis.

Unit:5	**DIET IN ALLERGY, FEBRILE CODITIONS, STRESS & CANCER AND AIDS**	**13 hours**

Diet in Allergy - Definition, classification, common food allergy, test of allergy, diet therapy. Diet in febrile conditions - Short duration -Typhoid, Long duration- Tuberculosis. Metabolic stress and cancer - Metabolic and clinical aberrations, diagnosis, complications, treatment, MNT and dietary counselling in Metabolic Stress -Surgery, Burns, Sepsis and Trauma Critical care, Cancer- General and Specific cancers, Effect of Cancer therapy on MNT, Diet in AIDS.

Unit: 6	**CONTEMPORARY ISSUES**	**2 hours**

Nutritional Management Of Pediatric Crohn's Disease

Total Lecture hours	**60 hours**

Text Book(s)

1	Srilakshmi, B (2002) Dietetics, IVth Edition. New Age International (P) Limited, Publishers, New Delhi
2	Joshi, S.J. (2002) Nutrition and dietetics, Tata Mc Graw- Hill publishing company limited, New Delhi.
3	Srilakshmi (2017) Nutrition science, New age international (P) limited, New Delhi.

Reference Books

1	Krause, M.V. and Hunesher, M.A. (2013) Food, Nutrition and Diet Therapy, 14th Edition, W.B. Saunders Company, Philadelphia, London.
2	Davidson S Passmore R, Brock JP (1999) Human Nutrition and Dietetics-, 10th Edition, ELBS and Churchill, Livingstone.
3	ICMR (2010) Nutrient Requirements and recommended dietary allowances for Indians.
4	Antia FP (1987) Clinical Dietetics and Nutriton, Oxford University Press, New Delhi
5	Sue rod Williams, Nutrition and diet Therapy, Times Mirror Mosby College publishing,Boston, 1989.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	https://www.rdehospital.nhs.uk/docs/trust/foi/foi_responses/2015/december/Enteral_feeding_guideline~version_Jan_201411.pdf
2	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5038894/
3	https://www.kidney.org/sites/default/files/11-50-0114_docsnutrikidfail_stage1-4.pdf
4	http://youtu.be/GBKu3_8Rkcw
	Course Modified By: Dr. G.Suba

Mapping with Programme Outcomes										
Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	S	M	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	S
CO4	S	S	S	S	M	S	S	S	S	S
CO5	S	S	S	S	M	S	S	S	S	S

*S-Strong; M-Medium; L-Low

Course code	43P	TITLE OF THE COURSE	L	T	P	C
Core Practical: IV		DIETETICS PRACTICAL			45hrs	2
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to:

Apply principles of diet therapy in planning, preparation and nutrient calculation of hospital diets, therapeutic diets for various diseases like disease of liver and gall bladder, cardiovascular system, kidney and diabetes mellitus.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Plan, prepare and serve different therapeutic diets.	K3
2	Assess the nutritive value of the diets.	K5
3	Discuss on the foods to be included and avoided in various disease conditions with reason	K4
4	Select specific foods for the management for obesity and underweight	K4
5	Identify the relationship between diet and cardiovascular disease	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Course code	4ZB	TITLE OF THE COURSE	L	T	P	C
SBS: II		INTERIOR DESIGN	45hrs			3
Pre-requisite			Syllabus Version			2020-21

Course Objectives:

The main objectives of this course are to:

Gain understanding of the basic art principles.
Develop ability to apply the above knowledge to create interesting and beautiful Interiors for varied purposes.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Develop skills in using the elements and principles of art and design.	K3
2	Apply the theoretical knowledge in colour and light to practical situation in interior design.	K3
3	Gain knowledge in selection, use and care of furniture, furnishing material and accessories.	K2
4	Identify and evaluate the technical aspects of interior design.	K5
5	Demonstrate basic flower arrangement techniques and styles.	K3

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	Introduction to Interior Design	8 hours

Concept of Interior Design-Meaning of Interior Design and Interior Decoration.Design – Definition, Meaning, Purpose. Types- structural and decorative design, elements and principles of design.

Unit:2	Colour	8 hours

Concept of colour. Dimensions of colour – Hue, value and intensity, Colour system- prang and Munsell colour system, Colour harmonies – related and contrasting colour hormonies, Application of elements and principles of colour n interiors.

Unit:3	Lighting	9 hours

Importance of lighting. Sources, Types, Glare- its types, causes and prevention. Accessories-Meaning, Types-functional, decorative, both functional and decorative. Lighting accessories-fixtures, Lighting for areas and specific activities. Picture mounting, wall hangings

Unit:4	Furniture	9 hours

Styles of furniture – traditional, contemporary and modern design. Furniture for different purpose, furniture materials, Selection and arrangement – Furniture for various rooms – Living, dining, bedroom, kitchen, study room, office. Furniture Dimensions, Care and maintenance.

Unit:5	Use of Furniture and Flower Arrangement	9 hours
Selection, Use and Care of furnishing materials. draperies, curtains,draperies, carpetsrugs. Use of flowers and containers for flower arrangement- importance, basic materials needed, basic shapes, types and styles in flower arrangement - Japanese arrangements – IKEBANA		
Unit: 6	**CONTEMPORARY ISSUES**	**2 hours**
Webinar on Interior Space and Furniture design		
	Total Lecture hours	**45 hours**

	Text Book(s)
1	Chaudhri. S.N. (2005) Interior Design, Aavishkar publication, Jaipur, India.
2	Mullik, P. (2007) A text Book of Home Science, Kalyani Publications, New Delhi.
	Reference Books
1	The making of interiors – An introduction- Allen Tate- Harper and Row Publishers, New York, 1987.
2	Interior Design and Decoration, Fourth Edition, Sherrill Whiton- Prentice Hall, 1974.
3	Interior lighting for Designers, Third edition – Gary Gordon andJamco L. Nuckolls – John Wiley and Sons, New York, 1995.
4	The Encyclopaedia of Decorative Styles – William Hardy and Steve Adams – New Burlington books, London, 1988.
	Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	KEVINRIGDONElementsandPrincipalsof Design.pdf
2	https://www.researchgate.net/publication/290591878 - Factors influential in Consumers' Furniture selection and their Preferences regarding Product Features
3	https://www.researchgate.net/publication/320800578 _Interior_Finishing_Materials
4	https://www.researchgate.net/publication/315835473 _Interior_Decoration
5	http://anj.co.in/idea-at-anj/ importance-of-lighting
6	https://youtu.be/yrhbTDoi1KY
Course Designed By: Dr.G.Suba	

Mapping with Programme Outcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	M	M	M	S	S	M	S	M	M	M
CO3	M	M	S	S	S	M	S	M	M	S
CO3	M	M	M	S	S	M	S	M	M	M
CO4	M	M	S	S	S	M	S	M	M	S
CO5	M	M	M	S	M	S	S	M	M	M

*S-Strong; M-Medium; L-Low

Fifth Semester

Course code	53A	TITLE OF THE COURSE	L	T	P	C
Core Paper: VII		FOOD MICROBIOLOGY	90 hrs			4
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to:

1. Provide knowledge of microorganisms associated with food spoilage and food borne diseases
2. Determine the presence, growth and survival of microorganism in food

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Understand different terminology related to microorganism	K2
2	Understand the different factors responsible for the microbial growth	K2
3	Analyze and describe the characteristics of important pathogens and spoilage in food	K4
4	Acquire, discover and understand the theories and principles of food microbiology	K2
5	Apply the importance of personal hygiene for food and food service personnel	K3

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	Different Terminology, Food Spoilage & Prevention	15 hours

Different terminology – Heterotrophic nutrition, autotrophic nutrition, saprophytic, holozoic, host, culture, parasite. General principles underlying spoilage-causes for spoilage, factors affecting kinds and number of micro organisms in food. Prevention and control of spoilage. Food poisoning, and food borne diseases.

Unit:2	Morphology of Bacteria, Mold, Yeast and Algae	19 hours

Bacteria and Mold- Nomenclature, genera of bacteria and mold, morphology, growth curve, importance in food microbiology. Observation of motility of bacteria in milk, demonstration of mold growth in bread. Yeast - Morphology, classification, importance of yeast in food. Observation of yeast cells. Algae – Morphology and importance of algae.

Unit:3	Contamination of Cereals , Fruits and Vegetables and Fleshy Foods	18 hours

Contamination and kinds of micro organisms causing spoilage of cereal products grains, flour, baked products and cake. Fruits and vegetables and their products- fruit uice,pickles. Fleshy foods - meats, poultry and fish.

Unit:4	Contamination of Egg, Milk & Milk Product, Beverages, Fats and Oils	17 hours

Contamination and kinds of micro organisms causing spoilage of eggs, milk and milk products- cream, milk frozen desserts and butter. Fats and oils, bottled beverages, spices and condiments.

Unit:5	**Microorganisms in Water**	**19 hours**
Micro-organisms in Water - sources, bacteriological examinations, total count, test of E.Coli, purification of water, water borne diseases. Micro organisms in sewage and sewage disposal Destruction of bacteria- sterilization, physical agents, light, desiccators, electricity, heat and chemical agents. Importance of sanitation and hygiene in relation with spreading of microorganisms.		
Unit: 6	**CONTEMPORARY ISSUES**	**2 hours**
Webinar on Microbiology testing for food products and their permissible limits		
	Total Lecture hours	**90 hours**

Text Book(s)	
1	Frazier, W.C. (2014) Food Microbiology, Tata McGraw Hills Publishing Company Limited, Chennai.
2	Adams, MR and Moss, MO (2015) Food Microbiology, New Age International (P) Ltd., New Delhi.
Reference Books	
1	Jay M.J (2015) Modern Food Microbiology, Fourth Edition, CBS Publishers and Distributors, New Delhi.
2	Sullia SB and S Shantharam- (1998) “General Microbiology” Oxford and IBH Publishing Ltd.
3	Ramesh, K.V (2012) Food Microbiology, MJP Publishers, Chennai.
4	Tamine, A (2015) Probiotic Dairy Products, Blackwell Publishing, USA
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://swayam.gov.in/nd1_noc19_ago7
2	http://nptel.iitm.ac.in
3	https://youtu.be/x8rkY-7B-8c
Course Modified By: Dr. G.Suba	

Mapping with Programme Outcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	M	S	S	S	M	S	S	M	M	S
CO3	M	M	S	S	M	M	S	M	M	S
CO3	M	M	M	S	M	M	S	M	M	S
CO4	M	M	S	S	M	S	S	M	M	S
CO5	M	S	S	S	M	S	S	M	M	S

*S-Strong; M-Medium; L-Low

Course code	53B	TITLE OF THE COURSE	L	T	P	C
Core Paper: VIII		POSTHARVEST TECHNOLOGY	75hrs			4
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to:

Gain knowledge about postharvest technology which enables storage of food grains and explain the causes of postharvest food losses and the preventive measures

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Understand the safety control measures in handling foods from harvest to consumption and agencies of control.	K2
2	Understand the types of food losses and the agents causing food loss.	K2
3	Gain knowledge about food processing methods.	K1
4	Apply physical and chemical methods to control spoilage agents.	K3
5	Analyze the importance of storage of grains.	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit: 1	INTRODUCTION TO POST HARVEST TECHNOLOGY	16 hours

Introduction to Post Harvest Technology - Definition, importance and problem encountered. Buffer stock – definition, quantity of stores available. Governmental measures to augment food production- need for food conservation. Food loss in the post harvest period, extent of losses, loss in the field, threshing yard, storage, marketing loss.Role of Post Harvest Technology in combating malnutrition in India.

Unit:2	AGENTS CAUSING FOOD LOSSES	16 hours

Agents Causing Food Losses - Physical agents, (moisture, temperature), Chemical losses, biological losses- insects- insects attacking food grains - types and life cycle, damage caused to food grains and detection of insect infestation, rats and rodents, birds, animals-Nature of damage, identification.

Unit:3	CONTROL OF SPOILAGE AGENTS	16 hours

Control of Spoilage Agents - Importance and methods of sanitary handling, physical, chemical, biological and other means of control of insects, rats and rodents and birds. Insect control methods- Physical methods and chemical methods including fumigation techniques. Handling and Transport of Food Commodities - Traditional and improvedmethods. Nutrient losses in spoiled grains and National program to save grains.

Unit:4	STORAGES OF GRAINS AND AGENCIES CONTROLLING FOOD LOSSES	14 hours

Storage of Grains - Importance of storage structures- requirements, traditional and modern and underground and above ground storage and their improvements, FCI godowns. PDS. Agencies Controlling Food Losses - Role of SGC, FCI, CWC, SWC, IGSI in controlling food losses.

Unit:5	**FOOD PROCESSING**	**11 hours**
Food Processing of Selected Food Items – wheat, rice, breakfast cereals, pulses and oilseeds.		
Unit: 6	**CONTEMPORARY ISSUES**	**2 hours**
Webinar on Post harvest food loss and waste monitoring protocol		
	Total Lecture hours	**75 hours**

Related Experiences:

1. Visit to FCI
2. Visit to Processing Mill (Cereal and Pulse)

Text Book(s)

1	Chakravarthi, A., Mujumdar, A.S., Raghavan, G.S.V and ramasami, H. S. (2003) Handbook of Post Harvest Technology, Marcel Dekker Inc., New York.
2	Handling and storage of food grains in tropical and subtropical areas- D W Hall, FAD, Rome, 1970.

Reference Books

1	Handling and storage of food grains- S V Pingale ICAR, New Delhi, 1976.
2	Food Technology, Prescott and Proctor. B.B.Mc Graw Hill Book Co., New York, 1937.
3	Gordon G Birth, Food science, Pub in New York. 6. Robins M Philip Convenience food-Recent Technology 1976.
4	Technology of cereals by NL Kent and JAD Evers.
5	Food protection technology by Charles W., Felix Havis Pub.1987.
6	John A Troller, 1983, Sanitation in food processing, Academic press.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	https://biologyreader.com
2	www.fao.org
3	http://agritech.tnau.ac.in-agriculturalproducts
4	https://youtu.be/3GsSx9LCIZ4

Course Modified By: Dr. G.Suba

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	S	S	M	S	S	M	M	S
CO3	M	M	S	S	M	S	S	M	M	S
CO3	S	M	S	S	M	S	S	M	M	S
CO4	M	M	S	S	M	S	S	M	M	S
CO5	S	M	S	S	M	S	S	M	M	S

*S-Strong; M-Medium; L-Low

Course code	53C	TITLE OF THE COURSE	L	T	P	C
Core Paper: IX		COMMUNITY NUTRITION	75hrs			4
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to: Understand the Malnutrition problems and prevalence in India. Gain knowledge on the National effort in combating malnutrition. Appreciate the National and International contributor towards National improvement in alleviating nutrition problems.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Understand the factors influencing health of a community	K2
2	Analyze nutritional problems, policies, programs and agencies involved in combating malnutrition	K4
3	Organizing nutrition education programs for the community	K3
4	Evaluate nutritional status of the community	K5
5	Outline the various agencies in combating malnutrition	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	Introduction to Public Nutrition	15 hours

Concept and scope of public nutrition –Definition, concept, scope and multidisciplinary nature of public nutrition.Nutritional problems affecting the community- Etiology, prevalence, clinical features and preventive strategies for malnutrition related problem and deficiency disorders- Protein energy malnutrition, Obesity, Nutritional anemia, Vitamin A deficiency, Iodine deficiency disorders, Fluorosis.

Unit:2	Assessment of nutritional Status	12 hours

Assessment of nutritional status- Objectives and importance, Methods of assessment: Direct (Clinical signs, nutritional anthropometry, biochemical tests, biophysical tests); Indirect (Diet surveys, vital statistics).

Unit:3	Nutrition Education	12 hours

Nutrition education- Objectives, principles and scope of nutrition and health education and promotion.

Unit:4	Nutrition Policy and Programs	17 hours

Nutrition policy and programs- National nutritional policy**;** Integrated child development scheme (ICDS), Midday Meal Program, National programs for the prevention of anemia, Vitamin A deficiency, Iodine deficiency disorders.

Unit:5	National and International Agencies	17 hours

National and International agencies in combating malnutrition- International: WHO, FAO, UNICEF; National: FSSAI, ICAR, ICMR, NIN, FNB, CFTRI, and NNMB.

Unit: 6	**CONTEMPORARY ISSUES**	**2 hours**
Nutritional Problems and Nutritional Programmes in India		
	Total Lecture hours	**75 hours**

PRACTICAL (No Examination)

1. Planning of low cost nutritious recipes for infants, preschoolers, pregnant/ lactating mothers for nutrition education.
2. Assessment of nutritional status
   - Anthropometry: Weight and height measurements
   - Plotting and interpretation of growth charts for children below 5 years
   - Identification of clinical signs of common nutritional disorders
   - Dietary assessment: FFQ and 24 hours recall
3. Visit to an ongoing nutrition and health promotion program

Text Book(s)

1	Wadhwa A and Sharma S (2003). Nutrition in the Community- A textbook. Elite Publishing House Pvt. Ltd. New Delhi.
2	Park K (2011). Park's Textbook of Preventive and Social Medicine, 21st Edition. M/sBanarasidasBhanot Publishers, Jabalpur, India
3	Mahtab, S, Bamji, Kamala Krishnasamy, G.N.V. Brahmam (2015) Text Book of Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi.

Reference Books

1	Brahman, G.N.V., Lakshmaiah, A., Rao, M. and Reddy, G.(2005) Methodology on Assessment of Diet and nutritional Status of Community, National Institute of nutrition, Hyderabad.
2	Jellife DB, Jellife ERP, Zerfas A and Neumann CG (1989). Community nutritional assessment with special reference to less technically developed countries. Oxford University Press. Oxford.
3	Reports of National Family Health Survey, International Institute for Population Science, Mumbai.
4	WHO (2006). Child Growth Standards: Methods and development: height-for-age, weight-for-age, weight-for-length, weight-for-height andbody mass index-for-age (http://www.who.int/childgrowth/standards/en/).

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	https://www.ncbi.nlm.nih.gov-nutritionalassessment
2	https://www.medicalnewstoday.com-anemia
3	https://www.nhp.gov.in/national-vitamin-a-prophylaxis-program-pg
4	https://www.dshs.wa.gov/altsa/program-services /nutrition-education
5	https://youtu.be/KySquUSrBhM

Course Modified By: Dr. G.Suba

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	S
CO4	S	S	S	S	M	S	S	S	S	S

CO5	S	S	S	S	M	S	S	S	S	S

*S-Strong; M-Medium; L-Low

Course code	53P	TITLE OF THE COURSE	L	T	P	C
Core Practical: V		NUTRITION PRACTICAL			45hrs	2
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to: Determine the nutrient content present in foods

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Understand the principles and procedure of determination of nutrients	K2
2	Gain knowledge about analysis of nutrients	K4
3	Develop skills in analyzing the nutrient content in various food items	K4
4	Evaluate the standard experimental techniques.	K5
5	Understand basic principles of food analytical procedures.	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Contents: **45 hours**

1. Determination of Gluten content in wheat.
2. Estimation of Acidity in tomato juice.
3. Estimation of Fibre content in any one food.
4. Determination of acid number of oils.
5. Determination of iodine number of oils.
6. Estimation of ash content in any one food.
7. Determination of Calcium content in milk.
8. Estimation of Iron content in any one food.
9. Estimation of Phosphorous content in any one food.
10. Demonstration of Protein content in foods.
11. Estimation of Ascorbic Acid content in Citrus fruit juice.

Course code	53Q	TITLE OF THE COURSE	L	T	P	C
Core Practical : VI		COMPUTERISED DATABASE MANAGEMENT IN HOME SCIENCE			45hrs	2
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to:

Gain knowledge on computer operations and applications to use existing health and nutrition based software.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Understand the coding, entry of data in MS office.	K2
2	Gain knowledge about preparation of various types of AV aids	K2
3	Develop skills in calculation of mean, median, mode, standard deviation, correlation.	K5
4	Develop skills in graphical presentation of data using MS Office	K5
5	Develop skills in preparation of models for interior design	K3

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Contents: **45 hours**

1. Database management of Anthropometric indices (Height, Weight, BMI)
2. Database management of Biochemical indices (Haemoglobin, Blood Pressure)
3. Preparation of Visual Aids for a Health Education programme.
4. Preparation of Interior Designing models.
5. Calculation of Mean.
6. Calculation of Median.
7. Calculation of Mode.
8. Calculation of Standard Deviation.
9. Determination of Correlation between the given set of data.
10. Graphical presentation of Data.

Course code	5ZC	TITLE OF THE COURSE	L	T	P	C
SBS: III		FOOD SAFETY AND QUALITY CDONTROL	45hrs			3
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to: Study about the control of quality and use of additives and gain knowledge on standards for food quality and food laws

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Understand the control of quality and use of additives	K2
2	Gain knowledge on standards for food quality and food laws	K2
3	Apply safety principles related to food industry	K3
4	Analyze basic principles of HACCP and FSSAI	K4
5	Know about food safety measures and food labeling	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	PRINCIPLES OF QUALITY CONTROL	8 hours

Principles of Quality control of food –Raw material, processed and finished product inspection. Leavening agents - classification, uses and optimum levels. Food additives - Preservatives, colouring, flavouring, sequestering agents, emulsifiers and antioxidants.

Unit:2	STANDARDISATION SYSTEM & ADULTERATION	10 hours

Standardisation systems for quality control of foods-National and International standardization system, Food grades, Food laws-compulsory and voluntary standards. Food adulteration - Common adulterants in foods and tests to detect common adulterants.

Unit:3	METHODS OF DETERMINING QUALITY	10 hours

Methods for determining quality - Subjective and objective methods. Sensory assessment of food quality-appearance, colour, flavour, texture and taste, different methods of sensory analysis, preparation of score card, panel criteria, sensory evaluation room.

Unit:4	FOOD SAFETY, RISKS & HAZARDS	8 hours

Food safety, Risks and hazards: Food related hazards, Microbial consideration in food safety, HACCP-principles and structured approach. Chemical hazards associated with foods. FSSAI

Unit:5	LABELLING	7 hours

Principles of labelling, nutrition labelling, Food packaging- principles, functions and types (metal, glass and flexible films), merits and demerits of packaging materials.

Unit: 6	**CONTEMPORARY ISSUES**	**2 hours**
Webinar on Food safety framework from consumer perspective		
	Total Lecture hours	**45 hours**

Text Book(s)	
1	Roday, S. (2011) Food Hygiene and Sanitation, 2nd Edition, Mac Grawhill Publication New Delhi.
2	Joshi, S.A. (2010) Nutrition and Dietetics with Indian Case Studies. Tata McGraw Hill Education Pvt. Ltd., Mumbai.
3	Manay, S.N. and M. Shadaksharawamy, 2001. (Eds) Foods, Facts and Principles. 3rd edition, New Age International. New Delhi.
4	Begum, R. (2006) A Textbook of Foods, Nutrition and Dietetics. Sterling Publishers Pvt. Ltd. New Delhi.
Reference Books	
1	Mudambi, S.R. and M.V. Rajgopal 2006. Fundamentals of Foods and Nutrition. Wiley Eastern Ltd.
2	Vijaya Ramesh, Food Microbiology, MJP Publications, 2007.
3	David, A. Shapton, and Naroh F. Shapton (2011) Principles and Practices for the Safe Processing of Foods, Heineman Ltd., Oxford.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://www.fssai.gov.in
2	mofpi.nic.in › Schemes › food-safety-quality-assurance.
3	https://youtu.be/LcM_ukojKjM
Course Modified By: Dr. G.Suba	

Mapping with Programme Outcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	M	S	M	M	S	S	M	M	S
CO3	S	M	M	S	M	S	S	M	M	S
CO3	S	M	S	S	M	S	S	M	M	S
CO4	S	M	S	S	M	S	S	M	M	S
CO5	S	M	M	S	M	S	S	M	M	S

*S-Strong; M-Medium; L-Low

Sixth Semester

Course code	63A	TITLE OF THE COURSE	L	T	P	C
Core Paper: X		FOOD SERVICE MANAGEMENT	90hrs			5
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to: understand the principles of planning, organizing and controlling in food service institution. Develop skills in meal planning to catering institution

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Understand the principles of planning, organizing and controlling in food service	K2
2	Develop skills in meal planning to catering institutions.	K3
3	Evaluate the principles of sanitation and hygiene	K5
4	Apply the principles and techniques of effective management	K3
5	Analyze the cost control and its important	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	INTRODUCTION	19 hours

Different types of catering institutions and services, classifications of food service institutions according to Function and Method of processing: Conventional systems, Commissary system, fast food service system. c. Types of food services: English, French,
Russian, American, silver, buffet and cafeteria.

Unit:2	ORGANISATION & MANAGEMENT	20 hours

Organisation - Types and principles, organizational structure for catering institutions. Management - Definition, principles and techniques of effective management, leadership and managerial abilities. Tools of management-organisational chart, work study and work improvement.

Unit:3	KITCHEN AREA	16 hours

Kitchen area- design, size, type, ventilation, lighting, flooring, carpets, wall covering and sample layout of kitchen, Equipments- major and minor

Unit:4	PERSONNEL MANAGEMENT	16 hours

Personnel Management - Methods of selection, orientation, training, supervision and motivation of employees, importance of good human relations, legal aspects of catering.

Unit:5	FRONT OFFICE & FINANCIAL MANAGEMENT	17 hours

Front Office organisation, layout, planning, communication between the Front Office and the other departments. Cost control - Principles and methods of food cost control. Financial management – Factors affecting food, labour, operating and overhead cost, budget, inventories.

Unit: 6	CONTEMPORARY ISSUES	2 hours
Webinar on career opportunities in front office department of hospitality & business management		
	Total Lecture hours	90 hours

	Text Book(s)
1	West ,BB, Wood (1998)"Food service in Institutions" ,Johnwiley and Sons,New York.
2	Sethi and Mahan S. (2015) Catering Management an integrated approach, John wiley Eastern Limited, New Delhi.
3	Sethi and Mahan S.(2016) Institution Management, John wiley Eastern Limited, New Delhi.
4	Khan MA (1987) "Food service operations", AVI publishing Company Inc. ND.
	Reference Books
1	Kotas R and Davis B "food cost control" Billing and Sons Ltd, Great Britian ,1976
2	Dr. B.K. Chakravati, " A Technical guide to Hotel operation" , Metropolitan, New Delhi India.
3	Earl R. Palan and Judity A. Stadler (1986) Preparing for the food service Industry, AVI – Publishingand co
4	Mickey Warner (1989) Recreatoinal food service Management Van Nostrand Reinhold, Newyork.
	Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	http://www.ihmbbs.org/upload/CHAPTER-0(THE%20HOTEL%20&%20CATERING%20INDUSTRY).pdf
2	https://www.dodea.edu/edSpecs/upload/Food-Service-15-Nov-11.pdf
3	https://ncert.nic.in/textbook/pdf/lehe104.pdf
4	https://youtu.be/uHB3Hg9nWV8
Course Modified By: Dr. G.Suba	

Mapping with Programme Outcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	M	M	S	M	S	M	M	M	M
CO3	S	S	S	S	M	S	S	M	M	M
CO3	S	M	M	S	M	S	M	M	M	S
CO4	S	M	M	S	M	S	S	M	M	S
CO5	S	M	M	S	M	S	M	M	M	S

*S-Strong; M-Medium; L-Low

Course code	63B	TITLE OF THE COURSE	L	T	P	C
Core Paper: XI		FOOD PRESERVATION AND PROCESSING	90 hrs			4
Pre-requisite			Syllabus Version		2020 -21	

Course Objectives:

The main objectives of this course are to: learn different food processing and preservation techniques.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Understand the principles of various methods of food preservation	K2
2	Knowledge about some ready to eat food items	K2
3	Explain the principles of different methods of storage and processing	K3
4	Evaluate the novel technologies in food preservation	K5
5	Utilize the possible, recent preservation methods in the food processing sector.	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	INTRODUCTION	20 hours

Food preservation - Definition, General Principles and Methods of Food Preservation- Classification of foods for processing. Preservation by addition of sugar- General principles and methods of preparation of jams, jellies and Marmalades, theory of gel formation. Preparation of preserves, squashes and syrups. Preservation by addition of salt- Pickling. Preparation of Indian Pickles, Sauerkraut. Status and scope of food processing industry in India in developing Entrepreneur.

Unit:2	PRESERVATION BY USING HIGH TEMPERATURE	20 hours

Preservation by Use of High Temperature - Pasteurization, Sterilization and their types. Thermal death curve/Thermal Death time, methods of heat transfer. Canning - steps, types of cans, advantages, disadvantages. Bottling - steps, advantages, disadvantages. Food dehydration - concept of dehydration and sun drying. Types of driers their advantages and disadvantages. Principle of dehydration-heat and mass transfer.

Unit:3	PRESERVATION BY USING LOW TEMPERATURE	17 hours
Preservation by use of Low Temperature, Types - Common types of cold storage, refrigeration-requirement of refrigerated storage, characteristic of refrigerant, refrigeration during transport, defects in cold storage. Freezing - Principles and methods of freezing, Freeze drying. Advantages and disadvantages.		
Unit:4	**PRESERVATION WITH CHEMICALS**	**17 hours**
Preservation with chemicals a. Mechanism of microbial inhibition, mechanism and action of preservatives in processed food (Inorganic and Organic preservatives, Antibiotics, Mold inhibitors, Antioxidants and its role). Radiation of Foods - Sources of radiation, units of radiation , Preservation of Semi moist foods.		
Unit:5	**PROCESSING OF FOODS**	**14 hours**
Processing of foods – processing of mushroom, meat, poultry, egg and fish, Retort processing of Ready to Eat (RTE) products. Preparation of masala powders, essence and honey based products.		
Unit: 6	**CONTEMPORARY ISSUES**	**2 hours**
Webinar on Impact of COVID-19 on Food Processing Industries and road Ahead		
	Total Lecture hours	**90 hours**

Text Book(s)

1	Sivasankar, B. (2013) Food Processing and preservation 2nd edition, prentice Hall, Pvt, Ltd.
2	Srilakshmi, B. (2016) 6th Edition, Food Science, New Age International Private Ltd., New Delhi, 2002.
3	Swaminathan, M. (2014) Food Science, Chemistry and Experimental Foods, Bappco Publishers, Bangalore.
4	Adams, M.R. and Moss, M.O. (2015) Food Microbiology, New Age International (P) Ltd., New Delhi.

Reference Books

1	Chandrasekhar, U (2012) Food Science and Applications in Indian Cookery, Phoenix Publishing House Private Ltd., New Delhi
2	Fellow, P., (2010) Food Processing Technology – Principles and Practices, 3rd Edition, CRC Press Woodland Publishers, England.
3	Sommers, C.H. and Xveteng Fan (2016) Food Irradiation Research and Technology, Blackwell Publishing.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	https://edblog.hkedcity.netpdf- food preservation and method
2	www.betterhealth.vic.gov.au- preservation by food additives
3	https://www.eufic.org/en/whats- in- food/article
4	https://youtu.be/-F311eYU5QI

Course Modified By: Dr. G.Suba

Mapping with Programme Outcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	M	M	S	M	S	S	M	M	S
CO3	S	M	S	S	M	S	S	M	M	S
CO3	S	M	M	S	M	S	S	M	M	S
CO4	S	M	M	S	S	S	S	M	M	S
CO5	S	M	M	S	M	S	S	M	M	S

*S-Strong; M-Medium; L-Low

Course code	63P	TITLE OF THE COURSE	L	T	P	C
Core Practical: VII		FOOD PRESERVATION AND QUALITY CONTROL			45hrs	3
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to: Includes a variety of techniques that allow food to be kept for extended periods of time and avoiding the growth of unwanted microorganisms

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Apply the principles of various methods of food preservation	K3
2	Increase the shelf-life of food products	K4
3	To make it attractive for the consumers.	K3
4	Analyze food adulteration test for common foods	K4
5	Evaluate the prepared products by using sensory analysis	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Contents: **45 hours**

1. Methods of Food Preservation using salt and sugar.
2. Drying and Dehydration
3. Food Adulteration tests for some common foods.
4. Preservation and bottling of fruit and vegetable products.
5. Preservation by using chemicals
6. Sensory analysis of preserved and processed foods

Course code	6ZD	TITLE OF THE COURSE	L	T	P	C
SBS:IV		HEALTH,FITNESS AND SPORTS NUTRITION	45 hrs			3
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to:

Understand the importance of health for quality living and acquire knowledge about the role of food and exercise for sound health

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Understand the importance of health for quality living.	K2
2	Acquire knowledge about the role of food and exercise for sound health	K2
3	Analyze the importance of nutrition for sports personnel	K4
4	Evaluate the effect of exercise on health	K5
5	Discuss the techniques used in weight management	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	INTRODUCTION	10 hours

Health – Definition, concept/ meaning of health and factors affecting health. Health hazards – environment, population explosion, explosives, adulteration, dampness and measures to prevent health hazard. Health insurance schemes (ESI, Mediclaim)

Unit:2	FUNCTIONS OF FOOD	8 hours

Functions of food – Physiological, psychological and socio - cultural functions, constituents of food and their functions.

Unit:3	PHYSICAL EDUCATION	9 hours

Physical education – Meaning and scope, role of gymnastic exercises and yoga in improving health. Difference between yoga and other gymnastic exercises. Health club equipments and activities – Tread mill, hammer strength, steppers, cycles, body sculpting, kick boxing, Reebok ridge rocker, hanging, hand grips, swing, climbing and lifting weight.

Unit:4	SPORTS NUTRITION	8 hours

Sports nutrition –Introduction to kinanthropometry, Requirements during training and performance for athletes and endurance games, aerobic and anaerobic exercise, fuel for exercise, glycogen load. Exercise to maintain fitness.

Unit:5	WEIGHT MANAGEMENT	8 hours

Weight Management - Ideal body weight, weight loss – making weight and rapid weight loss strategies, Nutrition for special population: child athlete, ageing athlete, and athletic diabetes, vegetarian and disabled athlete.

Unit: 6	CONTEMPORARY ISSUES	2 hours
Webinar for Sports, Nutrition and Immunity: A sustainable lifestyle		
	Total Lecture hours	45 hours

Practicals:(No Examination)

1. Food intake during cultural festivals.
2. Visit to a health club / fitness centre
3. Assessment of fitness – simple test, Stepper technique
4. Guest lecture on health insurance schemes.
5. Observation of / Compulsory yoga exercise.
6. Observation of physical training for sports person

Text Book(s)

1	Werner W. K Hoejer (1989), Life time Physical Fitness and Wellness, Morton Publishing Company, Colorado.
2	Mishra, S. C (2005) Physiology in Sports. Sports Publication, New Delhi
3	Greenberg, S. J and Pargman, D (1989) Physical Fitness – A Wellness Approach Prentice Hall International (UK) Limited, London
4	Swaminathan M. (2008) Essentials of Food and Nutrition Bangalore Printing Publishing Co.

Reference Books

1	McArdle, W. D, Frank I. Katch, F. I and Victor L. Katch (1996) Exercise Nutrition: Energy Nutrition and Human Performance. William & Wilkin Publishing USA.
2	Mahan, K and Stump, E. S (1996) Krause Food and Nutrition and Diet Therapy W.B Saunders Company, USA.
3	McArdle, W. D, Frank I. Katch, F. I and Victor L. Katch (2010) Essentials of Exercise Physiology, 7th edition. William & Wilkin Publishing USA.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	https://www.sciencedaily.com
2	https://www.nutritionist-resource.org
3	https://youtu.be/NqJQ7iCepOg

Course Modified By: Dr. G.Suba

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	S	S	M	M	S
CO3	S	S	S	S	M	S	S	M	M	S
CO3	S	S	S	S	M	S	S	M	M	S
CO4	S	S	S	S	M	S	S	M	M	S
CO5	S	S	S	S	M	S	S	M	M	S

*S-Strong; M-Medium; L-Low

Course code	5EA	TITLE OF THE COURSE	L	T	P	C
Elective Paper: I A		BAKERY	75 hrs			3
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to: Understand the Role of automation, RPA, science and technology in bakery industry. Develop skills in planning and maintenance of a bakery institution.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Understand the use of robotic process automation in bakery industry	K2
2	Understand the science and technology of baking	K2
3	Understand the role of different ingredients in baking	K2
4	Develop skills in planning and maintenance of a bakery institution	K3
5	Understand the packaging materials used in bakery industry	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	INTRODUCTION TO AUTOMATION	14 hours

Introduction to Automation and RPA**:** Bascis of RPA- RPA benefits- Types of robots. Automation and RPA concepts**:** Business models for implementing RPA- Centre of Excellence- Types and their applications- Building an RPA team- Approach for implementing RPA initiatives.

Unit:2	BAKING	13 hours

Baking - Definition, Principles of baking, classification of baked foods. Types of equipments in baking industry, cleaning and sanitizing methods of baking equipments, baking temperature of different products, operation techniques of different baking equipments.

Unit:3	INGREGIENTS & THEIR ROLE IN BAKING	16 hours

Ingredients and Their Role in Baking - Flour, Yeast, sugar, egg, butter, salt, baking powder, colouring, flavouring agents. List of standard colouring and flavouring agents. Preparation of baked foods - Quick breads, cakes and its varieties, different types of
biscuits, cookies and pastries.

Unit:4	DECORATION OF BAKED FOODS	15 hours

Decoration of baked foods - Icing- Types of Icing used in different bakery product. Role of other ingredients used in icing. Baking unit/ plant layout and design of a baking unit sanitation and hygiene. Types of packaging materials used for bakery products, method of Packaging

Unit:5	PROCESS AUTOMATION IN BAKERY PRODUCTION AND PACKAGING.	15 hours

Automation in food industry & uniqueness, Tools of Automation in food industry. Advantages and Disadvantages of Automation in food Industry. Reason for automation process. Robotics in Packaging.

Unit: 6	**CONTEMPORARY ISSUES**	**2 hours**
Taste the future of bakery, Mithai & Namkeen Industry		
	Total Lecture hours	**75 hours**

PRACTICALS: (To gain knowledge about bakery- No Examination)

1. **Breads**
2. **Cakes**
3. **Biscuits and cookies**
4. **Pastries**
5. **Icing**

Text Book(s)

1	Potter M,N. and Hotchkiss, J.H. (1998) Food Science 5th edition, CBS Publications and Distributors, Daryaganji, New Delhi.
2	Dubey, SC, (1979) Basic Baking Science and Craft, Jwalmukhi Job Press, Bangalore

Reference Books

1	Baker"s Handbook on practical Baking .Wheat Associates, USA, New Delhi.
2	Modern Pastry Chab, Vol.I and II, A VI Publishing Co., Inc., West Port, Connecticut, 1977.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	https://www.uipath.com/landing/academic-studio-download
2	https://www.uipath.com/rpa/robotic-process-automation
3	https://www.uipath.com/rpa/academy
4	https://youtu.be/Cd3ELHVCJJo

Course Modified By:Ms.K.Suba Latha

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	S	S	M	M	S
CO3	S	M	M	S	S	S	S	M	M	S
CO3	S	M	M	S	S	S	S	M	M	S
CO4	S	M	S	S	S	S	S	M	M	S
CO5	S	M	S	S	S	S	S	M	M	S

*S-Strong; M-Medium; L-Low

Course code	5EB	TITLE OF THE COURSE	L	T	P	C
Elective : I B		FOOD PRODUCT DEVELOPMENT AND ENTREPRENEURSHIP	75 hrs			3
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to: focusing on creating or improved food products. Develop innovative and health food products.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Select ingredients needed for formulation of a new product	K3
2	Understand the importance of evaluation techniques for new products	K2
3	Develop new products based on the needs of customer	K3
4	Apply Automation and uses of Computer in food analysis	K4
5	Gain knowledge about entrepreneurship and its relevance in carrier growth.	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	INTRODUCTION	15 hours

Definition and classification, characterization and factors shaping new product development. Food needs and consumer preference: market survey and its importance. Advantages of processed foods in urbanized modern society.

Unit:2	SHELF LIFE REQUIREMENTS	16 hours

Shelf life requirements and factors affecting shelf life. Evaluation of shelf life, sensory attributes and effects of environmental conditions; accelerated shelf life determination; sensory attributes and effects of environmental conditions; accelerated shelf life determination selection and training of judges, development of score card analysis of data.

Unit:3	NEW PRODUCT DEVELOPMENT	14 hours

Designing new products and new food product development (NPD) process and activities, use of traditional recipe and modification, recent development.

Unit:4	ENTREPRENEURSHIP	15 hours

Importance of entrepreneurship and its relevance in carrier growth. Entrepreneur, entrepreneurship and enterprise, concept and development and characteristics of an entrepreneur. Types of enterprises and ownership, employment, self-employment and entrepreneurship.

Unit:5	AUTOMATION AND USES OF COMPUTER IN FOOD ANALYSIS:	13 hours

Tools of automation, automation in food industries and its example, Computer in food analysis and its application: Bar code technology, GSI system RFID technology, Chromatography, Spectroscopy

Unit: 6	**CONTEMPORARY ISSUES**	**2 hours**
Value addition in coconut International webinar		
	Total Lecture hours	**75 hours**

Practicals : Formulation of new food products for(No Examination)

1. **Infants**
2. **Preschool Children**
3. **Adolescents**
4. **Pregnant and nurshing mothers**
5. **Old age**
6. **Sports person**

Text Book(s)

1	Sudhir Gupta (2017) Handbook of Packaging Technology, Engineers India Research Institute, New Delhi
2	Daise, Frank, A. (Ed.) 2015, Modern Processing, Packaging and Distribution System for Food, Blackie, Glasgow and London.
3	Suja, R. Nair(2014) Consumer Behaviour and Marketing Research, 1st Edition, Himalaya Publishers.

Reference Books

1	Food Packaging Technology Handbook, 2013, NIIR Board of Consultants and Engineers, National Institute of Research, New Delhi.
2	Modern Packaging Industries, 2014, NIIR Board of Consultants and Engineers, National Institute of Industrial Research, New Delhi.
3	Potter, N.M., Food Science, The AVI Publishing Company Inc., West Post, Connecticut, USA 2015,
4	Khanaka, S.S. (2016) Entrepreneurial Development, S. Chand and Company Ltd, New Delhi.
	Hmacfie (2017) Consumer led Food Product Development, Weedhead Publishing Ltd., UK .

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	http://mek.oszk.hu/11400/11406/11406.pdf
2	http://entrepreneuriat.inforoutefpt.org/documents/ang_nc-4328_projet.pdf
3	www.destechpub.com › wp-content › uploads › 2015/01

Course Modified By: Ms.K.Suba Latha

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	S	S	S	M	M	S
CO3	S	M	M	S	S	S	S	M	M	S
CO3	S	M	S	S	S	S	S	M	M	S
CO4	M	M	M	M	S	S	S	M	M	S
CO5	S	M	M	S	S	S	S	M	M	S

*S-Strong; M-Medium; L-Low

Course code	6EA	TITLE OF THE COURSE	L	T	P	C
Elective: II A		QUANTITY FOOD SERVICE AND PHYSICAL FACILITIES	90hrs			3
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to: Understand the layout of foodservice institution and basics of quantity food production.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Understand the physical requirements for quality food production	K2
2	Gain knowledge and develop skills in handling food service equipment	K2
3	Understand the basics of quantity food production and meal planning	K2
4	Understand the basic principles of food storage, preparation, service and cleaning	K3
5	Gain knowledge about floor planning and layout for a foodservice institution.	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	FLOOR PLANNING AND LAYOUT	20 hours

Floor planning and layout – characteristics of typical food service facilities. Floor plan– physical planning, space allocation for the various areas and flow of traffic through receiving, storage, preparation, service and dish washing areas. Working heights and dimensions of work centers, lighting, ventilation and pest – rodent control.

Unit:2	MATERIALS	14 hours

Materials - Basic materials used in the manufacture of equipment, finishes and insulation. Strength and limitation of materials.

Unit:3	EQUIPMENT	18 hours

Equipment - Equipment required for quantity food service-major and minor equipment with reference to food storage, preparation, service and cleaning. Factors influencing their selection and purchase. Arrangement of equipment in work centers, use, care and maintenance of equipment. Transition from traditional to modern equipment.

Unit:4	MEAL PLANNING	18 hours

Meal Planning - Menu-principles involved in planning menu, types of menu. Fuel: Cooking fuels-selection, advantages, limitations, safety measures and fuel saving techniques.

Unit:5	QUANTITY FOOD PREPARATION	18 hours

Quantity food preparation – Selection, purchasing and storage of foods, standardization of recipe, portion control, utilization of left over foods. Marketing of foods –Importance and need for advertisement.

Unit: 6	CONTEMPORARY ISSUES	2 hours

Webinar on food product development

	Total Lecture hours	**90 hours**
Text Book(s)		
1	Sethi and Mahan s. (2015) Catering Management and integrated approach ,Johnwiley and Sons,New York .	
2	Potter M,N. and Hotchkiss, J.H. (1998) Food Science 5th edition, CBS Publications and Distributors, Daryaganji, New Delhi	
3	West, B.B., Wood, L., Harger, C.F. and Shugart, G. (1988), Food Service in Institutions, John Wiley and Sons, New York.	
Reference Books		
1	Glow ,G., (1977) "Catering Equipment and Systems Design „" , Applied Science Publishers Ltd.	
2	Unkelsbay,Nand Unkilesbay,k. (1982) "Energy management in Food service : Ellis Harwood Ltd.,England 1982.	
3	Kinton ,R and Ceserani ,V. (1985) "The Theroy of catering ", Arnold – Heinemam.	
4	Marian C.Spears , (1995) Food Service Organisation , III rd edition – Managerial and system approach ,prentice hall.inc.Osio,.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	Psu.pb.unizin.org	
2	epgp.inflibnet.ac.in	
3	https://youtu.be/BHGNy3i99Yo	
Course Modified By: Dr. G.Suba		

Mapping with Programme Outcomes										
Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	M	M	S	M	S	S	M	M	S
CO3	S	M	M	S	M	S	S	M	M	S
CO3	S	M	M	S	M	S	S	M	M	S
CO4	S	S	S	S	M	S	S	M	M	S
CO5	M	M	M	S	M	S	S	M	M	M

*S-Strong; M-Medium; L-Low

Course code	6EB	TITLE OF THE COURSE	L	T	P	C
Elective Paper: II B		ELECTIVE PAPER II-B HUMAN DEVELOPMENT	90 hrs			3
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to:

Develop an understanding of an individual from infancy to adolescence so that they Can be guided effectively. Develop an awareness of the problems of children and adolescents and old age. Learn about exceptional children and address their needs

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Familiarize with the growth process from conception to confinement	K2
2	Understand the physical, psychological and social development of the individual from infancy to old age.	K2
3	Understand the human development in contemporary society	K2
4	Develop an awareness of the problems of children and adolescents and old age.	K3
5	Learn about exceptional children and address their needs	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	INTRODUCTION	16 hours

Introduction to Human Development- Definition, History, Multidisciplinary and Scientific nature. Scope of Human Development in contemporary society. Domains and Stages of Human Development. Principles of growth and development.

Unit:2	PRENATAL DEVELOPMENT	20 hours

Prenatal Development and Post natal Care- Birth and the Neonate (newborn) - Reproductive health, planning and preparing for parenthood. Conception – signs and symptoms of pregnancy, prenatal development – stages of development, factors affecting development, birth process – signs of labour, stages, birth injuries, postnatal care – adjustment of the newborn. Infancy and - Development during infancy – Physical, social, emotional, cognitive and language. Infant care and hygiene – immunization schedule, habit formation. Minor ailments and preventive measures.

Unit:3	EARLY AND LATE CHILDHOOD	19 hours

Early and late childhood– Physiological and psychological. Role of Child care centres. Physical, motor, emotional, language, moral, social and intellectual development. Child and family member relationship. Habit formation. Behaviour problems – causes, prevention and treatment. Preschool education – importance, objectives, programmes. Play – definition, types, characteristics and play hazards. Children with special needs – definition, classification of each exceptional children, characteristics and rehabilitation of children with special needs.

Unit:4	**ADOLESCENCE**	**18 hours**
Adolescence – definition, physical, emotional, intellectual and motor development, personal adjustment and maladjustment. Delinquency – causes, prevention and rehabilitation. Role of Parents and Society. Factors influencing Personality Development, Drug addiction and alcoholism – rehabilitation.		
Unit:5	**ADULTHOOD AND OLD AGE**	**15 hours**
1. Adulthood – characteristics and developmental tasks, problems in middle age. Old Age – physical and psychological changes, problems of the aged, family attitude towards aged, place of the aged in Indian Society.		
Unit: 6	**CONTEMPORARY ISSUES**	**2 hours**
Webinar on Managing Common Pain and Movement problems in Elderly		
	Total Lecture hours	**90 hours**

Text Book(s)

1	Charles, S.P. (1983). Adolescent Psychology, New Delhi: Vikas House.
2	Duvall,M.E., (1972). Marriage and Family Development, New York: J.P. Lippincott Co.
3	Rajammal P. Devadas and Jaya N. Muthu (2002). A Text Book of Child Development, New Delhi: Macmillan Publishers.
4	Nanda V.K., (1998): Principles of Child Development, New Delhi: Anmol

Reference Books

1	Hurlock E.B., (1972). Child Development, New York : McGraw Hill Book company.
2	Hurlock, E.B., (1995): Developmental Psychology – A Life Span Approach, 5th (Ed.) New York: McGraw Hill Book Co.,.
3	Mussenetal.(1990). Child Development and Personality, New York: Harper and Row publishers.
4	Sapra, R. (2007): Integrated Approach to Human Development. New Delhi Vishwabharathi.
5	Singh, A. (2015). Foundations of Human Development: A Life Span Approach. New Delhi: Orient Black Swan.
6	Suriakanthi A., (1997). Child Development – An Introduction, Tamil Nadu: Kavitha Publishers.
7	Swaminathan, M (1998). The First Five Years : A Critical Perspective on Early Childhood Care and Education in India. New Delhi : Sage Publications.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	https://my.clevelandclinic.org- prenatal development

2	https://www.tuv.edu- child rearing practices
3	https://library.ccis.edu- exceptional children
4	https://www.childtrends.org- adulthood characteristics
5	https://www.ncbi.nlm.nih.gov- old age problems social
6	https://youtu.be/CNAUQj1Dg40
Course Modified By: Dr. G.Suba	

Mapping with Programme Outcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	S	S	S	M	M	S	S	M	M	S
CO3	S	M	S	M	M	S	M	M	M	S
CO3	S	M	S	S	M	S	S	M	M	S
CO4	S	M	S	S	M	S	S	M	M	S
CO5	S	M	S	S	M	S	S	M	M	S

*S-Strong; M-Medium; L-Low

Course code	6EC	TITLE OF THE COURSE	L	T	P	C
Elective Paper : III A		FAMILY RESOURCE MANAGEMENT	90hrs			3
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to:

Understand concepts & principles of resource Management & its functions. Understand the significance of management in changing environment .Help students to learn to use resources Effectively

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Understand the use of IOT in home automation.	K2
2	The significance of management applicable to families.	K3
3	Recognize the importance of wise use of resources to achieve one's goals.	K4
4	Become a good home maker	K2
5	Gain knowledge in various aspects in home economics	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	INTRODUCTION TO IOT	14 hours

Introduction to IoT: Evolution of IoT- Definition & characteristics of IoT- Architecture of IoT- Technologies for IoT- Developing IoT application- Application of IoT- Industrial IoT-Security in IoT, IoT in home automation.

Unit:2	MANAGEMENT AND ITS CONCEPTS	20 hours

Management – Definition, Principles and elements involved in management, Process – planning, controlling and evaluation. Motivation in management.(Introduction to values, goals and standards)

Management Concepts - Goals and Values – their relationship to decision-making Standard of Living – Definition, constituents – Means for raising the standard of living of families.

Unit:3	DECISION MAKING AND RESOURCES	18 hours

Decision Making – steps, importance, types of decisions, Habitual versus Conscious decision making. Individual and group decisions, resolving conflicts in group decisions. Resources – Human and non-human resources. Characteristics of Resources-utilized to achieve family goals.

Unit:4	FAMILY AND ENERGY MANAGEMENT	18 hours

Family - Concept, Role, life cycle changes and stages of family life cycle. Work simplification – Definition, importance, Mundel's classes of change Time Management – Time Demands during different stages of the family life cycle, Time cost, Factors to be consider in making time and activities plans. Energy Management – Relation of energy to the stages of the family life cycle, Fatigue – Forms and effects of fatigue.

Unit:5	**FAMILY INCOME**	**18 hours**

Family Income – Definition, Types - Money, Real and Psychic income, various ways of improving the income of the family, Family finance management, family, Budget – Definition and meaning, importance of budgeting, steps, factors affecting the budget. Engles's Law of Consumption.

Savings – Meaning, objectives, Needs for savings in the family, types of savings institutions and schemes. Consumer – Meaning and definition of consumer, consumerrights. Problems faced by the consumer.

Unit: 6	**CONTEMPORARY ISSUES**	**2 hours**

Webinar on Living with COVID-19: Biochemical and physiological Considerations for family

	Total Lecture hours	**90 hours**

Text Book(s)

1	Varghese,M.A et al. – "Home Management", (Second Edition), New Age International (P) Limited, Publishers, 7/30 A, Daryaganj, New Delhi – 110002.
2	Asay, S.M. and Moore, T.J. (2016) Family Resource Management, Third Edition,.

Reference Books

1	Nickell.P. and Dorsey. J.M. – "Management in Family Living", John Wiley and Sons, Inc, New York, 1960.
2	SingalSavita Prof. and GandotraVeena Prof. Family Resource Management. Historical and contemporary Developments, Dominant Publishers and Distributors, New Delhi – 110002.
3	NeeruGargSushma Gupta, Textbook of Family Resource Management, 9th Edition 2008.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	http://download.nos.org/srsec321newE/321-E- Lesson-10.pdf
2	http://cmsnew.pdst.ie/sites/default/files/Resource%20Mgt.pdf
3	http://ecoursesonline.iasri.res.in/mod/page/view.php?id=122107
4	http://shodhganga.inflibnet.ac.in/jspui/bitstream/10603/129462/8/08_chapter3.pdf
5	http://www.yourarticlelibrary.com/home-management/home-science-work-simplificationmethods-with-diagram/47806
6	https://youtu.be/g6P-OpXuMN4

Course Modified By: Ms.K.Suba Latha

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	M	S	S	S	S	M	M	S
CO3	M	M	S	S	S	S	S	M	M	M
CO3	M	M	M	S	S	S	S	M	M	M
CO4	S	M	S	S	S	S	S	M	M	M
CO5	S	M	S	S	S	S	S	M	M	M

*S-Strong; M-Medium; L-Low

Course code	6ED	TITLE OF THE COURSE	L	T	P	C
Elective Paper: III B		FOOD PACKAGING	90 hrs			3
Pre-requisite			Syllabus Version		2020-21	

Course Objectives:

The main objectives of this course are to: Introduce artificial intelligence for food packaging. understand the need for food packaging and recent trends in packaging material

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Understand the need for food packaging	K2
2	Know the recent trends in packaging materials and labelling	K2
3	Learn and gain knowledge on food packaging and applications during transportation	K3
4	Compile about the different packaging materials	K4
5	Understand the uses of robots in packaging	K2

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate;

Unit:1	INTRODUCTION TO AI	14 hours

Artificial Intelligence (AI): Introduction to AI- Fundamentals- Need for AI- Foundations of AI – AI environment-Applications domains of AI- AI tools- Challenges and future of AI

Unit:2	FOOD PACKAGING AND ITS MATERIALS	20 hours

Food packaging - Definition, functions of packaging materials for different foods, characteristics of packaging material. Food packages – bags, pouches, wrappers, tetra packs- applications.

Packaging materials - Introduction, purpose, requirements, types of containers. Modern packaging materials and forms-Glass containers, metal cans, composite containers, aerosol containers, rigid plastic packages, semi rigid packaging, flexible packaging.

Unit:3	PACKAGES OF RADIATION STABILIZED FOODS	18 hours

Packages of radiation stabilized foods - Introduction, rigid containers, flexible containers, general methods for establishing radiation stabilization. Radiation- measurement of radiations. Biodegradable packaging material – biopolymer based edible firm.

Unit:4	PACKAGES OF DEHYDRATED PRODUCTS	17 hours

Packages of dehydrated products Orientation, metallization, co-extrusion of multilayer films, stretch, package forms and techniques. Aspectic packaging, retortable containers, modified and controlled atmosphere packaging, skin, strink and cling film packaging, micro-ovenable containers, other package forms and components of plastics.

Unit:5	USES OF ROBOTS IN PACKAGING.	19 hours

Types of Robots used in food packaging. Automation of packaging. Types of Equipment and technologies in automation of packaging System. Packaging of finished goods weighing, filling, scaling, wrapping, cartooning, labeling, marking and trapping. Labeling: Standards, purpose, description types of labels, labeling regulation barcode, nutrition labeling, health claims, and mandatory labeling provision.

Unit: 6	**CONTEMPORARY ISSUES**	**2 hours**
Food Packaging		
	Total Lecture hours	**90 hours**

Text Book(s)	
1	Potter, N.M. (2015) Food Science, The AVI Publishing Company Inc., West Post, Connecticut, USA.
2	Daise, Frank, A. (2015) (Ed.) Modern Processing, Packaging and Distribution System for Food, Blackie, Glasgow and London.
Reference Books	
1	Food Packaging Technology Handbook (2013) NIIR Board of Consultants and Engineers, National Institute of Research, New Delhi.
2	Modern Packaging Industries (2014) NIIR Board of Consultants and Engineers, National Institute of Industrial Research, New Delhi.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://www.scielo.br
2	https://www.uipath.com/rpa/robotic-process-automation
3	egya;//nkosh.ac.in
4	https://youtu.be/Nxla-0kwWnk
Course Modified By: Ms. K.Suba Latha	

Mapping with Programme Outcomes										
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	M	M	S	S	S	S	S	M	M	S
CO3	M	M	S	S	S	S	S	M	M	S
CO3	M	M	S	S	S	S	S	M	M	S
CO4	M	M	M	S	S	S	S	M	M	S
CO5	M	M	M	S	S	S	S	M	M	S

*S-Strong; M-Medium; L-Low

Annexure

BHARATHIAR UNIVERSITY: COIMBATORE 641046

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

MISSION

Food Science and Nutrition promotion is to advance an integrative approach to foods, nutrition and health by innovative research and progressive education of undergraduate students and to educate the public through creative outreach.

Currently in Food Industry, where Industry 4.0 focusing more on nutrient composition of the products such as calories, percentage of macronutrients, nutraceutical properties etc. Hence it is essential that Food Science and Nutrition is offered at various levels of education in general and masters in particular.

Job opportunities are wide in the field of nutrition both in public and private sector. Professionals can work at hospitals, fitness centers, food industries, self-employment (small scale industries), entrepreneurship, research and development etc.

List of Elective papers (Colleges can choose any one of the paper as electives)		
Elective-I	**A**	Bakery *
	B	Food Product Development and Entrepreneurship
Elective-II	**A**	Quality Food Service and Physical Facilities
	B	Human Development
Elective-III	**A**	Family Resource Management
	B	Food Packaging

- ***Training in a Bakery for 15 days in semester break of V semester compulsory to earn 3 credits.
- Minimum ten practical exercises per paper per semester
- Unit VI, included all the papers, will not come under question paper setting