

M.Sc. Food Science & Nutrition

Syllabus

AFFILIATED COLLEGES

Program Code: 32N

2023 – 2024 onwards



BHARATHIAR UNIVERSITY

(A State University, Accredited with “A++” Grade by NAAC,
Ranked 21st among Indian Universities by MHRD-NIRF)

Coimbatore - 641 046, Tamil Nadu, India

Program Educational Objectives (PEOs)	
The M. Sc. Food and Nutrition program describe accomplishments that graduates are expected to attain within five to seven years after graduation	
PEO1	Academic Excellence: Being completing post-graduation, the candidate acquires knowledge and skill related to their field and will be able to communicate their knowledge with ease and can provide solution for problems and also has decision making ability.
PEO2	Higher Order Thinking Skills: The candidate will be able to think critically. Is able to analyse, evaluate and create new knowledge and skills both in the chosen discipline and across other fields.
PEO3	Subscription to Quality Research: The candidate is able to identify a research problem and carryout a systematic and innovative research in the field of specialization.
PEO4	Lifelong Learning: Have ability to update the knowledge and skills in the emerging areas of the field of specialization.
PEO5	ICT Literacy: Gain knowledge and can use it in their field of work. Readily able to Adapt to the technical advancements related to digitalization.
PEO6	Good Communication: Ability to communicate fluently in their regional languages and English.
PEO7	Civic, Social and Individual Responsibility: Will be honest, loyal and truthful, able to function abiding by the law, rules and has the ability to continuously develop oneself professionally.

Program Specific Outcomes (PSOs)	
After the successful completion of M.Sc. Food and Nutrition program, the students are expected to	
PSO1	Acquire knowledge on food science, food chemistry, food preservation, and processing and food biotechnology.
PSO2	Explain the role of macro and micro nutrients In human health and disease.
PSO3	Correlate the nutritional deficiencies and non-nutritional diseases and food intake.
PSO4	Communicate the physiological and biochemical aspects of human body.
PSO5	Analyse the role of nutraceuticals and functional foods.
PSO6	Identify a problem and design a systematic way of solving it statically.
PSO7	Critically evaluate the issues related to nutritional deficiencies, food safety and security, food preservation and processing.



Program Outcomes (POs)	
After the successful completion of M.Sc. Food and Nutrition program, the students are expected to	
PO1	Apply the basic principles in food science, food processing, preservation, food chemistry, food microbiology, food biotechnology and nutrition.
PO2	Correlate the role of macro and micro nutrients as well as the biochemical balance in normal physiology and in pathological conditions.
PO3	Critically evaluate the issues related to food safety and security, food preservation and processing.
PO4	Explain the role of nutrition in disease and the importance of nutraceuticals in human health.
PO5	Extend the knowledge on food science, nutrition and food processing for innovative research.
PO6	Develop strategies to apply theoretical concepts in clinical interventions, nutritional assessment, diet planning and for health promotion.
PO7	Seek the problems related to food science, nutrition, processing, food and environmental safety and solve the problems using latest technical knowledge and tools.



BHARATHIAR UNIVERSITY, COIMBATORE 641 046

M.Sc. FOOD AND NUTRITION

(Affiliated Colleges)

(For the students admitted from the academic year 2023 – 24 onwards)

Course Code	Title of the Course	Credits	Hours		Maximum Marks		
			Theory	Practical	CIA	ESE	Total
FIRST SEMESTER							
13A	Food Science	4	5	-	25	75	100
13B	Nutrition Through Life Cycle	4	5	-	25	75	100
13C	Physiological aspects of nutrition	4	6	-	25	75	100
13D	Macronutrients	4	5	-	25	75	100
1EA / 1EB	Elective paper-I	4	3	-	25	75	100
13P	Practical – I Food Analysis Practical	4	-	6	40	60	100
	Total	24	24	6	165	435	600
SECOND SEMESTER							
23A	Food Biotechnology	4	4	-	25	75	100
23B	Research Methodology and Statistics	4	4	-	25	75	100
23C	Micronutrients	4	5	-	25	75	100
23D	Nutritional Biochemistry	4	4	-	25	75	100
23E	Nutrition in Disease-I	4	4	-	25	75	100
23P	Biochemical analysis practical	4	-	6	40	60	100
2EA / 2EB	Elective paper II	4	3	-	25	75	100
	Total	28	24	6	190	510	700
THIRD SEMESTER							
33A	Food Processing	4	6	-	25	75	100
33B	Community Nutrition	4	6	-	25	75	100
33C	Nutrition in Disease-II	4	6	-	25	75	100
33P	Practical-II Nutrition in disease Practical	4	-	3	25	75	100
33D	Application of computer in nutrition	2	3	-	25	25@	50
	Practical – III Application of computer in nutrition practical	2	-	3	20	30	50
3EA / 3EB	Elective paper-III	4	3	-	25	75	100

		Total	24	24	6	170	430	600
FOURTH SEMESTER								
43A	Nutraceuticals and Functional Foods	4	6	-	25	75	100	
46V	Mini Project*	2	-	-	50*	-	50	
43P/43Q	Elective Paper IV – Practical	4	-	3	25	75	100	
47V	Project work (Project work : 80 & Viva-voce : 20 marks)	4	-	21	-	100**	100	
Total		14	6	24	100	250	350	
Grand Total		90					2250	

15 days training in multi-specialty hospital to qualify for the degree

* One month training in Food industry and submit a mini project. Only internal. No external.

**Project work:80 & Viva-voce:20 marks). Only external. No internal.

For Project work: 40 marks & Viva-voce: 10 marks

Unit VI is only for self-learning it is not included for exam.

List of Group Elective papers: Colleges can choose any one of the Group papers as electives)

GROUP A Paper I /	GROUP A	GROUP B
Sem I	Convenience foods	Institutional Food Management
Paper II / Sem II	Food packaging	Food Product Development and Marketing
Paper III / Sem III	Food quality control	Culinary Techniques
Paper IV / Sem IV	Food quality control - Practical	Food Service Management Practical

- 1. Elective Courses:** Minimum Two for Each Semester.
- 2. Supportive Courses:** Minimum One for first three Semesters.
- 3. Value Added Courses:** Minimum 2 and maximum 5 for Each Department for Entire Program
- 4. Job Oriented Certificate Courses:** Two Courses (Each one on First and Second Year)



First Semester

Course code	13A	Paper – I FOOD SCIENCE	L	T	P	C
Core			75	-	-	4
Pre-requisite	A knowledge on foods and chemistry		Syllabus Version	2023-24		
Course Objectives:						
The main objectives of this course are to:						
<ol style="list-style-type: none"> 1. Gain knowledge on composition and nutritive value of foods 2. Develop skills in cooking. 3. Understand the principles of cooking different kinds of foods 4. Apply the scientific principles while making new recipes 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	List and classify foods based on its nutritive value and understand the properties of food					K1&K2
2	Understand and apply the scientific principles in cooking different foods like cereals and pulses.					K2&K3
3	Apply the principles in various preparations and processing of fruits and vegetables					K3
4	Analyze the impact of different cooking methods on nutritive value of foods					K3
5	Evaluate the nutrient loss during cooking					K5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
Unit:1	Properties of foods				15 hours	
<p>Properties of Foods - Physical properties, chemical bonds in foods, chemical reactions in foods - enzymatic reaction and non-enzymatic reaction.</p> <p>Food Colloids - Structure, formation, mechanisms, stabilization, factors affecting stabilization. Millets - Products, composition, structure and nutritive value. Cereal and their Uses Structure of the grain, composition of seed parts, storage of grains.</p> <p>WHEAT Structure, composition, nutritive value. Wheat flour — types, functionality of components, baking qualities, manufacture of bread and cakes. RICE Structure, nutritive value and composition. Cereal cookery.</p>						
Unit:2	Pulses, Nuts and Oil seeds				15 hours	
<p>PULSES Composition, nutritive value, methods of processing, vegetable protein mixes protein, natural toxicants and pulse cookery.</p> <p>NUTS AND OILSEEDS Composition, nutritive value, nutritious food mixes from oil seeds. FATS AND OIL Sources, nutritional composition, functions, physical and chemical properties, rancidity — types and prevention, role of fat / oil in food preparations.</p> <p>Sugars and related products -Sources, uses, reactions of sugar and sugar related products. Crystalline and non-crystalline candies.</p>						
Unit:3	Fruits, Vegetables and Beverages				15 hours	
<p>VEGETABLES AND FRUITS Classification, selection, storage, composition, structure, texture, pigments, browning reaction, pectic substances, ripening of fruits, changes on cooking and processing.</p> <p>BEVERAGES – types and classification.</p>						

Unit:4	Meat, Egg and Milk products	15 hours
<p>Meat - Structure, composition, postmortem changes, Rigor mortis, Aging and Tenderization of meat, colour of meat, changes of meat in cookery and methods of cooking.</p> <p>Poultry - Classification, composition, market forms, selection factors and methods of cooking. Fish - Classification, composition, kinds of fish, characteristics of fresh fish, fish products and methods of cooking.</p> <p>Egg - Structure, composition, grading and selection, effects of heat on egg protein, egg foam and role in cookery. Milk and milk products - Composition, physical and chemical properties — effects of heat, acid and enzymes, processing of milk, types of milk. Milk products –butter, cheese, milk powder, khoa, ice cream</p>		
Unit:5	Spices and condiments	15 hours
<p>Spices and condiments – types, uses and abuses, role in cookery ,medicinal uses. Quality of foods- Subjective and objective evaluation of foods. Food additives - Food colours and flavours, thickeners, emulsifiers and food improvers.</p> <p>GRAS additives Food Preservation Methods of food preservation- dehydration, freezing, refrigeration, preservation with chemicals, mold inhibitors and antioxidants, irradiation, microwave heating.</p>		
Unit:6	Contemporary Issues	2 hours
Composition of pulses		
ABHVA Foundation International webinar on Food Science & Nutrition		
Total Lecture hours		75 hours
Text Book(s)		
1	Srilakshmi, B., —Food Science, New Age International Private Ltd., New Delhi, 2003.	
2	Swaminathan, M –Food science chemistry and experimental foods –Bappco Publishers	
3	Manay, S.M and Shadaksharaswamy –Food, facts and Principles, Wiley Eastern Ltd, 1987	
Reference Books		
1	Paul, P.C. and Palmer, H.H., Food Theory and applications, John Wiley and Sons., New York, 1992.	
2	Charley, H and Weanee, C.M. — Foods — A scientific Approach, IIIrd Edition, Practice Hall, 1995.	
3	Norman.N.Potter –Food Science, CBS Publishers	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://www.google.com/search?q=PULSES+Composition%2C+nutritive+value&oq=PULSES+Composition%2C+nutritive+value&aqs=chrome..69i57j33.6333j0j15&sourceid=chrome&ie=UTF-8#	
2	https://youtu.be/S_17LjFvqo	
Course Modified By: Dr.G.suba		

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

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

Course code	13B	Paper – II NUTRITION THROUGH LIFE CYCLE	L	T	P	C
Core			75	-	-	4
Pre-requisite	A knowledge on nutrition and physiology		Syllabus Version	2023-24		
Course Objectives:						
The main objectives of this course are to:						
<ol style="list-style-type: none"> 1. Gain knowledge on the nutritional requirement for different age group 2. Develop skills in planning balanced for different age group 3. Understand the nutritional problems in different age group and 4. Be aware of the nutritional demands in physiological stages of life cycle. 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Know the nutritional requirements and RDA for different age groups.					K1
2	Outline nutritional needs of different age groups.					K2
3	Plan and prepare menu for different age groups with justification.					K3&K4
4	Analyse the nutritional alterations needed for nutritional problems of different age group.					K4
5	Evaluate changes in human life span and to predict there changes needed for lifecycle.					K4 &K5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
Unit:1	RDA, Nutrition in Pregnancy				15 hours	
UNIT I Concept of health recommended dietary allowances for Indians, basis for requirement, computation of allowance. ICMR - Indian recommended allowances Nutrition in pregnancy - Stages of gestation, maternal physiological adjustments, weight gain during pregnancy and nature of weight gain, nutritional requirements, physiological cost of pregnancy, complications of pregnancy and adolescent pregnancy.						
Unit:2	Nutrition in Lactation and Infancy				15 hours	
UNIT II Nutrition in Lactation - Physiological adjustments during lactation, hormonal controls and reflex action, lactation in relation to growth and health of infants, physiology of milk production, problems of breast feeding, nutritional components of colostrum and mature milk, special foods during lactation, nutritional requirements during lactation. Nutrition in infants - Rate of growth, weight as the indicator, premature infant, feeding premature infants, low birth weight, breast vs. bottle feeding, nutritional allowances, supplementary feeding, weaning foods.						
Unit:3	Nutrition in Preschool and School Going Children				15 hours	
Nutrition in Preschool Children - Growth and development of preschool children, prevalence of malnutrition (Vitamin A deficiency, Anaemia, IDD) in preschool age, food habits, nutritional requirements, supplementary foods. Nutrition in School Age - Early and middle childhood, physiological development, food habits, nutritional needs and feeding, RDA, Foods habits. Feeding of sick children and children with special needs.						

Unit:4	Nutrition during Adolescence, Adulthood and Old Age	15 hours
<p>Nutrition During Adolescence - Physical growth, physiological and psychological problems associated with pubertal changes, nutritional needs, eating disorders — anorexia nervosa, bulimia nervosa, Nutiriton and Medical problems during adolescents.</p> <p>Nutrition During Adulthood — Nutrition and work efficiency, basis for requirements, Nutrition in Menopause – Osteoporosis.</p> <p>Nutrition for Old Age - Socio economic and psychological factors — nutritional requirements, factors affecting food intake, clinical needs and malnutrition, institutionalized changes in old age. Advances in geriatric nutrition.</p>		
Unit:5	Nutrition for Physical Activity and Exercise	15 hours
<p>Body systems involved in physical activity (Cardio-respiratory and musculo-skeletal system), benefits of an active lifestyle (cardiorespiratory, musculo-skeletal improvements and other health benefits of physical activity), physical fitness assessment — cardio respiratory fitness, assessment of body composition, muscular fitness assessment, flexibility assessment.</p> <p>Exercise and thermogenesis, role of carbohydrate, fat and protein as a fuel for exercise, fluid and electrolyte balance during prolonged exercise, nutritional requirements in sports, dietary intake before, during and after exercise.</p>		
Unit:6	Contemporary Issues	2 hours
<p>https://youtu.be/bB-ejXVWFw</p>		
Total Lecture hours		75 hours
Text Book(s)		
1	Vinodhni Reddy, Prahiad Rao, GovmthSastry and Kashinath, —Nutrition Trends in India, NIN, Hyderabad, 1993. 6.	
2	Shills, E.M. Olson, A.J. and Shike, Lea and Febiger, —Modern Nutrition in Health and Diseases.	
3	Krause’s Food,nutrition and diet therapy,Eleventh edition	
Reference Books		
1	Frances, J. Zeman, Nutrition and Dietetics, 1983.	
2	B. Srilakshmi, —Dietetics, New Age International Pvt. Ltd, 2003.	
3	B. Srilakshmi, —Nutrition Sciencel, New Age International Pvt. Ltd., 2003.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	Nutrition & Women’s Health	
Course Modified By: Dr.G.suba		

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	S	S	M	S	S	S	M
CO2	S	S	M	S	S	S	M
CO3	S	S	M	S	S	S	M
CO4	M	M	M	M	S	S	S
CO5	M	M	S	S	S	S	S

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

Course code	13C	PAPER III PHYSIOLOGICAL ASPECTS OF NUTRITION	L	T	P	C
Core			90	-	-	4
Pre-requisite		Knowledge on anatomy and physiology of human body	Syllabus Version	2023-24		
Course Objectives:						
The main objectives of this course are to: To enable students						
1. Gain knowledge on blood components and immunological aspects						
2. Understand the physiological aspects of hormones, drugs, etc.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Remember the functions of blood, hormones.					K1
2	Understand the mechanism of action of hormones and drugs.					K2
3	Apply the knowledge on identification of nutritional problems.					K3
4	Analyze the interaction among drug and nutrients.					K4
5	Evaluate the impact of hormones in hyper and hypo conditions.					K5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6- Create						
Unit:1	BLOOD					18 hours
Blood - Composition, cellular elements of blood — RBC, WBC AND Platelets. Haemoglobin — structure and function. Plasma proteins — functions. Blood coagulation and disorders of blood coagulation						
Unit:2	IMMUNITY					18 hours
Immunity - Types of immunity, cells of the immune system, immune response - humoral immunity, cell mediated immunity, immune changes in malnutrition, vitamin deficiency, iron deficiency and zinc modulation, neuro-endocrine control of stress and immunity, immune mechanisms in infections, auto-immunity and hypersensitivity.						
Unit:3	HORMONES					18 hours
Hormones - Principles of hormone action and endocrine control, synthesis, secretion and biological effect of pituitary, thyroid, parathyroid, adrenal, pancreas, male and female reproductive hormones. Enzymes- definition,classification,action,factors influencing rate of enzyme action,MichaelsMentonequation,derivation, enzymes in medical diagnosis.						
Unit:4	WATER AND ELECTROLYTE BALANCE					18 hours
Water and Electrolyte Balance - Total body water, intake versus output of water, body fluid compartments, composition of body fluid, measurement of body fluid volumes, forces controlling the water and electrolyte balance between cells and extra cellular fluid, metabolism of water and electrolytes, regulation of acid balance, effect of diet on water, electrolyte and acid base balance. Function tests - Gastric function test, liver function test, renal function test and endocrine function test.						
Unit:5	DRUGS					18 hours
Drugs - Introduction, absorption, biotransformation and excretion of drugs, drug metabolism, routes of drug administration, and mechanisms of drug action factors modifying drug effects, receptor theories, drug and nutrient interactions. Hunger, appetite and satiety,physiological and psychological factors						

affecting food intake.		
Unit:6	Contemporary Issues	2 hours
Webinar on Immuno -nutrition –The way Ahead		
Total Lecture hours		90 hours
Text Book(s)		
1	Concise Human Physiology by M.Y. Sukkar, H.A. El-Murshid and M.S.M. Ardawi — Blackwell Scientific Publications, 1993.	
2	P. Parimoo, A textbook of Medicinal Chemistry, CBS Publishers and Distributors, 1995.	
3	Textbook of clinical (Medical) Biochemistry and immunology by S. Rainakrishnan&Raji Swami, T.R. Publications Private Ltd., 1995.	
4	Human Physiology — Chakrabarti, Ghosh and Sahara — The New Book Stall, Second Edition, 1984.	
5	N. Muruges, A concise textbook of Pharmacology, Fifth Edition, Prabhu Offset Printers, 2000.	
6	Essentials of physiology — M. Muthayya, Emerald Publishers, Second Edition, 1986	
7	Textbook of Medical Physiology — Guyton, I,E, Saunders, Seventh Edition.	
Reference Books		
1	Basic and Clinical Immunology — Daniel P. Stites, Abba I. Terr, Tristrain G. Parsiow — Prentice Hall International Inc., 1994, 8th Edition.	
2	G. Tripathi, Enzyme Biotechnology, Techno Science Publications, 1999.	
	Modern Nutrition in Health and Disease — Robert S. Goodhart, Maurice E. Shils — Indian Edition, Fifth Edition, 1973.	
3	Modern Nutrition in Health and Disease — Maurice E. Shils, Vernon, R. Young — Indian Edition, Seventh Edition, 1980.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://youtu.be/2dJ_wMa4W70	
Modified By: Dr.G. Suba		

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

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

Course code	13D	PAPER IV MACRONUTRIENTS	L	T	P	C
Core			7 5	-	-	4
Pre-requisite	Knowledge on food science and nutritive value of foods		Syllabus Version	2023-24		
Course Objectives:						
The main objectives of this course are to: To enable students						
1. Gain recent knowledge about macro nutrients 2. Gain recent findings in the study						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Determine the energy value of foods					K3
2	Understand the role of different nutrients in normal health.					K2
3	Apply the knowledge of functions of nutrients in identifying nutritional problems.					K3
4	Analyze the interaction of nutrients with other nutrients and anti-nutrient substances.					K4
5	Evaluate the nutritional imbalance on health and to create new nutritional alterations to improve the health in degenerative conditions.					K5 & K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6- Create						
Unit:1	ENERGY				15 hours	
Energy - Historical background, energy content of food, energy measurements - direct and indirect calorimetry, energy utilization in cells, basal metabolism, physical activity. Regulatory thermogenesis, energy requirements, variables which influence the energy requirements with reference to adults, infants, adolescents, ICMR, FAO and WHO requirements, energy balance and control of body weight, the share of three main energy nutrients — carbohydrates, proteins and fats.						
Unit:2	CARBOHYDRATES				15 hours	
Carbohydrates - Classification, digestion, absorption and utilization of carbohydrates, nutritional importance of carbohydrates. Dietary fibre - Definition, types of fibre in plant foods, sources, composition, digestion, clinical aspects. Role of dietary fibre in therapeutic nutrition. Effect of fibre in the absorption of different nutrients.						
Unit:3	FATS				15 hours	
Fats and lipids - Classification of fats and fatty acids, review of digestion and absorption of fats, transport of lipid in blood, lipid transformation in the liver, lipotropic factors, role of essential fatty acids; deposition of fats in the body. Effect of deficiency and toxicity, role of fats in the etiology of arteriosclerosis.						
Unit:4	PROTEINS				15 hours	
Protein - Classification of proteins and amino acids, protein synthesis, function, digestion, absorption and utilization. Factors affecting protein utilization. Amino acid requirements and amino acid pattern, essential amino acids, amino acid balance, imbalance and toxicity, computation of protein requirements through factorial method and balance study, ICMR and FAO / WHO requirements, evaluation of quality of protein, conduct of animal studies, rat as an						

experimental animal, food sources, protein deficiency- prevalence, causes and treatment, role of animal proteins and vegetable protein mixture in combating malnutrition, estimation of amino acids and protein needs.		
Unit:5	NUTRIENT INTERACTIONS	15 hours
Hormone and Nutrient Interactions - Interaction over carbohydrate, protein and fat metabolism. Nutrition in alcoholism — effect of alcohol in digestion and absorption of nutrients, Alterations of nutrient metabolism and organ damage, nutrigenomics		
Unit:6	Contemporary Issues	2 hours
Webinar on Early Fracture Healing and Role of VitaminD and Calcium		
Total Lecture hours		75 hours
Text Book(s)		
1	Berdanier, C.D. Advanced Nutrition: Macro. Nutrients CRC Press VSA, 1995.	
2	Guthrie.I-I. Andrew S. —Introductory Nutrition Saint Hours' time, Mosby College, 1988.	
	Swaminathan, M. Advanced Text Book foods Nutrition, Bappco Publication. Vol.1,2000	
Reference Books		
1	Gardon M. Wardlaw, Paul. M. lunset and Marcia F. Seyler, Contemporary Nutrition, Moshy, Sixth edition.	
2	Z.S.C. Okoye, —Biochemical Aspects of Nutrition , Prentice Hall of India Pvt. Ltd., Eastern Economy Edition, 1992.	
3	Shils E.M., Olson and Febiger, —Modern Nutrition in health and disease , Philadelphia, 1999,ninth edition	
4	Sorimshaw, N.S and Schwrch, B. Protein Energy Interactions Proceedings of DECG Workshop, 1992.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://youtu.be/QI2vKZMkzXE	
Course Designed By:		

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	S	S	M	S	M	M	M
CO2	S	S	M	S	M	M	M
CO3	S	S	M	S	M	S	S
CO4	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S

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

Course code	13P	PRACTICAL -I FOOD ANALYSIS PRACTICAL	L	T	P	C
Core			-	-	6	4
Pre-requisite		Knowledge on chemistry and biochemistry practical	Syllabus Version		2023-24	
Course Objectives:						
The main objectives of this course are to:						
<ol style="list-style-type: none"> 1. Summarize food analysis experiments, analyzing data and reporting their findings. 2. Understand basic principles of food analytical procedures 						
Exercise : 1	ANALYSIS OF FOOD FOR				10 hours	
A. Calories B. Moisture C. Fibre D. Ash E. Calcium F. Iron G. Phosphorus H. Protein By Micro-Kjeldahl Method I. Water Soluble Protein-By Lowry's Method J. Fat-By Soxhlet Extraction K. Carotene L. Thiamine M. Riboflavin N. VITAMIN-C (foods have to be analysed before and after processing)						
Exercise : 2	GLYCOGEN EXTRACTION AND ESTIMATION				5 hours	
Glycogen extraction and estimation						
Exercise : 3	ANALYSIS OF FAT				5 hours	
sap no, iodine no, acid no and RMvalue						
Exercise : 4	ESTIMATION OF LIPID IN EGG YOLK				5hours	
Estimation of lipid in egg yolk						
Exercise : 5	ESTIMATION OF AMINO ACID				5 hours	
Sorensen's formal titration for estimation of amino acid.						



**Second
Semester**

Course code	23A	PAPER - XIV FOOD BIOTECHNOLOGY	L	T	P	C
Core			90	-	-	4
Pre-requisite	Knowledge in food science and biochemistry		Syllabus Version		2023-24	
Course Objectives:						
The main objectives of this course are to: To enable students						
1. understand the concepts of biotechnology and its application in food production						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Remember the basic concepts in biotechnology					K1
2	Understand the upstream and downstream processing					K2
3	Apply the knowledge in production of high nutritive value foods					K3
4	Analyze the quality of genetically modified foods					K4
5	Evaluate the impact of food biotechnology on human health and create new products imbued with probiotics, prebiotics and antioxidants					K5 & K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6- Create						
Unit:1	INTRODUCTION TO BIOTECHNOLOGY				18 hours	
Development and progress of biotechnology related to food production and processing, scope and importance. Genetic engineering – tools, enzymes – exonucleases, endonucleases, restriction endonucleases, ligases, reverse transcriptases. Cloning vectors – plasmids, bacteriophage, cosmids, phasmids.						
Unit:2	BIOTECHNOLOGICAL METHODS				18 hours	
Regulatory aspects of biotechnological methods – Upstream & Downstream processing, biosensors, biochips, limiting factors and regulation. Impact of biotechnology on the nutritional quality of foods. Single cell protein and mycoprotein: Production of microbial protein, SCP, substrate, nutritional value, harvesting spirulina, mushroom culture and yeast biomass production.						
Unit:3	ENZYME TECHNOLOGY				18 hours	
Soluble enzymes, immobilized enzymes : amylases, invertase, glucose isomerase, protease, lipase, lactase and pectinase – synthesis and application in food industry. Organic acids and pigments; Vitamins – vitamin A, ergosterol, riboflavin, vitamin B12, fatty acids; Amino acids – lysine, methionine, tamate.						
Unit:4	FERMENTATION TECHNOLOGY				18 hours	
Fermentation systems & process – Batch and continuous process, fermentor design, bioprocess control. Technology of production of fermented foods - Alcoholic beverages, cheese making, fermented cereal products, soy based foods, meat fermentation, probiotic, prebiotic and synbiotic foods, vinegar and baker's yeast production.						
Unit:5	GENETICALLY MODIFIED FOODS				18 hours	
Role of biotechnology in the production of – food additives synthesis – citric acid, gluconic acid High fructose corn syrup (HFCS), thickeners and gelling agents, xanthan gums. Genetically modified foods – need, challenges, potential benefits, nutritional improvement, issues of concern (Safety aspects of						

genetically modified foods). Microencapsulation- basic aspects only		
Unit:6	Contemporary Issues	2 hours
International webinar on Recent development in Biotechnology		
Total Lecture hours		90 hours
Text Book(s)		
1	Dubey, R.C and Maheswari, D.K, A Text book of Microbiology, S.Chand and Co, Ltd, New Delhi (2003).	
2	MridulaMirajkar, SreelataMenon, Food science and processing technology; Biochemistry of food and nutrition, Kanishka publishers, Vol 1	
3	V.K.Joshi, Ashok pandy, Biotechnologies food fermentation, Vol II, Applied educational publishers and Distributors.	
4	ByongH.Lee, Fundamentals of food biotechnologyJohnwiley& sons.	
5	Anthony pometto et al., Food biotechnology, CRC press; second edition, 2005.	
6	Nester, Anderson, Roberts, Pearsall, Microbiology – A Human Perspective, 4th edition, Mc Grew Hill Publication.	
Reference Books		
1	Gustavo F.Gutierrez – Lopez, Gustavo V. Barbosa – canovas, Food preservation technology series, Food science and food biotechnology, 2003, CRC press.	
2	Gary Walsh and Denis R. Headen, Protein Biotechnology John Willey & Sons England	
3	Stahl, Ulf et al., Advances in biochemical engineering/ Biotechnology, 2008.	
4	Bong S.Noh., Food science and biotechnology, ISSN: 1226 – 7708 11.	
	Alexander N.Glazer, Hiroshi Nikaido, W.H. Microbial biotechnology; Fundamentals of applied microbiology, Freeman & Company.	
4	Handbook of organic food processing and production, Simon Coright and Diane McCrea,, Second Edition	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://youtu.be/spFXaeeAZPk	
Course Designed By:		

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	M	M	M	M	M	M	S
CO2	M	M	M	M	M	M	M
CO3	M	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S

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

Course code	23B	PAPER - VI RESEARCH METHODOLOGY AND STATISTICS	L	T	P	C
Core			7 5	5	-	4
Pre-requisite	A knowledge on research and statistical methods		Syllabus Version		2023-24	
Course Objectives:						
The main objectives of this course are to:						
<ol style="list-style-type: none"> Understand the principles and methods of research Apply statistical procedure to analyse numerical data and draw inferences 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Outline various kinds of research, objectives of doing research, research process, research designs and sampling.					K1
2	Demonstrate qualitative, quantitative and mixed methods research, as well as relevant ethical and philosophical considerations					K2
3	Apply measurement & scaling techniques as well as the quantitative data analysis in research					K3
4	Analyse the criteria that can be used to select an appropriate statistical test to answer a research question or hypothesis					K4
5	Discuss the link between quantitative research questions and data collection and how research questions are operationalized in educational practice					K5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6- Create						
Unit:1	MEANING, TYPES OF RESEARCH AND SAMPLING					15 hours
Meaning of research, objectives of research, types of research and their application, selection and formulation of research problems, hypothesis, designing a research — different types, census and sample method, theoretical basis of sampling, sampling methods — random sampling methods and non-random sampling methods, size of sample, sampling and non-sampling errors.						
Unit:2	DATA COLLECTION AND PROCESSING					15 hours
Methods of Collecting Primary Data - Questionnaire, preparation of schedules, interview method, case study method, experimentation method, sources of secondary data, precautions while using secondary data. Editing and Coding the Data Organization of Data - Classification - meaning and objectives, types of classification, formation of discrete and continuous frequency distribution, tabulation - role, part of a table, general rules of tabulation, types of tables.						
Unit:3	REPRESENTATION, INTERPRETATION AN REPORT WITING					15 hours
Representation of Data - Diagrammatic and graphical representation - significance of diagrams and graphs - general rules for constructing diagrams - types of diagrams, graphs of time series, graphs of frequency distribution. Interpretation and Report Writing - Meaning of interpretation, technique, precautions, format of research report, types, steps and stages, mechanism and style, precautions and essentials for good report, footnotes and bibliographical citations.						

Unit:4	MEASURES OF CENTRAL TENDENCY AND DISPERSION	15 hours
Measures of Central Tendency - Mean, median, mode, their relative advantages and disadvantages. Measures of dispersion — mean deviation, standard deviation, quartile deviation. Co-efficient of variation, percentile and percentile ranks. Association of attributes, contingency tables, correlation, coefficient of correlation and its interpretation, rank correlation, regression equations and predictions.		
Unit:5	TESTS OF SIGNIFICANCE	15 hours
Tests of significance – large and small samples, t and F test, tests for independence using chi-square test. Analysis of variance - one-way and two-way classification. Probability - Rules of probability and its applications. Distribution - normal, binomial, their properties, importance of these distributions in statistical studies. Post Hoc tests – LSD, Duncan tests		
Unit:6	Contemporary Issues	2 hours
Webinar on Research Methodology and Data Analysis		
Total Lecture hours		75 hours
Text Book(s)		
1	Kothari, C.R. Research Methodology	
2	Gupta, S.F., Statistical Methods, Sultana Chand and Sons, 31 Revises Edition, 2002	
3	Devadas, R.P., A Handbook on Methodology of Research, Sri Ramakrishna Vidhyalaya, Coimbatore, 1989.	
4	R.S.N. Pillai, V. Bagavathi, Statistics, S. Chand and Company Limited, 2001.	
Reference Books		
1	Ramakrishnan, P., Biostatistics, Sara Publication, 2001.	
2	Donald, H. Mc. Burney, Research Methods, Fifth Edition, Thomson and Wadsworth Publications, 2002.	
3	P. Shanthi Sophia Bharathi, Computer Oriented Statistical Methods / Probability and Statistics, Chanilatha Publications, Second Edition, 2000.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://youtu.be/77HBr1hSDCO	
Course Designed By:		

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	M	M	S	M	S	M	M
CO2	M	M	M	M	M	M	M
CO3	M	M	S	S	S	M	S
CO4	M	M	M	M	S	S	S
CO5	M	M	M	M	S	S	S

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

Course code	23C	PAPER VII MICRO-NUTRIENTS	L	T	P	C
Core			90	-	-	4
Pre-requisite		Knowledge on functions and deficiency of micronutrients	Syllabus Version		2023-24	
Course Objectives:						
The main objectives of this course are to: To enable students						
1. Acquire knowledge in the role of micronutrients in health and disease.						
2. Understand the recent advance in the study of micro-nutrients.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Remember the functions and deficiency of the micronutrients					K1
2	Understand the role of each micronutrient on health					K2
3	Apply the knowledge of micronutrients in planning menu for nutritional deficiencies					K3
4	Analyze the interaction among the micronutrients					K4
5	Evaluate the effect of micronutrient deficiency on health and create and justify micronutrient rich simple foods for various age group					K5 &6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
Unit:1	CALCIUM AND PHOSPHORUS					18 hours
Calcium - Calcium in skeleton and other tissues, measurements, bone mass, effect of diet and immobilization. Calcium absorption and utilization, calcium balance, requirements, sources, deficiency and excess. Phosphorus - Concentration in the body, calcium - phosphorus ratio, phosphorus adsorption and utilization, deficiency and toxicity. Sodium - Potassium, Magnesium and Sulphur - Distribution, absorption, utilization, role in human nutrition, deficiency and toxicity.						
Unit:2	TRACE ELEMANTS					18 hours
Trace Elements - Concept, mode of action, trace element interaction. Iron-intake, utilization, storage, output and iron balance, deficiency and toxicity, role in prevention of anaemia. Methods of assessing nutritional status and availability of iron. Iodine - History, functions, metabolism, deficiency. Fluorine- functions, sources, uses of fluoride in the prevention of dental caries, toxic effects of fluoride. Historical background – Functions, sources, deficiency and toxicity of zinc, copper, molybdenum, cobalt, nickel, manganese, selenium, chromium and cadmium.						
Unit:3	FAT SOLUBLE VITAMINS					18 hours
Vitamins - Fat soluble vitamins — A, D, E and K; History, Chemistry, Physiological action, transport, utilization and storage, methods of assay, dietary sources and losses in preparation and handling. Conversion of carotene into vitamin A in human beings, recommended intake, human deficiency and diagnosis, hyper vitaminosis.						
Unit:4	WATER SOLUBLE VITAMINS					18 hours
Water Soluble Vitamins - Thiamine, riboflavin, niacin, vitamin B12, folic acid, pyridoxine, pantothenic acid, biotin and ascorbic acid: History, Chemistry, Physiological action, biochemical utilization, storage, transport, biosynthesis -of vitamins dietary sources, losses in preparation and handling, recommended intake, human deficiency and diagnosis, toxicity, bio availability and inter relationships.						

Unit:5	VITAMIN LIKE MOLECULES	15 hours
Vitamin Like Molecules - Choline, carnitine, inositol, taurine-chemistry, metabolism, deficiency, excess and dietary consideration. Pseudo vitamins — flavanoid, pangamate, laetrile. Interdependence between nutrients and hormones in general.		
Unit:6	Contemporary Issues	2 hours
Macronutrients and Micronutrients/NutriAthletics webinar series		
Total Lecture hours		90 hours
Text Book(s)		
1	Smolin and Grosevenor —Nutrition-Science and Applications, Sauders Company, 1997.	
2	Swaminathan, M. Advanced Text Book foods Nutrition, Bappco Publication. Vol.1,2000.	
3	Carolyn D. Berdanier, —Advanced Nutrition-Micronutrients, CRC Publications, 1994.	
4	Suzanne K. GRaty, Adrienne bendich. VishwaN.Singh, Lawrence F. Machin, Vitamin intaker and health, Mareddekker mc, 1991	
Reference Books		
1	Sue Rodwell Williams, —Essentials of Nutrition and Diet therapyl, V Ed, Times Mirror / Mosby College Publishing, 1990.	
2	James L. Groff and Sareen, S. Gropper, —Advanced Nutrition and Human Metabolisml, 1999. Thomson Wardsworth.	
3	Whitney P.N., and Roes S.R. —Unyerstanding Nutritionl, West Publication Co, 1996.	
4	Robert S.Goodhart and ManiceEShills, —Modem Nutrition in Health and diseases, Lea and Feliger, 1980.	
5	Maurice E. Shills and Vernon R. Young, —Modem Nutrition in Health and Diseasel, Ninth Edition ,1988.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://youtu.be/aChbRLmf3w4	
Course Designed By:		

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	S	S	M	S	M	M	M
CO2	S	S	M	S	M	M	M
CO3	S	S	M	S	S	S	S
CO4	S	S	S	S	S	S	S
CO5	M	S	S	S	S	S	S

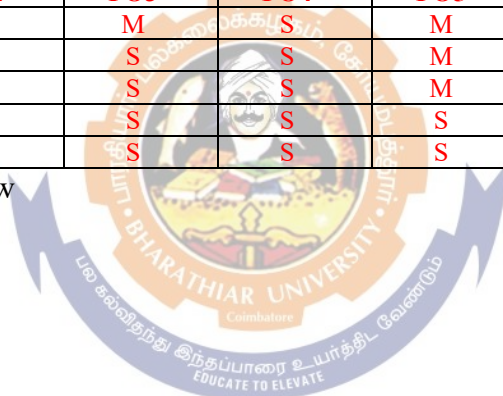
*S-Strong; M-Medium; L-Low

Course code	23D	Paper – VIII NUTRITIONAL BIOCHEMISTRY	L	T	P	C
Core			90	-	-	4
Pre-requisite	A knowledge on nutrition and physiology and chemistry		Syllabus Version	2023-24		
Course Objectives:						
The main objectives of this course are to: To enable the students to understand the application of biochemistry in the field of Foods and Nutrition						
<ol style="list-style-type: none"> 1. Gain knowledge on metabolism of carbohydrate, protein and fat. 2. Understand the metabolism of nucleic acids. Be aware of the abnormalities in the metabolism of carbohydrate, protein and fat.						
<ol style="list-style-type: none"> 3. Develop skills in the biochemical techniques. 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Know the metabolism of carbohydrate, protein and fat.					K1
2	Outline the intermediary metabolism of carbohydrate, protein and fat.					K2
3	Explain about the abnormalities in the metabolism.					K3
4	Analyse the biochemical changes taking place in the disease.					K4
5	Evaluate the disorders based on the biochemical parameters					K5
6	Create awareness based on biochemical assay.					K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
Unit:1	Metabolism of Carbohydrate					18 hours
Metabolism of carbohydrates- Glycolysis, TCA cycle, HMP shunt and energy production, Glycogenesis, Gluconeogenesis, Biosynthesis of ascorbic acid, Renal threshold for glucose.						
Unit:2	Metabolism of Fatty Acids					18 hours
Biosynthesis and oxidation of saturated and unsaturated fatty acids, cholesterol and phospholipids, Bile salts and fatty liver.						
Unit:3	Protein synthesis and metabolism					18 hours
Metabolism of individual amino acids –glycine, tyrosine, phenyl alanine, tryptophan, histidine, methionine and creatinine. Denaturation, transamination, deamination, decarboxylation, urea formation. Synthesis and breakdown of haemoglobin and bile pigments.						
Unit:4	Nucleic acids					18 hours
Composition, functions and classification. Isolation, structure and properties of DNA and RNA. Biosynthesis and breakdown of purine and pyrimidine nucleotides						
Unit:5	Techniques in nutritional biochemistry					18 hours
Assay techniques, microbiological assay of vitamins.						
Unit:6	Contemporary Issues					2 hours

Webinar on Biochemical techniques- advanced methods.	
Total Lecture hours	
90 hours	
Text Book(s)	
1	Lehninger, A.L, Biochemistry, Worth publishers Inc., New York, 2000.
2	Keith Wildonsnfzjohn Walker, Practical Biochemistry, Cambridge University Press, 2000.
3	AmbigaShanmugam, Fundamentals of biochemistry for medical students, Karthik printers, 1992.
Reference Books	
1	Geoffrey,LZubay, William.W.Parson, Dennis E Vance, Principles of Biochemistry, W>M>C.
2	RariganathaRao.K, Text book of Biochemistry, Prentice Hall of India, New Delhi, 1980.
3	Harold Varley, Practical Clinical Biochemistry, IV ed, CBS publishers and Distributors.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://youtu.be/lg9jbig8Gpg
Course Modified By: Dr.G.Suba	

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	S	S	M	S	M	M	M
CO2	S	S	S	S	M	M	M
CO3	S	S	S	S	M	S	S
CO4	M	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S

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



Course code	23E	PAPER IX NUTRITION IN DISEASE –I	L	T	P	C
Core			75	5	-	4
Pre-requisite	Knowledge on human anatomy and physiology		Syllabus Version		2023-24	
Course Objectives:						
The main objectives of this course are to:						
<ol style="list-style-type: none"> 1. Understand the dietary principles for various diseases. 2. Plan and prepare standardized hospital diet based on the needed patients. 3. Select specific foods for management of disease condition. 4. Apply nutrition principles to health promotion and the prevention of diseases. 5. Compare the food exchange list in the control of diseases. 6. Identify the relationship between diet and disease. 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Remember the functions of the various organs					K1
2	Understand the dietary principles of diet therapy					K2
3	Apply the principles in planning menu for disease conditions					K3
4	Justify the menu plan for cardiac diseases based on the dietary principles.					K4
5	Analyze and plan menu for cancer patients based on their individual problems.					K5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	PRINCIPLES OF THERAPEUTIC DIETS				15 hours	
Therapeutic Diets – Principles, objectives and diet therapy, Review of hospital diets, type of dietitians, role of dietitian in the hospital and community, Nutrition Care Process (NCP), diet planning and use of exchange list in nutrient calculation, diet counseling and patient education. Enteral and Parenteral nutrition –types, applications, types & nutrient composition of feeds, complications, merits and demerits. Functions of Indian Dietetic Association .						
Unit:2	DIET IN GASTRO INTESTINAL AND LIVER DISEASES				15 hours	
Gastro Intestinal Diseases Diseases of Oesophagus Esophagitis and Hiatus hernia. Disease of Stomach Indigestion, hypochlorhydria, acute and chronic gastritis and peptic ulcer 3. Disease of Intestine Flatulence, constipation - atonic, spastic and obstructive, diarrhoea - acute and chronic and steatorrhea. Inflammatory Diseases -Diverticulosis, diverticulitis, regional enteritis, ulcerative colitis, malabsorption syndrome - sprue.						
Unit:3	DIET IN LIVER AND GALLBLADDER DISEASES				15 hours	
Diseases of Liver, Gall Bladder and Pancreas Etiology, dietary management in liver, gall bladder and pancreas, jaundice, viral hepatitis, cirrhosis, hepatic coma and fatty liver, cholecystitis, cholelithiasis, acute and chronic pancreatitis						
Unit:4	DIET IN HEART DISEASES				15 hours	
Diseases of the Heart and Circulatory System - Acute and chronic cardiac disorders, risk factors of cardiac diseases, dietary management in hypertension, atherosclerosis, congestive heart failure, hyperlipoproteinemia, hypercholesterolemia, role of antioxidants in the prevention and treatment.						

Unit:5	NUTRITION IN CANCER	15 hours
Nutrition in cancer - Epidemiological studies, reproduction of the normal cells, classification of neoplasms, principles of cancer, pathogenesis. Causes of cancer cell development, metabolic and nutritional alterations in malignancy, cancer therapy and nutrition, nutritional therapy and cancer, eating problems in cancer.		
Unit:6	Contemporary Issues	2 hours
Webinar on Diabetes & Covid-19		
Total Lecture hours		75 hours
Text Book(s)		
1	Antia, F.P., Clinical Dietetics and Nutrition, Oxford University, Mumbai, 1989.	
2	B. Srilakshmi, Dietetics, New Age International Private Ltd.	
3	Davidson, S.S. Passmore, P., Branch, J.F. Humani Nutrition and Dietetics, 9th Edition, F & S, Lingstons Ltd., Edinburgh and London, 1993.	
Reference Books		
1	Cornine H. Robinson, Marilyn R. Lawles, Wanda L., Chenweth, Ann Garwin, Normal and Therapeutic Nutrition, XVII Editor.	
2	Krause, M.V. Hunseher, M.A., Food Nutrition and Diet Therapy, W.S. Saunder's Company, Philadelphia, London, Toronto, 1980.	
3	Gopalan, C., Ramshastri and Balasubramaniam, S.C. Nutritive value of Indian Foods, NIN, Hyderabad, 1994.	
4	Sue Rod Williams, Nutrition and Diet Therapy, Times Mirror Mashy College Publishing St. Laws, Toronto, Boston, 1989.	
5	Maurice, E. Shills, James, A. Olsen, Moshe Shihe, Modern Nutrition on Health and Disease, Vol. 1 & 2, VIII Edition, Lea and Pediger, Philadaipha, 1994.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://youtu.be/V9ChpUxwwPM	
Course Designed By:		

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	S	S	M	S	S	M	M
CO2	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S
CO4	M	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S

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

Course code	23P	PRACTICAL-II BIOCHEMICAL ANALYSIS PRACTICAL	L	T	P	C
Core			-	-	90	4
Pre-requisite	Knowledge on chemical analysis		Syllabus Version		2023- 24	
Course Objectives:						
The main objectives of this course are to: To enable students						
1. acquire skill on analyzing the blood parameters						
2. Understand the various nutrition intervention programmes of vulnerable groups in the community						
3. Appreciate national and international agencies towards nutrition in programmes.						
Unit:1	QUALITATIVE ESTIMATION				6 hours	
A. Sugars-Mono, Di And Polysaccharides						
B. Proteins And Amino Acids						
Exercise :2	ANALYSIS OF BLOOD				6 hours	
A. Glucose						
B. Haemoglobin And Iron						
C. Cholesterol						
D. Pyruvic Acid						
E. Serum AG Ratio						
F. Serum Phospholipid						
G. Serum Protein						
H. Serum Alkaline Phosphate						
Exercise :3	ANALYSIS OF URINE				6 hours	
A. Creatinine						
B. Urea						
C. Total Nitrogen						
D. Calcium						
E. Phosphorus						
F. Vitamin-C						
G. Uric Acid						
Course Designed By: Dr. G.Suba						



Third Semester

Course code	33A	PAPER - V FOOD PROCESSING	L	T	P	C
Core			7 5	-	-	4
Pre-requisite	Knowledge on milling, preservation		Syllabus Version	2023- 2024		
Course Objectives:						
The main objectives of this course are to: To enable students to learn different food processing and preservation techniques Choose the best processing techniques to be used for a specific group of produce. Critique the importance of fermentation and pickling process to enrich the food for diversity of flavour and nutrients and eliminate the anti-nutrients.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Remember the structure and nutritive value of foods					K1
2	Understand the different methods of processing foods					K2
3	Compare the novel technologies with the traditional methods in food preservation.					K3
4	Analyze the nutrient loss during processing					K4
5	Evaluate best method of processing for different foods.					K5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6- Create						
Unit:1	FOOD INDUSTRY AND FOOD PROCESSING SECTOR				15 hours	
Magnitude, Division and Interdependent activities of the food industry, unit operations of the food industry. Food processing sector –vision and mission, opportunities, strategies and constraints in the Indian food processing sector. Post harvest priority requirements, Strengths, weakness, opportunities and threats (SWOT) of food sector.						
Unit:2	RICE TECHNOLOGY				15 hours	
Rice Technology - Production, processing, milling of rice, parboiling, processes, by products of rice milling and their utilization. Nutrient loss during processing. Wheat Technology - Production, processing, manufacture of breakfast cereals Millets - Production, processing.						
Unit:3	PROCESSING OF PULSES AND OIL SEEDS				15 hours	
Pulses - Production, types of processing of different pulse products - Soyabean Processing. Technology of oil seeds - Processing, meal concentrates and isolates. Rice bran oil, membrane processing of vegetable oils, vanaspathi with low trans fatty acids, bakery fats with low trans fatty acids, low-fat spreads, and hydrogenation of fats.						
Unit:4	PROCESSING OF ANIMAL FOODS				15 hours	
Mushroom - Production, processing, utilization. Meat - Production, processing, smoking and curing of meat, grading. Poultry - Production, preparing poultry for consumption, packaging. Fish - Production, effect of handling practices, storage of eggs, manufacturing and packaging of egg products.						
Unit:5	PROCESSING OF VEGETABLES AND FRUITS				15 hours	
Vegetables - Drying and dehydration techniques –drum drying, vacuum puffing, foam mat drying, freeze drying, accelerated freeze drying. Processing of potato grits, potato granules, Potato flour, dehydrated						

garlic and dehydrated green peas. Fruits- Sun drying of banana and grapes; Mechanical dehydration – use of kiln drier and tunnel drier. Canning -steps, spoilage of canned foods, advantages, disadvantages. Bottling –steps, advantages, disadvantages.		
Unit:6	Contemporary Issues	2 hours
Food processing and preservation certificate course online		
Total Lecture hours		75 hours
Text Book(s)		
1	Saiauel, A. Matz., The Chemistry and Technology of cereals of Foods and Feed”, CBS Publishers and Distributors, 1996.	
2	G.C. Banerjee, Poultiy, Oxford and IBH Publishing CODUB Ltd., New Delhi.	
	RaghurentChinatamini, Advances in Agro Industry and Food Processing, Dominant Publishers and Distributors, 1999.	
3	GiridhariLal,G.S.Sidhappa and G.L.Tandon-Preservation of fruits and vegetables,ICAR,New Delhi,1998	
4	ShakuntalaManay, N., ShadakCheraswamy, M., Food Facts and Principles, Wiley Eastern Ltd., 1987.	
Reference Books		
1	Potter, N.W. Food Science, AVI Publishing Co., Connecticut, 1960.	
2	D.K.Salunkhe,S.S.kadam-Handbook of vegetable science and technology,Marcel Dekker Inc,New York,2005.	
3	Research and Development at CFTRI, 1950 — 2000, CFTRI, Mysore.	
4	R & D at the CFTRI, Three decades M.R. Raghavendra Rao, K.R. Bhatt achaiya and J.V. Shankar CFTRI, Mysore.	
5	Processed food Industry	
	Journal of Indian food industry	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://alison.com/course/introduction-to-food-processing-and-preservation?utm_source=google&utm_medium=cpc&utm_campaign=PPC%3eIndia%3eCcourse-2140%3eIntroduction-to-Food-Processing-and-Preservation-(Broad)&gclid=CjwKCAjwiOv7BRBREiwAXHbv3KxGBGN1YenMesfQ6SNiFLRshNnzrj6WYg_Kfa_Y0JWeC6cjJC_Q6hoCoGoQAvD_BwE	
Course Designed By:		

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	S	S	S	M	S	M	M
CO2	S	M	S	M	S	M	M
CO3	S	M	S	M	S	S	S
CO4	M	M	S	M	S	S	S
CO5	S	M	S	M	S	S	S

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

Course code	33B	PAPER –XI COMMUNITY NUTRITION	L	T	P	C
Core			60	-	-	4
Pre-requisite	Knowledge on nutritional problems in community		Syllabus Version	2023-24		
Course Objectives:						
The main objectives of this course are to: To enable students						
1. Gain insight into nutritional problems of the community						
2. Understand the various nutrition intervention programmes of vulnerable groups in the community						
3. Appreciate national and international agencies towards nutrition in programmes.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Remember the nutritional problems arising in emergency situations					K1
2	Understand the nutritional deficiencies and treatment measures					K2
3	Apply the knowledge on overcoming malnutrition					K3
4	Analyze the interaction among the micronutrients during deficiency					K4
5	Evaluate the impact of nutritional intervention programmes on community and to create awareness among the community on nutritional deficiencies and nutritional programmes					K5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	EMERGENCY SITUATIONS					12 hours
Famine, drought, flood, earthquake, cyclone, Tsunamis, coastal hazards, war, civil and political emergencies and factors giving rise to emergency situation in these disasters. Illustration using case studies from Indian subcontinent. Food security, nutrition security, Millenium development goals.						
Unit:2	NUTRITIONAL DEFICIENCIES					12 hours
Protein energy malnutrition (PEM) - Etiology, types, prevalence, metabolic changes and prevention. Nutritional Anaemia - Definition, causes, types, prevalence, anemia control programme in India. Iodine Deficiency: Causes, prevalence, clinical features and control programme in India. Fluorosis: Causes, prevalence, Clinical features, Fluorosis control programme in India. Vitamin A deficiency : Causes, signs and symptoms,prevention&prophylaxis B complex deficiency: Causes, signs and symptoms,prevention. Assessment of Nutritional Status Dietary survey, biochemical methods, growth monitoring methods, food consumption survey, body composition studies. Test of intelligence related to nutrition.						
Unit:3	NUTRITION INTERVENTION PROGRAMMES					12 hours
Objectives, Special nutrition programme (SNP), Modified Applied Nutrition Programmes (ANP), NIDDCP, Vit A Prophylaxis Programme,Integrated Child Development Services (ICDS), Tamil Nadu Integrated Nutrition programme (TFNP) and Noon Meal Scheme. Role of International Organizations - Food and Agriculture Organization (FAO), World Health Organization (WHO), United Nations International Children’s Emergency Fund (UNICEF), Co-operative American Relief Everywhere (CARE) and World Bank. National Organizations National Institute of Nutrition (NIN), National Nutrition Monitoring Bureau (NNMB), Indian Council of Agriculture Research (ICAR), Indian Council of Medical Research (ICMR), Central Food Technological Research Institute (CFTRI). National health mission, NNP, NNAPP						
Unit:4	NUTRITION EDUCATION					12 hours
- Objectives, definitions, importance of nutrition education to the community. Methods of nutrition education, nutrition education programmes - Planning, implementation and evaluation, training workers						

in nutrition education programmes, integration of nutrition education with education and extension of works, nutrition and health education for adolescent girls, lactating and pregnant women. Nutrition education in schools and community.		
Unit:5	COMMUNITY HEALTH AND COMMUNICABLE DISEASES	12 hours
<p>Concepts of community Health, National Health Policy, Primary Health Center (PHC)- Concept, organization, current status in India and delivery of service, Taluk level hospitals, Employees State Insurance (ESI) Epidemiology of Communicable Diseases Factors responsible for the spread of communicable diseases, mode of transmission — chicken pox, typhoid fever, tuberculosis, malaria, leprosy, filariasis and AIDS. Prophylaxis and Immunization schedule. Waste disposal system in India.</p>		
Unit:6	Contemporary Issues	2 hours
Webinar on Nutrition Communication in the complex food and media environment- A Challenge for a Nutritionist		
Total Lecture hours		60 hours
Text Book(s)		
1	Hojn C., Water low, Andrew M. Tomkins, Sally M. Grantham. MC, Anegor, —Protein Energy Malnutrition, Published by Edward Arnold, 1992.	
2	Vinodini Reddy, Praihad Rao, GowrinathSastry, J. and Kashinath, K.C., Nutrition Trends in India, NIN, Hyderabad, 1993.	
3	Jelliffee, D.D. Pathes, Assessment of Nutritional Status of community, WHO Geneva, 1989.	
4	SaralaGopalan (1996), Towards better nutrition for women and children, Problem and Programmes, Department of Women and Child Development, Government of India.	
Reference Books		
1	Proceedings of the Nutrition Society of India, Vol. 35, 42, 43, 44, 46 and 47, 1999, NIN, Hyderabad.	
2	S. WalRuchi Mishra, Encyclopedia of Health Nutrition and Family Welfare, Published by Sarup and Sons, New Delhi, 2000.	
3	Park and Park, Text book of preventive and social medicine, Banarsidas Published by Jahalpu, 1995.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://youtu.be/l4brbwkxk	
Course Designed By:Dr.G.Suba		

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	M	S	M	S	M	M	M
CO2	M	S	M	S	M	M	M
CO3	M	S	S	S	S	S	M
CO4	M	S	S	S	S	S	S
CO5	M	S	S	S	S	S	S

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

Course code	33C	PAPER - XII NUTRITION IN DISEASE -II	L	T	P	C
Core			7 5	-	-	4
Pre-requisite	Knowledge on physiology and nutrition in normal health		Syllabus Version		2023-24	
Course Objectives:						
The main objectives of this course are to: To enable students						
<ol style="list-style-type: none"> 1. Understand the etiology of various diseases 2. Gain knowledge in the dietary modifications in various disease conditions. 						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Plan and prepare standardized hospital diet for the needed patients.					K1
2	Select specific foods for management of disease condition.					K2
3	Apply nutrition principles to health promotion and the prevention of diseases					K3
4	Analyze the relationship between diet and disease.					K4
5	Evaluate the role of diet in the control of degenerative diseases and create awareness on intake of healthy and appropriate diet in illness					K5& K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	DIET IN FEVER, INFECTION, BURNS, ALLERGY AND DENTAL CARRIES				15 hours	
Etiological factors and Dietary modifications in - Fevers and infection ; Burns, surgery; Nutritional deficiency diseases -PCM, anaemia, vitamin A def.;Diet in allergy; Dental diseases -Dental caries and Peridontitis.						
Unit:2	DIET IN NUTRITIONAL IMBALANCES				15 hours	
Nutritional Imbalances - Obesity and under weight, types of obesity, etiological factors, assessment of obesity, grades of obesity, theories — set point fat cell, thermogenesis in obesity. Dietary modifications role of maintenance diets, anorexia, bulimia nervosa. Respiratory and Musculo-skeletal Systems Arthritis, rheumatoid and osteo arthritis, asthma, chronic pulmonary diseases, epilepsy and multiple sclerosis.						
Unit:3	DIET IN METABOLIC DISORDERS				15 hours	
. Diabetes Mellitus - Epidemiology / Incidence - Classification - symptoms. Metabolic changes : Long term & short term complications, clinical findings - diagnostic tests - glycemic index of foods, types of insulin, dietary complications, dietary modifications in energy, carbohydrate, fat, protein, fibre and micronutrients. Herbal plant remedies for diabetes mellitus. Inborn errors of Metabolism. Etiology, symptoms and dietary treatment for						
<ol style="list-style-type: none"> 1. Disorders of Amino Acid Metabolism Phenylketonuria, tyrosemia, histidinemia and maple syrup urine diseases. 2. Disorders of Carbohydrate Metabolism Galactosemia, fructose and lactose intolerance. 3. Diseases of Adrenal Cortex and Thyroid Gland Etiology, symptoms and dietary management of Addison disease, hypothyroidism, hyperthyroidism, tetany, hypocalcaemia and gout. 4. GERD;Celiac disease and Lactose intolerance 						
Unit:4	DIET IN RENAL DISEASES				15 hours	
Diseases of Kidney- Etiology, dietary Management in kidney, urinary tract disorders, acute and chronic						

glomerulo nephritis, nephrosis, acute renal failure, chronic renal failure, end stage renal disease, uremia, nephrosclerosis, nephrolithiasis, kidney transplants, maintenance of an artificial kidney (dialysis)		
Unit:5	DIET IN HIV AND AIDS	15 hours
HIV Infection and AIDS Epidemiology, transmission of HIV, pathophysiology, clinical manifestations, HIV infection and other diseases, Immunity and AIDS virus, dietary management, Prevention and Control. Basic aspects of neurotransmitters and its modulators.		
Unit:6	Contemporary Issues	2 hours
Nutrition & The Immune system		
Total Lecture hours		75 hours
Text Book(s)		
1	Antia, F.P., Clinical Dietetics and Nutrition, Oxford University, Mumbai, 1989.	
2	B. Srilakshmi, Dietetics, New Age International Private Ltd.	
3	Davidson, S.S. Passmore, P., Branch, J.F. Human Nutrition and Dietetics, 9th Edition, F & S, Lingstons Ltd., Edinburgh and London, 1993.	
Reference Books		
1	Corinne H. Robinson, Marilyn R. Lawler, Wanda L., Chenweth, Ann Garwin, Normal and Therapeutic Nutrition, XVII Editor.	
2	Krause, M.V. Hunseher, M.A., Food Nutrition and Diet Therapy, W.S. Saunder's Company, Philadelphia, London, Toronto, Eleventh edition.	
3	Maurice, E. Shills, James, A. Olsen, Moshe Shihe, Modern Nutrition on Health and Disease, Ninth Edition, Lea and Pediger, Philadelphia, 1994.	
4	Sue Rod Williams, Nutrition and Diet Therapy, Times Mirror Masby College Publishing St. Laws, Toronto, Boston, 1989.	
5	Gopalan, C., Ramshastri and Balasubramaniam, S.C. Nutritive value of Indian Foods, NIN, Hyderabad, 1994.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://youtu.be/bB_ejXVWFw	
Course Designed By:		

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	M	M	M	S	M	S	M
CO2	S	S	S	S	M	S	M
CO3	M	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S

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

Course code	33P	PRACTICAL III NUTRITION IN DISEASE PRACTICAL	L	T	P	C
Core			-	-	45	4
Pre-requisite	Knowledge on physiology and nutrition in normal health		Syllabus Version		2023-2024	
Course Objectives:						
The main objectives of this course are to: To enable students						
<ol style="list-style-type: none"> 1. Understand the etiology of various diseases 2. gain knowledge in the dietary modifications in various disease conditions. 						
Exercise:1	WEIGHTS AND MEASURES OF FOODS				25hours	
Exercise: 2	MENU PLANNING				20 hours	
<p>Menu planning, food plan, meal distribution, Ideal body weight prescription and preparation of</p> <ol style="list-style-type: none"> a. Normal diet, regular diet, light diet, soft diet, full liquid diet, clear liquid diet & bland diet b. Pre-operative diet and post-operative diet c. Diet for obesity, under weight d. Diet for anemia, PEM, iron deficiency e. Diet for diseases of the GI tract – peptic ulcer, diarrhea, and constipation. f. Diet for Cardio-vascular diseases- atherosclerosis, hypertension. g. Diet for diseases of the kidney –kidney stones, renal failure, nephritic and nephrotic syndrome. Diet before & after dialysis. h. Diet for diabetes – Type I & II, Diabetes with CVD disease. i. Diet in febrile conditions- Short duration – typhoid; long duration – tuberculosis j. Diet in liver diseases – Viral hepatitis, cirrhosis and coma k. Diet in burn condition l. Diet in GERT j. Celiac disease 						

Course code	33D	PAPER XIII APPLICATIONS OF COMPUTERS IN NUTRITION	L	T	P	C
Core			30	-	4 5	2 +
Pre-requisite	Knowledge on basic operations in computer		Syllabus Version	2023-24		
Course Objectives:						
The main objectives of this course are to: To enable students						
1. Gain knowledge on Ms-Access Version 2002.						
2. Acquire knowledge to create software in Nutrition using Visual Basics.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Remember the functions of computer					K1
2	Understand the basic languages in computer					K2
3	Apply the knowledge on menu planning and calculation of nutritive value					K3
4	Analyze the data and do basic ways of summarizing the data					K4
5	Create forms, reports and database					K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6- Create						
Unit:1	INTRODUCTION TO WINDOWS				6 hours	
Introduction to Windows 2000 - Working within a window, using start menu, using explorer, using toolbars, menus and dialog boxes, customizing the Desktop via control panel opening control panel, using Accessibility options, adding and removing programs, setting date and time, customizing screen display, Adjusting the mouse, controlling drives, folders and files, recycle bin. Introduction to Ms-Access 2002-Database - Creating a database, opening a database, closing a database, printing database, introduction to database objects. Table - Creating table in design view and table wizard, setting primary key, creating Relationship between tables, enforcing referential integrity, customizing fields and tables, importing and linking a table.						
Unit:2	CREATING FORMS AND REPORTS				6 hours	
Queries - Creating a query in design view, working with design, creating different types of queries in wizard, using queries to calculate values and summarising the data. Forms - Creating a form in design view and wizard, modifying on existing from, creating a subform. Reports - Creating a report in design view and in wizard, creating a summary report, modifying an existing report, calculating values in a report, grouping report records, creating a subreport, creating mailing labels. Adding and deleting controls to forms and reports, beautifying forms and Reports - formatting text, adding lines, shapes, borders, pictures / images and clip art, setting image, alignment.						
Unit:3	INTRODUCTION TO VISUAL BASICS				6 hours	
Introduction to Visual Basic - Introduction to development environment, forms - setting form properties, form events and methods, common intrinsic controls - setting properties for controls, events and methods for controls, adding controls to forms, dialog boxes - Input Box, MsgBox, Common dialog boxes. Advanced Active X controls - Tree view and List view control Rich Text Box control, Ms Flex Grid						

control.	
Unit:4	COMPUTER PROGRAMMING
6 hours	
Programming Basics - Visual Basic data types, variables - naming and declaring variables, types, constants, operators - Arithmetic, Relational and logical operators, Handling keyboard and Mouse Input in programs. Arrays - Declaring arrays, static array, Dynamic array, multi-dimensional array and control array. Modules - Form module, standard module, class module working with subprocedures and function procedures, Built-in functions.	
Unit:5	PROGRAMMING WITH VISUAL BASICS
6 hours	
Program Flow Control - Working with conditional statements - If Then, If Then Else if, Nested If, select case, working with looping concept - For.. .Next, Do... .While, Do.... Until, While.. ..Wend, Nested loops. Drawing with Visual Basic - Co-ordinate systems, Graphics controls, Graphics controls, Graphics methods, specifying colors, Processing Images. Database Basics - Creating a database in Visual Basic, creating a user interface using ADO Data control, Data report.	
Unit:6	Contemporary Issues
2 hours	
Evolution Nutrition Menu Planning Software	
Total Lecture hours	
30 hours	
APPLICATIONS OF COMPUTERS IN NUTRITION PRACTICAL P-45 C-2	
Creating a nutrition related database in Access and in Visual Basic	
<ol style="list-style-type: none"> 1. Applying different types of queries 2. Creating a form for patient details for any one disease 3. Creating simple software in nutrition. 	
Total Lecture hours	
45 hours	
Text Book(s)	
1	T.Karthikeyan, P.C.software for Office Automation (Ms-Office), for private circulation, Gobi Arts and Science College, Gobichettipalayam, Erode, July 2002.
2	Curtis Frye, —Microsoft Access Version 2002, Plain and Simplel, Printie — Hall of India, Private Limited, New Delhi — 110 001, 2001.
3	Susan Sales, harkins, Ken Hansen, MCSD, Tom Gerhart, —Using Microsoft Access 2000l, Prentice Hall of India, Private Limited, 1999.
4	Brain siler and Jeff spotts, —Using Visual Basic 6l, Special Edition, Prentice -- Hall of India, Private Limited, New Delhi — 110 001, 200L
5	EvangelosPetroustos, —Mastering Visual Basic 6l, BPB publications, 1998.
Reference Books	
1	Craig Eddy and Timothy Buchanan, —Microsoft Access 2000 in 24 hoursl; Technedia publications, 1999.
2	Alan Simpson, Celeste Robinson, —Mastering Access 2000l, BPB publications, 1999.
3	Garry cornell — —Visual basic 6 from the Ground upl, TMH, 1999.
4	Steve Brown, Visual Basic 6-In Record Timel, BPB publications, 1998.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://youtu.be/HZNb6FnHW9u
Course Designed By:	

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

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



Fourth Semester

Course code	43A	PAPER X NEUTRACEUTICALS AND FUNCTIONAL FOODS		L	T	P	C	
Core				6 0	-	-	4	
Pre-requisite	Knowledge on antioxidant and protective functions of food components		Syllabus Version	2023-24				
Course Objectives:								
The main objectives of this course are to: To enable students								
1. Understand the etiology of various diseases 2. gain knowledge in the dietary modifications in various disease conditions.								
Expected Course Outcomes:								
On the successful completion of the course, student will be able to:								
1	Understand the role of nutraceuticals in health and disease.						K1 & K2	
2	Apply the knowledge of nutraceuticals on to health promotion and the prevention of diseases.						K3	
3	Analyze the relationship between nutraceuticals in treatment of skin, eye, bone, heart etc.						K4	
4	Emphasize the role of functional foods in health and disease.						K4	
5	Evaluate the role of diet in the control of degenerative diseases create awareness on intake of healthy and appropriate diet in illness.						K5 & K6	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create								
Unit:1	INTRODUCTION TO NUTRACEUTICALS					12 hours		
Introduction to Nutraceuticals as Science: Nutraceutical- Definition, Classification - Dietary supplements, Functional foods, Historical perspective, scope & future prospects. Applied aspects of the Nutraceutical Science. Sources of Nutraceuticals. Relation of Nutraceutical Science with other Sciences: Medicine, Human physiology, genetics, food technology, chemistry and nutrition (brief description).								
Unit:2	CLASSIFICATION, PROPERTIES OF NUTRACEUTICALS					12 hours		
Classification, Properties and structure of various Nutraceuticals: Alkaloids, Terpenoids, Glycosides, Natural phenols, Isoprenoidderivatives, Glucosamine, Octacosanol, flavonoids, carotenoids, polyunsaturated fatty acids, lecithin, choline and spingolipids, Lycopene, Carnitine, Melatonin and Ornithine alpha ketoglutarate as nutraceuticals. Use of proanthocyanidins, grape products, flaxseed oil as Nutraceuticals.								
Unit:3	APPLICATIONS OF NEUTRACEUTICALS					12 hours		
Nutraceuticals of plant and animal origin: Plant metabolites – Functions, sources - Alkaloids, phenols, Terpenoids. Applications with specific examples with reference to skin, hair, eye, bone, muscle, heart, brain, liver, kidney, general health and stimulants. Concept of cosmoceuticals and aquaceuticals. Animal metabolites – Functions, Sources - chitin, chitosan, glucosamine, chondroitin sulphate and other polysaccharides of animal origin. Uses and applications in preventive medicine and treatment.								
Unit:4	FUNCTIONAL FOODS					12 hours		
Functional Foods : Definition. Applications of herbs to functional foods. Concept of free radicals and antioxidants; Nutritive and Non-nutritive food components with potential health effects. Soy proteins and soy isoflavones in human health; Role of nuts in cardiovascular disease prevention.								

Functional foods from wheat and rice and their health effects. Role of Dietary fibers in disease prevention. Vegetables, Cereals, milk and dairy products as Functional foods. Health effects of common beans, Capsicum annum, mustards, Ginseng, garlic, citrus fruits, fish oils, and sea foods.		
Unit:5	ROLE OF NEUTRACEUTICALS IN DISEASE	12 hours
Food as remedies: Nutraceuticals bridging the gap between food and drug, Nutraceuticals in treatment for cognitive decline, Nutraceutical remedies for common disorders like Arthritis, Bronchitis, circulatory problems, hypoglycemia, Nephrological disorders, Liver disorders, Osteoporosis, Psoriasis and Ulcers etc. Brief idea about some Nutraceutical rich supplements e.g. Bee pollen, Caffeine, Green tea, Lecithin, Mushroom extract, Chlorophyll, Kelp and Spirulina etc.		
Unit:6	Contemporary Issues	2 hours
Webinar on Challenges in Nutraceuticals as Therapeutic Agents		
Total Lecture hours		60 hours
Text Book(s)		
1	Antia, F.P., Clinical Dietetics and Nutrition, Oxford University, Mumbai, 1989.	
2	Todd and others, Clinical Diagnosis and Management, 17 th Ed, W.B.Saunders, Philadelphia.	
3	Swaminathan M., Essentials of Food and Nutrition, 2 nd Ed, 1985, Ganesh and Co.	
4	Devlin, T.M., 1997, 4th Ed, Text Book of Biochemistry with Clinical Correlation, Wiley Liss Inc.	
Reference Books		
1	Murray Robert, Harper`s Biochemistry, 24th Ed, Prentice Hall International UK Ltd, 1990.	
2	Krause's Food, Nutrition and Diet Therapy, 10th Edition by Mahan, L.K. & Ecott-Stump, S. (2000), W.B. Saunders Ltd.	
3	Maurice, E. Shills, James, A. Olsen, Moshe Shihe, Modern Nutrition on Health and Disease, Ninth Edition, Lea and Pediger, Philadelphia, 1994.	
4	Lehninger Albert, 2001, Principles of Biochemistry, Kalyani Publishers, New Delhi.	
5	Greenberg David M., Metabolic Pathways, Vol 3, 3rd Ed, Academic Press Pvt Ltd, New York.	
6	Gopalan C., et al, Dietary Allowances for Indians, NIH, Hyderabad.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://youtu.be/QamH5kmn4uY	
Course Designed By:		

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	S	S	M	S	M	M	M
CO2	S	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S
CO4	M	S	S	S	M	M	S
CO5	M	S	S	S	S	S	S

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



Elective Paper

Course code	1EA	GROUP A PAPER I CONVENIENCE FOODS	L	T	P	C
Elective			45	-	-	4
Pre-requisite	Knowledge in food science and food technology		Syllabus Version	2023-24		
Course Objectives:						
The main objectives of this course are to: To enable students						
1.To understand the importance of convenience foods						
2.To acquire knowledge on food processing techniques of convenience foods						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Remember and understand the concept of preparing convenience foods					K1 & K2
2	Apply the knowledge in production of high nutritive value convenience foods					K3
3	Analyze the quality of those foods					K4
4	Evaluate the shelf life and acceptability of those foods among the consumers					K5
5	Create new products imbued with probiotics, prebiotics and antioxidants					K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
Unit:1	FOOD PRODUCT DEVELOPMENT				9 hours	
Over view of grain based snacks: Snack foods Popped snacks – Popcorn –popping procedures, loss during popping, measurement of expansion, factors affecting quality of popcorn, storage. Puffed snacks – Puffable materials, extrusion methods ,drying, Addition of flavours and colours, Simulated popcorn						
Unit:2	SNACK FOODS				9 hours	
. Baked snacks –Proportion and role of ingredients; Sweet based –plain cookies, wire cut cookies; Salt based –soda crackers and cheese crackers. Split and sweetened flour based snacks, batter and dough based products, formulated chips and wafers, papads.						
Unit:3	FRUIT AND VEGETABLE SNACKS				9 hours	
Fruit and vegetable based snacks : sauces, fruit bars, glazed candies and ready to serve beverages. Coated nuts, chikki,Ready to cook and ready to eat meat and meat products						
Unit:4	CONVENIENCE FOODS FOR DEFENSE SERVICE				9 hours	
Convenience foods for defense services –IMF and Hurdle Technology-Principles. Processing of dehydrated vegetables, vegetable powder, IMF fruit slices, IMF fruit bars, fruit milk, soup powder. Foods designed by DRDO for defense services – list and principle of processing applied.						
Unit:5	AUTOMATION AND RPA				9 hours	
Process Automation in Food preparation and packaging industry. 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	
A study on The Benefit of Convenience Foods To Non-Working Women						

		Total Lecture hours	30 hours
Text Book(s)			
1	Food processing and preservation –G.Subbulakshmi&Shoba.A.Udipi,NewAge Publishers,2001.		
2	Kamaliya MK and Kamaliya KB “Baking Science and Industries” 2001, Vol1 &2, Anand Publishers.		
3	Kaliraj.P and Devi.T , Industry 4.0 and Education:TransformativeTechnologyand applications, 2022, CRC Press, Tylor and Francis Group		
Reference Books			
1	The complete technology book on snack foods-H.Panda, NIIR, New Delhi		
2	Gordon BR, “Snack Foods” AVI Publication 1997		
3	Indian Food industry– Journal		
4	Food Processed Industry- Journal		
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]			
1	Aissmschmct.in>2016/07PDF https://www.publishingindia.com		
2	https://www.uipath.com/landing/academic-studio-download		
3	https://www.uipath.com/rpa/robotic-process-automation		
4	https://www.uipath.com/rpa/academy		
Course Designed By:			

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	S	M	S	M	M	M	M
CO2	S	S	S	M	S	S	M
CO3	S	M	S	M	S	S	S
CO4	M	M	S	M	S	S	S
CO5	S	M	S	M	S	S	S

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

Course code	2EA	ELECTIVE GROUP A PAPER II FOOD PACKAGING	L	T	P	C
Elective			45	-	-	4
Pre-requisite		Knowledge on food labeling and package materials	Syllabus Version		2023-24	
Course Objectives:						
The main objectives of this course are to: To enable students						
1. To understand the need for food packaging						
2. To know the recent packaging materials and labeling.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Remember the different kinds of packaging materials and understand the characteristics of package materials.					K1 & K2
2	Apply the knowledge in choosing best package materials.					K3
3	Analyze the quality of those packed foods.					K4
4	Evaluate the quality of package materials.					K5
5	Create new package materials as alternate to plastic.					K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create						
Unit:1	FOOD PACKAGING MATERIALS				9 hours	
Definition, functions of packaging materials for different foods, characteristics of packaging material, food packages -bags, pouches, wrappers, tetra packs.						
Unit:2	TYPES OF FOOD OF PACKAGING MATERIALS				9 hours	
Types of packaging materials – characteristics, applications in food industry, merits and demerits, textiles and wood, metal, glass, flexible films, rigid and semirigid plastic containers, paper and boards. Retortable packages – Retort pouches, retortable aluminium containers, composite flexible retortable packages – application and advantages. Shrink packaging, active packaging, smart pack, Intelligent packaging.						
Unit:3	OVANABLE AND ECO FRIENDLY PACKAGES				9 hours	
Microwave ovenable containers – characteristics, applications and advantages. Ecofriendly alternatives to plastics – Edible packaging – advantages, material used – lipid coating, proteins, composite films, current applications, biodegradable packaging material – biopolymer based edible film. Packaging of finished goods – weighing, filling, scaling, wrapping, cartooning, labeling, marking and trapping.						
Unit:4	FOOD LABELLING				9 hours	
Labelling- Standards for labelling, Purpose of labels, description of label for food packaging, critical elements of food label, types of labels, common terms for labels, materials used, surface treatment, labels for freight containers, labelling regulations, bar code, nutrition labelling, health claims, mandatory labelling provisions.						
Unit:5	INTRODUCTION TO LoT , AUTOMATION IN FOOD				9 hours	

INDUSTRY		
Automation and uses of Computer in food analysis: Tools of automation, automation in food industries and its example, Computer in food analysis and its application: Bar code technology, GSISystem RFID technology,		
Unit:6	Contemporary Issues	2 hours
Webinar on Food Packaging		
Total Lecture hours		45 hours
Text Book(s)		
1	A hand book of food packaging by Paine. F.A & Paine.H.Y. Leonard hill. Blackie Sons Ltd London.	
2	Handbook of packaging materials. By Sacharow.S. Avi Pub Co. Westport	
3	Food processing technology- Fellows, Second edition, Woodhead Publ, England, 2000.	
4	Arshdeep Bahga, Vijay Madiseti, 'Internet of Things: A hands- On Approach', 2014. ISBN: 978-0996025515	
5	Kaliraj.P and Devi.T, Industry 4.0 and Education: Transformative Technology and applications, 2022, CRC Press, Tylor and Francis Group	
Reference Books		
1	Principles of food packaging by Stanley Sacharous. Roger C Griffirin. 2nd Ed. Avi pub Co. Westport.	
2	Food packaging materials by Croshy N.T. Applied Science Pub Ltd. London.	
3	The packaging media by Paine F.A. Blackie & Sons Ltd. London.	
4	Food Packaging technology Hand book-NIIR, Delhi	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://youtu.be/Nxla_0kwWnk	
	https://www.uipath.com/landing/academic-studio-download	
	https://www.uipath.com/rpa/robotic-process-automation	
	https://www.uipath.com/rpa/academy	
Course Modified By: Dr. G. Suba		

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	M	M	S	M	S	M	M
CO2	S	M	S	M	S	M	M
CO3	S	M	S	M	S	M	S
CO4	M	S	S	S	S	S	S
CO5	M	S	S	S	S	S	S

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

Course code	3EA	ELECTIVE GROUP A PAPER III FOOD QUALITY CONTROL	L	T	P	C
Elective			45	-	-	4
Pre-requisite	Knowledge on food safety and sanitation		Syllabus Version	2023-24		
Course Objectives:						
The main objectives of this course are to: To enable students						
1. To gain knowledge on food safety & food laws						
2. To study about quality control & common food standards.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Remember the functions and stages of quality control.					K1
2	Understand the governmental regulations in quality control.					K2
3	Apply the knowledge in planning a food service unit.					K3
4	Analyze the quality of foods and food preparation area.					K4
5	Evaluate the quality of packed food items and create awareness on the governmental regulations.					K5, K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	IMPORTANCE OF QUALITY CONTROL				9 hours	
Quality control – Objectives, Importance, functions of quality control, Stages of quality control in food industry. Food quality assurance – Design of company quality assurance program, Microbiological concerns. Managing quality in supply chain and marketing of food products.						
Unit:2	GOVERNMENT REGULATIONS				9 hours	
Government regulations in quality control – FAO/WHO codex Alimentarius commission, FSSAI, PFA, AGMARK, BIS, FPO, fair average quality (FAQ) specification for food grains, ISO 9000 series. HACCP – background, current status, structured approach, principles, benefits and limitation. Consumer Protection Act (CPA)						
Unit:3	ROLE OF CENTRAL AND STATE GOVERNMENT				9 hours	
Role of Central and State Government in imparting quality control – WHO assisted activities – Role of control food laboratory and state food laboratories. Qualification and duties of public analyst and food inspector. Role of FSO.						
Unit:4	FOOD SAFETY AND STANDARDS				9 hours	
Food safety – meaning of food safety. Importance of food quality and safety for developing countries. Food hazards – Physical, Chemical, Biological hazards associated with foods – types. Effect of processing and storage on microbial safety. Types of food toxicants – Endogenous, natural, synthetic toxicants. Food standards – cereals & products – bread, biscuits, cakes, pasta products. Fruit products – jam, juices, squashes, ketchup, sauce, Oils & fats – coconut oil, groundnut oil, palm oil, sunflower oil, vanaspati. Milk & products – Skimmed milk powder, partly skimmed milk powder, condensed sweetened milk. Other products-coffee, tea, sugar, honey, toffees. Patent – definition, requirements, patent laws in India, administrator, need for patent system, advantages, precautions to be taken by applicants, patent procedures, non-patentable.						

Unit:5	ARTIFICIAL INTELLIGENCE	9 hours
Introduction to AI- Fundamentals- Need for AI- Foundations of AI – AI environment-Applications domains of AI- AI tools- Challenges and future of AI. Uses of Robots in Packaging. 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
Webinar on Food Product development		
Total Lecture hours		45hours
Text Book(s)		
1	A first course in food analysis – A. Y. Sathe, New Age Publications, 1999.	
2	Food Science, Chemistry & Experimental foods – M. Swaminathan, Bappco Publishers.	
Reference Books		
1	Food Science – Norman. N. Potter & Joseph. H. Hotchkiss, CBS Publishers, 1996.	
2	BIS standards	
3	Technology of food preservation – DesrosierAndDesrosier ,CBSPublishers,Fourth edition,1999.	
4	Indian food Industry.	
5	Kaliraj.P and Devi.T , Industry 4.0 and Education:TransformativeTechnologyand applications, 2022, CRC Press, Tylor and Francis Group	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://youtu.be/BHGNy3;99Yo	
Course Designed By:		

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	M	M	S	M	M	M	M
CO2	S	M	S	M	S	M	M
CO3	M	M	S	M	S	S	S
CO4	M	M	S	M	S	M	S
CO5	M	M	S	M	S	S	S

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

Course code	43P	GROUP A PAPER IV QUALITY CONTROL PRACTICALS	L	T	P	C
Elective			-	-	4 5	4
Pre-requisite	Knowledge on food service quality control operations		Syllabus Version		2023-24	
Course Objectives:						
The main objectives of this course are to: To enable students						
<ol style="list-style-type: none"> 1. To gain knowledge on food safety & food laws 2. To study about quality control & common food standards. 						
<ol style="list-style-type: none"> 1. Estimation of titrable acidity. 2. Estimation of total solids 3. Estimation of specific gravity in foods. 4. Estimation of fat content in milk by volumetric Gerber method. 5. Analysis of pectin in foods. 6. Estimation of lactose in milk. 7. Estimation of tannins in tea. 8. Test for rancidity in oils – Kries test 9. Food adulteration – Test to detect adulteration 10. Preparation and inoculation of growth media – Inoculation and incubation – counting of microbes. 11. Product formulation – Cereal based, Pulse based, Milk based, Vegetable, Fruit based or Combinations. 12. Standardization of formulated food 13. Evaluation of sensory characteristics – development of score cards 14. Consumer acceptability and popularization of formulated product 						
Course Designed By:						

Course code	13B	GROUP B PAPER I INSTITUTIONAL FOOD MANAGEMENT	L	T	P	C
Elective			45	-	-	4
Pre-requisite		Knowledge on food services, preparation and storage	Syllabus Version		2023-24	
Course Objectives:						
The main objectives of this course are to: To enable students						
1. By emphasizing the various facets of functioning of food service institutions.						
2. With the necessary knowledge to become an efficient manager.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the governmental and non- governmental food service organizations.					K2
2	Apply the knowledge in planning and preparing food in a food service unit.					K3
3	Analyze the quality of foods and food preparation area.					K4
4	Evaluate the quality of prepared and packed food items.					K5
5	Create awareness on the governmental regulations related to food safety and standards.					K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	TYPES OF FOOD SERVICE SYSTEMS					15 hours
Food service system Introduction to food service system, evaluation of the food service industry, characteristics of the various types of food service units-commercial, institutional, hospital, military, any other. Scope and development of food service institution in India Principles and functions of food service management.						
Unit:2	MANAGEMENT OF FOOD SERVICE ORGANISATIONS					15 hours
Food service organization Definition and types of organization in food, tools of organization and administrative leadership. Financial management –definitions, application of management accounting to catering operations, budgeting, determining the financial needs sources and book-keeping and accounting.						
Unit:3	QUALITY FOOD PURCHASE AND SERVICE					15 hours
Quantity food purchase Procedures and records involved in purchasing, receiving, storing, and issuing of food materials. Factors involved in selection of raw materials. Quantity food service - types, objectives, Indian and western styles of service.						
Unit:4	QUALITY FOOD PREPARATION, FOOD SAFETY AND SANATATION					15 hours
Quantity food preparation Menu planning – definition, types of menus. Standardization of recipe – definition, standard recipe format and uses. Standard portion sizes - definition, portioning equipment and portion control. Use of left over foods. Organization of space and equipment Kitchen- type, designing, storage space and service areas. Equipment - planning, selection and purchasing. Sanitation and safety of food service Industry-Sanitation of plant – measures taken to maintain sanitation – types of cleaning. Personnel hygiene – facilities and benefits provided to workers. Safety at work – measures adopted.						
Unit:5	INTRODUCTION TO AUTOMATION AND RPA					15 hours
Process Automation in Food preparation and packaging industry. 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
Food Laws and the requirements of Food Testing in India		
Total Lecture hours		15hours
Text Book(s)		
1	Sethi, m. and Matha, S. Catering Management – An Integrated approach, wiley Eastern Ltd., New Delhi, II Edition 1993 34. 5.	
2	Delfakis, H. Scanion, W.C. and Van Burch, J.B. Food service Management, South Western Publication Co., cincinatti, ohio, 1992.	
Reference Books		
1	Palacio, J.P. Harger, V., Shugart, G. and Theis, M. West's Introduction to food service, MacMillan Publication Co., New York, XVII Edition, 1994.	
2	Kotschevar, L.H. and Teerell, M.E., Food service planning, Layout and Equipment, MacMillan Publication co., New York, III Edition, 1985.	
3	Cracknell, H.C. and Nobis, G. Mastering Restaurant Service, Macmillan Master Service, Macmillan Education Ltd, (pub) London, 1989.	
4	Kaliraj.P and Devi.T , Industry 4.0 and Education: Transformative Technology and applications, 2022, CRC Press, Tylor and Francis Group	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://youtu.be/COy5f4an_0	
Course modified By: Dr. G. Suba		

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	M	M	M	M	M	S	M
CO2	S	M	S	M	S	S	M
CO3	S	M	S	M	S	S	S
CO4	M	M	S	M	S	S	S
CO5	M	M	S	M	S	S	M

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

Course code	2EB	ELECTIVE GROUP B PAPER II FOOD PRODUCT DEVELOPMENT AND MARKETING	L	T	P	C
Elective			45	-	-	4
Pre-requisite		Knowledge on formulation of new foods	Syllabus Version		2023- 24	
Course Objectives:						
The main objectives of this course are to: To enable students						
1. To understand and know various aspects of food product develop food science and technology, packaging, nutrition values and marketing.						
2. To recognize the potential for entrepreneurship through marketing.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the importance of formulation of new foods based on customer demands.					K2
2	Apply the knowledge in the preparation of new food formulae.					K3
3	Analyze the quality of formulated foods.					K4
4	Evaluate and standardize the new formulas.					K5
5	Create awareness on the governmental regulations related to food additives, supplements.					
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	NEW PRODUCT DEVELOPMENT					9 hours
New product development Definition and classification, characterization and factors shaping new product development. Health concerns impact of technology and market place influence.						
Unit:2	FORMULATION OF NEW PRODUCT					9 hours
Formulation of new product development Formulation of new product development for infants, preschool, sports person, elderly- Selection of raw materials, portion size, standardization methods, calculation of nutritive values, cost production, shelf life.						
Unit:3	SENSORY EVALUATION					9 hours
Sensory evaluation Establishing sensory panels – Designing testing facilities – Analytical Test – Conduct a sensory Evaluation Test – Designing score card, objective evaluation, Instruments used for texture evaluation.						
Unit:4	PACKAGING AND MARKETING					9 hours
Packaging – Introduction, Types of packing materials. New product development – patent, patent laws, international code for Intellectual property rights (IPR). Marketing Concept of market and marketing – Approaches to study marketing and marketing functions, market structure, market efficiency and market integration. Role of government in promoting agricultural marketing.						
Unit:5	AUTOMATION IN FOOD INDUSTRY					9 hours
Automation and uses of Computer in food analysis: Tools of automation, automation in food industries and its example, Computer in food analysis and its application: Bar code technology.						
Unit:6	Contemporary Issues					2 hours
Online Practical Food Product Development webinar						

Webinar on “Enterpreneurship& Startup Opportunities in Food Covid-19”	
Total Lecture hours	
45hours	
Text Book(s)	
1	Baker,R.C., Fundamentals of New Food Product Development,1988.
2	Sivarama Prasad A. Agricultural marketing in India, Mittal Publication, New Delhi, 1985
Reference Books	
1	Fuller G.W, New Food Product Development from Concept to Market place.
2	Aaron, L. Brody, Joha .B. Lord.Developing New Food Product for a changing Market place, 2nd Edition, 2005
3	Acharya S. S. and N.L. Agarwal Agricultural Marketing in India – Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, 1992.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://www.cfpa.com/CourseDescription/CourseDescription/1709904O2782A/2782
2	https://youtu.be/Fc1aKdtu3Hg
3	https://www.uipath.com/landing/academic-studio-download
4	https://www.uipath.com/rpa/robotic-process-automation
4	https://www.uipath.com/rpa/academy
Course modified By: Dr. G. Suba	

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	S	S	S	M	S	S	M
CO2	S	M	S	M	S	S	M
CO3	S	M	S	M	S	S	S
CO4	S	M	S	M	S	S	S
CO5	S	M	S	M	S	S	S

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

Course code	3EB	GROUP B PAPER III CULINARY TECHNIQUES	L	T	P	C
Elective			45	-	-	4
Pre-requisite		Knowledge on food preparation	Syllabus Version		2023-24	
Course Objectives:						
The main objectives of this course are to: To enable students						
1. To develop skills needed for a career in the food service industry. □ To learn a variety of cooking techniques						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the preparation of cakes and other bakery and confectionary items.					K2
2	Apply the knowledge in setting up a dietary or food service unit .					K3
3	Analyze the quality of foods and food preparation area.					K4
4	Evaluate the quality of packed food items.					K5
5	Create awareness on the governmental regulations.					K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	WORK STATION SETUP					3 hours
Workstation set-up The essentials for setting up workstations in basic commercial and institutional settings. Set up of the grill, hot and cold food stations, salad, dessert, and baking stations. Culinary tools Hand Tools, Light Kitchen Equipment, Heavy Kitchen Equipment – types and uses						
Unit:2	BAKING					3 hours
Dessert baking and cake decoration Cake-mixing methods, cake preparation fundamentals, assembling and icing, and decorating techniques. Preparations of different types of cakes, pies, cookies, petite four, and pastries that use various dough bases. Preparations of butter cream and glazed icings. Cake decoration. Sweetening substitutions for sugar-restricted diets.						
Unit:3	VEGETABLE CUTTING AND SALAD DRESSINGS					3 hours
Vegetable cooking Vegetarian entrees and side dishes. Vegetables cuts and different methods of preparing common vegetables including boiling, steaming, and sautéing. Vegetables used for flavoring and garnishing. Vegetable carving. Salads Components and preparation of salads and salad dressings. Salad preparation includes fruit, vegetable, leafy green, meat, seafood, gelatin, and pasta salads dressings made from the three basic types of salad dressings – oil and vinegar, mayonnaise, and boiled or cooked. Sandwich production Preparation of hot, cold, and grilled sandwiches.						
Unit:4	SOUPS, GRAVIES AND BEVERAGES					3 hours
Soups, stocks, sauces, and gravies Common procedures used to prepare stocks, ingredients used in making stocks, and the function of a stock in making sauces and soups. Classifications of soups, preparations methods of thickening, holding, and serving. Classic and contemporary sauces and the uses featuring the five major sauces in the culinary field. Beverages Hot and cold beverages and proper serving methods. Beverage products prepared with and without caffeine. Breakfast drinks such as hot cocoa and party beverages such as fruit-based punches. Dairy products The use of dairy products as thickening, binding, adhesive, emulsifying, clarifying, and lightening. Types of milk products such as cheese, cream, sour cream, and whipping cream. Desserts						

using eggs Spices and seasonings Use various spices and seasonings in food in order to enhance flavors in cereal and pulse preparations, meats, poultry, fish, and vegetables. Enhancement of special diets that are fat and salt restrictive through various herbs and spices. Basic procedures of infusion with fresh herbs and spices.		
Unit:5	ARTIFICIAL INTELLIGENCE	3 hours
Uses of Robots in Packaging. 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
The Science of Good Cooking		
Total Lecture hours		15hours
Text Book(s)		
1	1. The new food lovers companion, Comprehensive Definitions of Nearly 6000 Food, Drink, and Culinary Terms (Barron's Cooking Guide) by Sharon Tyler Herbst	
2	Recipes, Restaurants, & Pitmasters from America's Great Barbecue Regions by Michael Karl Witzel	
3	Knives Cooks Love: Selection. Care. Techniques. Recipes. by Sur La Table and Sarah Jay	
Reference Books		
1	Chef's Companion: A Concise Dictionary of Culinary Terms, 2nd Edition by Elizabeth Riely	
2	BIS standards	
3	The Cook's Essential Kitchen Dictionary By Jacques L. Rolland	
4	Kaliraj.P and Devi.T , Industry 4.0 and Education: Transformative Technology and applications, 2022, CRC Press, Tylor and Francis Group	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://youtu.be/jz_7Z0iYt8	
2	https://www.uipath.com/landing/academic-studio-download	
3	https://www.uipath.com/rpa/robotic-process-automation	
4	https://www.uipath.com/rpa/academy	
Course modified By: Dr. G. Suba		

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	S	M	S	M	M	M	M
CO2	S	M	S	M	M	M	S
CO3	S	M	S	M	S	M	S
CO4	S	M	S	M	S	M	S
CO5	S	M	S	M	S	M	S

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

Course code	43Q	GROUP B PAPER IV-PRACTICAL FOOD SERVICE MANAGEMENT PRACTICAL	L	T	P	C
Elective			45	-	-	4
Pre-requisite	Knowledge on food service and leadership skills		Syllabus Version	2023-24		
Course Objectives:						
The main objectives of this course are to: To enable students						
<ol style="list-style-type: none"> 1. To gain an understanding of commercial food service. 2. To have hands-on preparation of items popular in food operations. 3. To gain experience in menu planning, recipe preparation, food portions and food preparation, presentation and cost and nutritive value calculation. 4. To apply the interpersonal skills crucial to working with coworkers and others effectively. 5. Perform cleaning and sanitation duties in accordance with sanitation and health codes 6. Prevent food contamination 						
Unit:1						
IMPORTANCE OF QUALITY CONTROL					45 hours	
Recipe preparation, food portions, presentation, cost and nutritive value calculation for the following..						
<ol style="list-style-type: none"> 1. Prepare four salads and salad dressings 2. Prepare two each hot and cold sandwiches 3. Prepare eggs, for breakfast foods 4. Use dairy and cheese products in two recipes 5. Prepare two fruits and fruit dishes 6. Prepare two vegetables and vegetable dishes 7. Prepare pasta, grains, rice and legumes (two dishes each) 8. Prepare any two meat and meat dishes including beef, pork, poultry, fish or shellfish 9. Prepare four stocks, basic sauces and gravies 10. Prepare two vegetarian and two non-vegetarian soups 11. Prepare two basic baked goods - Fruit Tart and Lemon & Chocolate Cake 12. Two field trips after the mid-point of the program to hotels / restaurant to observe work station set up, tools used, preparation and portioning, pricing and presentations. 						
Course Designed By:G.SUBA						



**Value Added
Course**

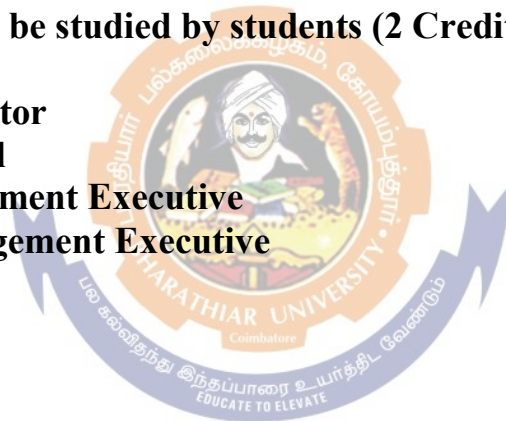
VALUE ADDED COURSES

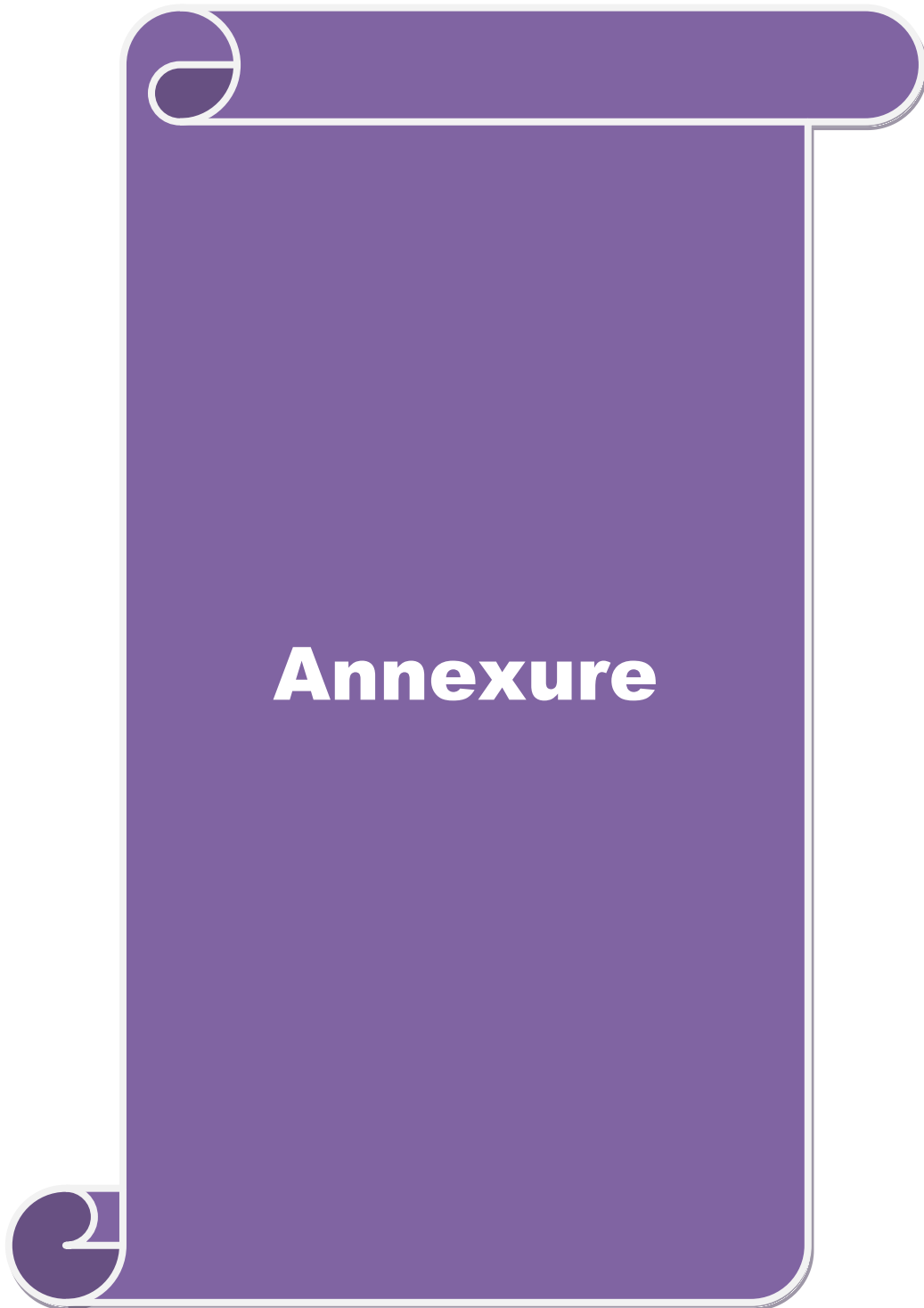
The students can choose any two of the following courses

1. Bakery
2. Food Preservation
3. Textiles and apparel designing
4. Basics of interior designing
5. Sports Nutrition
6. Food Processing techniques
7. Diabetes educator
8. Health management executive
9. Diet counseling

Add on courses to be studied by students (2 Credits)

1. Diabetes Educator
2. Quality Control
3. Health Management Executive
4. Hospital Management Executive





BHARATHIAR UNIVERSITY: COIMBATORE 641046

DEPARTMENT OF FOOD AND NUTRITION

MISSION

Food Science and Nutrition programme is designed to advance an integrative approach between food, nutrition and health by progressive education and innovative research for Postgraduate students and to make the students educate the public through creative outreach.

Currently in food industry, Industry 4.0 is focusing on automation in food industry.

ELIGIBILITY CRITERIA FOR ADMISSION

For MSc., Food and Nutrition

- a) UG Degree with 55% marks in Home science/Nutrition & Dietetics/ Food science and Nutrition/Foodservice Management and Dietetics/ Clinical Nutrition & Dietetics - with Chemistry
- b) B.Sc., degree in Botany, Zoology, Biochemistry, Biotechnology, Food technology, Food processing & Technology, Microbiology, Microbiology with Nanotechnology/ B.Voc., in Food Processing - (10% students can be admitted with the above said course)

