POST GRADUATED DEPARTMENT OF NUTRITION AND DIETETICS

B.Voc., FOOD PROCESSING AND SAFETY

Syllabus

(2020 – 2023 onwards)

JAMAL MOHAMED COLLEGE (Autonomous)

Accredited (3rd Cycle) with 'A' Grade by NAAC

(Affiliated to Bharathidasan University)

Tiruchirappalli – 620020, Tamil Nadu, India

PROGRAMME OUTCOMES – SCIENCE

Undergraduates will be able to

- Discuss current scientific facts, concepts, fundamental principles and scientific theories in solving societal problems and make informed decisions in scientific contexts.
- Transcribe scientific ideas, arguments and practical experiences and demonstrate laboratory skills in handling new scientific techniques and equipment's safely and ethically.
- Recognize the benefits and limitations of science and its application in technological developments.
- Demonstrate an ability to pursue higher education as an independent learner and becomes entrepreneurs in the relevant discipline.
- Devise strategies to meet community requirements and serve as responsible citizens.

B.Voc. Programme (Food Processing and Safety)

At the end of the programme the students will be able to

- Increases employability of the graduates and meet industry demand for human resources.
- Provide a robust and vibrant eco-system for students with excellent skills in the food processing sector in the country.
- Demonstrate an ability to pursue higher education as an independent learner and become entrepreneurs in the relevant discipline.
- Devise strategies to meet community requirements and serve as responsible citizens. Increase the scope for self-employment as small, medium or large scale entrepreneur in food industry.

PG & RESEARCH DEPARTMENT OF NUTRITION AND DIETETICS

JAMAL MOHAMED COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 020

B.Voc. (Food Processing and Safety)

(Programme structure for Students admitted from 2020-2021 onwards)

Sem.	Part	Course	Course Code	Course Title	Total Hours	Credits	Marks		
							CIA	ESE	Total
I	I	General	**20B1LT1/ 20B1LBT1**	**Language-I- Tamil/Basic Tamil-I**	30	2	25	75	100
	II	General	**20 BCN1LE1**	**Communicative Grammar**	30	2	25	75	100
	III	General	18 BFP1C1	Food Science	45	3	25	75	100
	III	General	18 BFP1C2	Bakery and Confectionery-I	45	3	25	75	100
	III	Skill	18 BFP1C3P	Food Science Practical	90	6	20	80	100
	III	Skill	18 BFP1C4P	Bakery and Confectionery-I Practical	90	6	20	80	100
	III	Skill	18 BFP1C5I	Bakery and Confectionery-I Internship	180	6	20	80	100
	IV	General	**20BCN1AE1**	**Value Education**	30	2	100	-	100
Total					**540**	**30**	**260**	**30**	**800**
II	I	General	**20B2LT2/ 20B2LBT2**	**Language-II -Tamil / Basic Tamil -II**	30	2	25	75	100
	II	General	**20 BCN2LE2**	**English**	30	2	25	75	100
	III	General	18 BFP2C6	Principles of Nutrition	45	3	25	75	100
	III	General	18 BFP2C7	Bakery and Confectionery-II	45	3	25	75	100
	III	Skill	18 BFP2C8 P	Principles of Nutrition Practical	90	6	20	80	100
	III	Skill	18 BFP2C9P	Bakery and Confectionery-II Practical	90	6	20	80	100
	III	Skill	18 BFP2C10I	Bakery and Confectionery-II Internship	180	6	20	80	100
	IV	General	**20BCN2SE1**	**Soft Skill Development**	30	2	100	-	100
		Total			**540**	**30**	**260**	**540**	**800**
III	III	General	18 BFP3C11	Principles of Food Preservation	30	2	25	75	100
	III	General	18 BFP3C12	Food Processing-I	60	4	25	75	100
	III	General	18 BFP 3C13	Food Chemistry	30	2	25	75	100
	III	General	18 BFP 3C14	Food Microbiology	30	2	25	75	100
	III	Skill	18 BFP3C15P	Food Processing-I Practical	90	6	20	80	100
	III	Skill	18 BFP3C16P	Food Chemistry and Food Microbiology Practicals	90	6	20	80	100
	III	Skill	18 BFP3C17I	Food Processing – I Internship	180	6	20	80	100
	IV	General	**20BCN3AE2**	**Environmental Studies**	30	2	100	-	100
Total					**540**	**30**	**260**	**30**	**800**
IV	3	General	18 BFP4C18	Food Processing-II	45	3	25	75	100
	3	General	18 BFP4C19	General Biochemistry	45	3	25	75	100
	3	General	18 BFP4C20	Food Service Management	45	3	25	75	100
	2	General	18 BFP4C21	Entrepreneurship Skill in Food Industry	30	2	25	75	100
	6	Skill	18 BFP4C22P	Food Processing-II Practical	90	6	20	80	100
	6	Skill	18 BFP4C23P	General Biochemistry and Food service Management Practicals	90	6	20	80	100
	6	Skill	18 BFP4C24I	Food Processing-II Internship	180	6	20	80	100
	1	General	**20BCN4AE3**	**Gender Studies**	15	1	100	-	100
Total					**540**	**30**	**260**	**540**	**800**
V	4	General	18 BFP5C25	Food Processing-III	60	4	25	75	100
	3	General	18 BFP5C26	Food Product Development	45	3	25	75	100
	3	General	18 BFP5C27	Nutrition through life cycle	45	3	25	75	100
	2	General	18 BFP5C28	Marketing Management	30	2	25	75	100
	6	Skill	18 BFP5C29P	Food Processing-III Practical	90	6	20	80	100
	6	Skill	18 BFP5C30P	Food Product Development and Nutrition through life cycle Practicals	90	6	20	80	100
	6	Skill	18 BFP5C31I	Food Processing-III Internship	180	6	20	80	100
Total					**540**	**30**	**160**	**540**	**700**
VI	3	General	18 BFP6C32	Human Physiology	45	3	25	75	100
	3	General	18 BFP6C33	Diet Therapy	45	3	25	75	100
	3	General	18 BFP6C34	Food Packaging and Labelling	45	3	25	75	100
	3	General	18 BFP6C35	Food standards and Safety	45	3	25	75	100
	6	Skill	18 BFP6C36P	Diet Therapy and Application of computer practicals	90	6	20	80	100
	6	Skill	18 BFP6C37P	Food Packaging and Labelling Practical	90	6	20	80	100
	6	Skill	18 BFP6C38I	Food Packaging and Labelling Internship	180	6	20	80	100
Total					**540**	**30**	**160**	**540**	**700**
Grand Total					**3240**	**180**	**1360**	**3240**	**4600**

SEMESTER-I

GENERAL EDUCATION COMPONENT

FOOD SCIENCE

Course Code	**:**	**18 BFPIC1**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**45**	**Internal Marks**	**:**	**25**
Credit	**:**	**3**	**External Marks**	**:**	**75**

Objectives: To enable the students to

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

Unit I: Introduction to Food science **9 Hours**

Food - Definition: Food, Food Science, Functions of food. Basic Four food groups. Cooking methods: Moist, Dry heat methods and its Merits and Demerits.

Unit II: Cereals, Millets & Pulses. **9 Hours**

Cereals: Wheat and Rice - Structure, Composition and Nutritive value, malting process. Role of Cereals in cookery. Millet: Types, composition and Nutritive value and its by product.

Pulses: Composition and Nutritive value, Germination process. Role of pulses in cookery.

Unit III: Milk, Egg and Fleshy foods **9 Hours**

Milk - Types of milk and milk products, Proteins and enzymes in milk, Role of milk in cookery.

Egg: Structure, quality of egg, factors affecting foam formation, factors affecting the Coagulation of egg. Role of egg in cookery.

Fleshy foods: Meat- Classes of meat, post mortem changes, ageing and tenderness of meat, methods of cooking. Poultry- Classification and poultry cooking. Fish- Classification, selection and methods of Cooking

Unit-IV: Vegetables and fruits **9 Hours**

Vegetables: Classification, Pigments, organic acids, enzymes and selection, Effect of acid, alkali medium on the pigments, Role of Vegetables in cookery. Fruits: Classification, Pigments, Changes during ripening of fruits, Browning reaction- types and its prevention.

Unit V: Oil, Fats, Sugar and Nuts **9 Hours**

Fats and oil: Refining and processing of fats, rancidity and role of fat/oil in cookery. Sugar: Stages of sugar, sugar related products, Role of sugar in cookery. Nuts: Specific nuts and oil seeds-walnut, almonds, coconut, groundnut and sunflower seed. Role of nuts and oilseeds in cookery.

Text Books:

1.Potter, N.Food science, The AVI Publishing Co.,Inc., West Port, Connecticut,1975.

2.Srilakshmi,"Food Science".5th edition, New Age International Pvt. Publishers, New Delhi, (2010).

SEMESTER-I

GENERAL EDUCATION COMPONENT

BAKERY AND CONFECTIONERY-I

Course Code	**: 18 BFP1C2**		**Max. Marks**	**:**	**100**
Total Hours	**: 45**		**Internal Marks**	**:**	**25**
Credit	**: 3**		**External Marks**	**:**	**75**

Objectives: To enable the students to

1. Know the baking terms, ingredients, equipment and tools
2. Gain knowledge to produce baked products using commercial ingredients and equipment

Unit I: Introduction to bakery **9 Hours**

Introduction: Scope of bakery, Units of measurement, Bakery terms, Minor and major equipment, Baking temperatures for bread. Structure of wheat grain-Physical structure, Longitudinal section.

Unit II: Bakery ingredients **9 Hours**

Role of raw materials in bread making- Flour, Salt, Leavening Agents, Water, Sugar, Egg, Milk, Fat, Oil. Bread improvers and additives- S.M.P, Soya flour, Glycerol Mono State, Potassium Bromate, Potassium Iodate.

Unit III: Bread making **9 Hours**

Methods of bread making-Bread Making Process-Methods-Straight Dough Method, Ferment dough, salt delayed method, no dough time method-types of bread.

Unit IV: Quality of Bread **9 Hours**

Characteristic of good bread- External- volume, symmetry, shape, colour-Internal- texture, aroma, elasticity. Bread faults and remedies-Basic reasons for faults, Common bread faults (internal and external), Remedies. Bread diseases-Rope and Mold-Causes and Prevention.

Unit V: Setting up Bakery unit **9 Hours**

Setting up a bakery unit-Location, Layout, Selection of equipment, Total space required, and Electricity, Government procedure.

Text Books:

1. Potter, N. Food Science, The AVI Publishing Co., Inc., West Port, Connecticut, 1975.
2. Bakers Handbook on practical Baking .Wheat Associates, USA, New Delhi.

Reference Books:

1. Dubey, SC, Basic Baking Science and Craft, Jwalmukhi Job Press, Bangalore, 1979.
2. Modern Pastry Chab, Vol.I and II, A VI Publishing Co., Inc., West Port, Connecticut, 1977.

SEMESTER-I

SKILL DEVELOPMENT COMPONENT

FOOD SCIENCE PRACTICALS

Course Code	**:**	**18 BFP1C3P**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**90**	**Internal Marks**	**:**	**20**
Credit	**:**	**6**	**External Marks**	**:**	**80**

Objectives: To enable the students to

1. Introduce students to the field of food science and technology.
2. Familiarize them with the application of method of cooking in cereals, pulses, fruits, vegetables, sugar, milk and egg.

1. Introduction to laboratory:

(a) Laboratory rules (b) familiarizing with laboratory equipments, procedure, and weighing methods

2. Cereals:

(a) Determination of Gluten content in wheat, maida and rice flour.

(b) Cereal preparations of recipes using rice, wheat, ragi by various cooking methods - Boiling, pressure cooking, steaming.

3. Pulses:

(a) Factor affecting the quality of pulses- Use of hard water, soft water, sodium bi Carbonate, Vinegar.

(b) Preparation of pulses based recipes by using different method of cooking.

4. Vegetables and Fruits:

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

(b) Browning reaction in vegetables and fruits and methods of its prevention.

(c) Preparation of vegetables and fruits based recipes.

5. Milk Cookery:

(a) Effect of prolonged heat, acid and enzyme. (b) Preparation of Milk based recipes

6. Egg:

(a) Boiled egg – Hard and Soft cooked egg.

(b) Preparation of scrambled, poached egg, custards (steamed and baked), omelette, egg curry.

7. Sugar:

(a) Identify the stages of sugar cookery using food thermometer.

(b) Sweet preparations - Fondant, Fudge, peanut brittle, mysore pak and Gulab jamun

8. Fats and Oils:

(a) Smoking temperature of different fats and oils - Safflower oil, groundnut oil & palm oil

(b) Frying poori at different smoking temperature

(c) Preparation of few deep fat fry snacks.

9. Beverages:
Preparation and evaluation of (a) Coffee - Filter and instant method (b) Tea (c) Soup
(d) Beverages -fruit and milk based drinks

Text Books

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

SEMESTER-I

SKILL DEVELOPMENT COMPONENT

BAKERY AND CONFECTIONERY-I PRACTICAL

Course Code	**:**	**18BFP1C4P**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**90**	**Internal Marks**	**:**	**20**
Credit	**:**	**6**	**External Marks**	**:**	**80**

Objectives: To enable the students to

1. Gain the knowledge about various raw ingredients used in bakery
2. Train the students to prepare the bakery products

Preparation of

1. Bread roll
2. Bread sticks
3. Fancy rolls- Danish pastry, crescent, dough nut,
4. Buns
5. Milk bread
6. Whole wheat bread
7. Pizza
8. Garlic bread
9. Sweetish tea ring
10. Millet bread
11. Visit to the bakery industry

Text Books:

1. Dubey, SC, Basic Baking Science and Craft, Jwalmukhi Job Press, Bangalore, 1979.
2. Bhuvaneswari.D and Kavitha.V, Easy to Bake, Dhivakar Publication, Musri, Trichy, 2017.

SEMESTER-I

SKILL DEVELOPMENT COMPONENT

BAKERY AND CONFECTIONERY-I INTERNSHIP

Course Code	**:**	**18BFP1C5I**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**180**	**Internal Marks**	**:**	**20**
Credit	**:**	**6**	**External Marks**	**:**	**80**

Objectives: To enable the students to

1. Develop skill in various baking procedures
2. Know various kinds of ingredients used in baking
3. Start a small bakery unit at home

In Hands on training the students will learn to

1. Know the different dough making procedures
2. Acquire skill in operating different types of oven
3. Handling of major and minor baking equipments
4. Analyze the sensory quality parameter in prepared bread
5. Handling the raw materials and baking supplies.
6. Design the layout of bakery unit

SEMESTER-II

GENERAL EDUCATIONAL COMPONENT

PRINCIPLS OF NUTRITION

Course Code	**:**	**18 BFP2C6**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**45**	**Internal Marks**	**:**	**25**
Credit	**:**	**3**	**External Marks**	**:**	**75**

Objectives: To enable the students to

1. Understand the concept of nutrition
2. Gain basic knowledge of the different nutrients and their role in maintaining health of the community.

Unit I: Concept of Nutrition and Carbohydrates **9 Hours**

Definition - Nutrition, health, nutritional status, optimum nutrition, malnutrition, undernutrition and over nutrition. RDA- Definition, RDA for Indians. Menu Planning – Definition of Menu Planning, Principle of Menu Planning. Carbohydrates- Definition, composition, functions, sources. Dietary fiber- Definition, classification, physiological effects and sources.

Unit II: Proteins and lipids **9 Hours**

Proteins- Definition, composition, nutritional classification of proteins and amino acids, functions, sources, requirements. Evaluation of protein quality: PER, BV, NPU and Chemical score. Lipids- Definition, composition, functions, sources, requirements. Essential fatty acids – Definition, functions, sources.

Unit III: Energy **9 Hours**

Definition, units of measurement, Determination of energy value of Food-Bomb calorimeter, Total
Energy requirement, Factors affecting physical activity. BMR- Definition, Factors affecting Basal
Metabolic Rate, factors affecting Thermic effect of food.

Unit IV: Vitamins **9 Hours**

Fat Soluble Vitamins – Vitamin A, D, E and K: Functions, requirements, sources and effects of deficiency. Water Soluble Vitamins – Thiamine, riboflavin, niacin, ascorbic acid, folic acid, vitamin B6 and vitamin B12: Functions, requirements, sources.

Unit V: Minerals **9 Hours**

Macro Minerals- Calcium and Phosphorous: Functions, requirements, sources and effects of deficiency. Micro minerals- Iron, Iodine, Copper, Fluorine and Zinc: Functions, sources, requirements and effects of deficiency. Sodium and Potassium: Functions, sources, requirements

Text Books:

SEMESTER-II

GENERAL EDUCATIONAL COMPONENT

BAKERY AND CONFECTIONERY-II

Course Code	**:**	**18 BFP2C7**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**45**	**Internal Marks**	**:**	**25**
Credit	**:**	**3**	**External Marks**	**:**	**75**

1 Sumathi R. Mudambi, Rajagopal, M.V., Fundametals of Foods and Nutrition, New Age International (P) Ltd, Publishers, Third edition, 1997.
2. Srilakshmi B.,Nutrition Science, New Age International (P) Ltd, Publishers, Fifth multi colour edition,2016.

Reference Books:

1. Sue Rodwell Williams, Nutrition and Diet Therapy, C.V. Melskey Co., 6 th edition, 2000.

Objectives: To enable the students to

1. Know the ingredients, equipment and tools used in the confectionary
2. Gain knowledge to produce confectionary products using commercial ingredients and equipment

Unit I: Introduction to confectionery **9 Hours**

Introduction - Scope of confectionery, confectionery terms, small and large equipment used in bakery and confectionery. Role of raw materials-wheat flour, sugar, fat, eggs. Essential ingredients, flour sugar, shortening, egg. Optional ingredients baking powder, milk, milk products, dry fruits, baking soda, dairy products.

Unit II: Confectionery Ingredients **9 Hours**

Moistening agents-milk, egg, water. Leavening agents-chemical, natural, water vapour and biological.

Unit III: Cake making methods **9 Hours**

Cake making methods-rubbing in method, melting method, creaming method, whisking method, all in one method. Cake faults and their remedies.

Unit IV : Icing **9 Hours**

Icing- types of icing. Preparation of cookies and biscuits- principles of cookies and biscuits making, various types of cookies and biscuits

Unit V : Pastry **9 Hours**

Pastry making-principles of pastry making, various types of pastries. **Costing-** components of cost, behaviour of cost (fixed cost, semi fixed cost, variable cost).

Text Books:

1. Potter, N. Food Science, The AVI Publishing Co., Inc., West Port, Connecticut, 1975.
2. Bhuvaneswari.D and Kavitha.V, Easy to Bake, Dhivakar Publication, Musri, Trichy, 2017.

Reference Books:

1. Bakers Handbook on practical Baking .Wheat Associates, USA, New Delhi.
2. Dubey, SC, Basic Baking Science and Craft, Jwalmukhi Job Press, Bangalore, 1979.Modern Pastry Chab, Vol.I and II, A VI Publishing Co., Inc., West Port, Connecticut, 1977.

SEMESTER-II

SKILL DEVELOPMENT COMPONENT

PRINCIPLS OF NUTRITION PRACTICAL

Course Code	**:**	**18BFP2C8P**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**90**	**Internal Marks**	**:**	**20**
Credit	**:**	**6**	**External Marks**	**:**	**80**

Objectives: To enable the students to

1. Know the qualitative and quantitative presence of nutrient in food sample
2. Acquire technical skills in estimating nutrient content for prepared food products

1. Qualitative tests for Carbohydrates, Proteins and Minerals.

Qualitative analysis for Carbohydrates in gives food samples.

a) Monosaccharide – Glucose (commercial Glucose), Fructose (fruit juice)

b) Disaccharide - Lactose (milk), Sucrose (table sugar)

c) Polysaccharide - Starch (rice)

2. Qualitative analysis for protein in given food samples

a) Albumin (egg)

b) Casein (milk)

3. Qualitative analysis for minerals in given food samples.

a) Calcium (ragi)

b) Iron (red rice flakes)

c) Phosphorus (ragi)

d) Magnesium (agathi)

4. Estimation of Moisture content in the given sample. (Hot air oven method)
5. Preparation of ash samples for mineral analysis.
6. Estimation of glucose in grape juice.
7. Estimation of ascorbic acid in raw or cooked cabbage.
8. Demonstration of Iron in drumstick leaves.
9. Planning, nutritive value calculation and preparation of recipes based on macro and micro nutrients rich food.

REFERENCE BOOKS:

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

SEMESTER-II

SKILL DEVELOPMENT COMPONENT

BAKERY AND CONFECTIONERY-II PRACTICAL

Course Code	**:**	**18 BFP2C9P**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**90**	**Internal Marks**	**:**	**20**
Credit	**:**	**6**	**External Marks**	**:**	**80**

Objectives :To enable the students to
1. Equip students with the necessary skills for cake, biscuit and pastry processing

A. Preparation of cake

1. Vanilla sponge cake
2. Fruit cake
3. Swiss roll
4. Black forest cake
5. Icing cake

B. Preparation of Biscuits and cookies

1. Melting moments
2. Choco chip cookies,
3. Nan khatai
4. Salted biscuits
5. Butter cookies
6. Pastry-puff pastry,
7. Apple pie,
8. Choux pastry,
9. Filo pastry.

Text Books:

1. Dubey, SC, Basic Baking Science and Craft, Jwalmukhi Job Press, Bangalore, 1979.
2. Bhuvaneswari.D and Kavitha.V, Easy to Bake, Dhivakar Publication, Musri, Trichy, 2017.

SEMESTER-II

SKILL DEVELOPMENT COMPONENT

BAKERY AND CONFECTIONERY-II INTERNSHIP

Course Code	**:**	**18 BFP2C10I**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**180**	**Internal Marks**	**:**	**20**
Credit	**:**	**6**	**External Marks**	**:**	**80**

Objectives :To enable the students to

1. Acquire skill in the preparation of confectionary and pastry products

In Hands on training the students will learn to

1. Know about the fundamentals of confectionary science
2. Acquire skill in operating different types of oven
3. Handle and prepare the cake, cookies and pastry products
4. Update in knowing the methods for preparing pastries
4. Analyze the sensory quality parameter in prepared confectionary products
5. Know the different Icing techniques and to prepare the birthday cake and wedding cake
6. Design the layout of bakery unit

SEMESTER-II

GENERAL EDUCATIONAL COMPONENT

PRINCIPLES OF FOOD PRESERVATION

Course Code	**:**	**18 BFP3C11**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**30**	**Internal Marks**	**:**	**25**
Credit	**:**	**2**	**External Marks**	**:**	**75**

Objectives: To enable the students to

1. Develop the knowledge on various methods of food preservation.
2. Know how to use these principles to preserve different types of foods.

Unit I Principles of Food preservation **6 Hours**

Definition, Basic principle and methods of food preservation

Unit II: **Preservation by using Preservatives** **6 Hours**

Inorganic and organic preservatives, antibiotics and other developed chemical preservatives

Unit III: **Preservation by use of high temperature** **6 Hours**

Pasteurization: Definition, types, Sterilization, Canning - Process, spoilage encountered in canned food. Food irradiation – Principles, merits and demerits, effects of irradiation on nutrients.

Unit-IV: Preservation by use of Low Temperature **6 Hours**

Refrigeration – Principles, advantages and disadvantages. Freezing: Types of freezing and merits and demerits.

Unit V: Preservation by Removal of Moisture **6 Hours**

Drying and dehydration - merits and demerits, factors affecting, different types of drying, Concentration: principles and types of concentrated foods.

TEXT BOOKS:

1. V.A .Vaclavik & E.W. Christian, Essentials of food Science, 2nd edition, Springer New Delhi-1 (2003).
2. S.R. Mudambi, S.M Rao & M.V. Rajagopal, “Food Science”, New Age International Pvt. Ltd. Publishers New Delhi(2007).
3. B. Sivasankar, Food Processing & Preservation, Prentice hall of India Pvt.Ltd, New Delhi(2002).

REFERENCE:

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

SEMESTER-III

GENERAL EDUCATIONAL COMPONENT

FOOD PROCESSING-I

Course Code	**:**	**18 BFP3C12**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**60**	**Internal Marks**	**:**	**25**
Credit	**:**	**4**	**External Marks**	**:**	**75**

Objectives: To enable the students to

- Know the milling process of cereals, pulses and oil seed processing
- Study the storage and handling techniques of cereals, pulses and oilseed.

Unit I: Introduction to Food Grains **12 Hours**

Food grains- Introduction, Production trends, structure and chemical composition of cereals, pulses and oilseeds. Supply chain of food grains, physicochemical properties of food grains.

Unit II: Processing of Wheat **12 Hours**

Wheat-Wheat classification,Structure of wheat grain.Wheat milling- basic concepts, products and by-products. Flour grades and their suitability for baking purposes. Storage and handling techniques of wheat and its by-products.

Unit III: Processing of Rice and Corn **12 Hours**

Rice- Rice milling- traditional and modern methods of milling, parboiling techniques. Corn milling-Dry and wet milling of corn, corn starch and its conversion products. Storage and handling techniques of rice, corn and its by-products.

Unit IV: Processing of pulses **12 Hours**

Pulses Processing-Pre-treatment of pulses for milling, Methods of milling of pulses, Factors affecting milling of pulses, Pulse based processed products. Storage and handling techniques of pulses.

Unit-V Processing of oilseeds **12 Hours**

Oilseeds Processing for Oil Extraction: Preparation of oilseeds, Mechanical and Solvent extraction methods of oil extraction, Oil refining, hydrogenation, Utilization of deoiled cake.

Text Book: Chakraverty, A. (1995), "Post Harvest Technology of Cereals, Pulses and Oilseeds". Oxford and IBH Publishing Co, Calcutta

References:

1. Corn: Chemistry and Technology by Watson SA & Ramstad PE., AACC
2. Unit Operations of Agricultural Processing by K.M. Singh and K.K. Sahay
3. Manuals on Rice and its processing by CFTRI Mysore and IIT Kharagpur.

4. Cereal Technology by Potter NN. AVI Publication.
5. Bakery Science & Cereal Technology by Neelam Khatarpaul, Rajbala Grewal & Sudesh Jood (Daya publishing house).
6. Post harvest technology of Cereals, Pulses and Oilseeds by Chakravarti A. Oxford Publishing
7. Bakery Technology and Engineering by Matz SA.CBS Publication

SEMESTER-III

GENERAL EDUCATIONAL COMPONENT

FOOD CHEMISTRY

Course Code	**:**	**18 BFP3C13**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**30**	**Internal Marks**	**:**	**25**
Credit	**:**	**2**	**External Marks**	**:**	**75**

Objectives: To enable the students to

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

Unit I: **Properties of food** **6 Hours**

Properties of Foods: Physico-Chemical properties of foods – Organic food components, colloids, osmotic pressure, food dispersions (sols, gels, emulsion, foam), Hydrogen ion concentration.

Unit II: Food Adulteration **6 Hours**

Adulteration- Definition, common food adulterants, contamination with toxic metals, pesticides and insecticides, effect of food adulteration and contamination, measure to control food adulteration.

Unit III: Food Toxins and Food Additives **6 Hours**

Food Toxins: Mycotoxins - aflatoxins, aspergillus and pencillium species, mushroom poisoning, and sea food toxins. Other toxins naturally occurring in foods: – Lathyrogens, haemagglutinins, goitrogens, favism, cyanogenic glycoside, saponins, and tannins. Food additives: Food colors, flavours, antioxidants, emulsifiers and stabilizers.

Unit: IV Heat transfer operation in foods **6 Hours**

Heat transfer operation in foods – conduction, convection, radiation, gelatinization, retro gradation, dextrinisation of starches, enzymatic and non enzymatic browning reaction in foods, rancidity – types and prevention.

Unit: V Water **6 Hours**

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

Text Books :

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

REFERENCE:

1. Shakuntala Manay, Shadaksharaswamy. M (2000) Foods, Facts and Principles, New Age International Pvt Ltd Publishers, 2nd Edition

2. Chandrasekhar, U. Food Science and applications in Indian Cookery (2002) Phoenix Publishing House, New Delhi

3. Swaminathan, M. Food Science, (2005) Chemistry and Experimental Foods, Bappco Publishers, Bangalore.

SEMESTER-III

SKILL DEVELOPMENT COMPONENT

FOOD MICROBIOLOGY

Course Code	**:**	**18 BFP3C14**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**30**	**Internal Marks**	**:**	**25**
Credit	**:**	**2**	**External Marks**	**:**	**75**

Objectives: To enable the students to

1. Understand the food and industrial microbiology
2. Aware about the importance of food quality control by avoiding pathogenic microbial attack.

Unit I: Introduction to food microbiology **6 Hours**

Discovery, current status, role of food microbiology, sources of micro organisms in food, changes caused by microorganisms - food fermentation, putrefaction, lipolysis. Bacterial growth curve, methods to control microorganisms.

Unit II: Characteristics of microorganisms **6 Hours**

Classification of microorganisms, morphology – yeast and moulds, bacterial cells, viruses. microbial growth characteristics – Microbial reproduction, nature of growth in food.

Unit III: Spoilage in non perishable foods **6 Hour**

Food spoilage – Introduction, spoilage in cereals, pulses, nuts and oil seeds, fats and oil seeds.

Unit IV: Spoilage in perishable foods **6 Hour**

Food spoilage – Introduction, spoilage in vegetables and fruits, meat, eggs, poultry, fish, milk and milk products, canned foods, nuts and oil seeds, fats and oil seeds.

Unit V : Beneficial uses of microorganisms **6 Hours**

Microorganisms used in food fermentation, prebiotics and probiotics, food bio preservatives of bacterial origin, food ingredients and enzymes of microbial origin. Economic importance of microorganisms.

Text Book:

1. Adams ,Martin R, Maurice O Moss, Peter McClure (2015), "Food Microbiology", Royal Society of Chemistry, Cambridge.

Reference Books:

1. Ray , Bibek; Arun Bhunia,(2013), "Fundamental Food Microbiology", CRC Press.
2. Jay, James M.(2012), "Modern Food Microbiology", Springer Science & Business Media., Maryland.

SEMESTER-III

GENERAL EDUCATIONAL COMPONENT

FOOD PROCESSING-I PRACTICAL

Course Code	**:**	**18 BFP3C15P**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**90**	**Internal Marks**	**:**	**20**
Credit	**:**	**6**	**External Marks**	**:**	**80**

Objectives: To enable the students to

1. Know the functional properties of cereals , pulses and oil seeds

1. Preparation of malt
2. Determination of gluten content in wheat flour
3. To study the cooking quality of rice using water up takes method.
4. To study the methods of extraction of oil from oilseeds
5. Determination of under milled grains from polished rice
6. Preparation of quick cooked rice
7. Determination of specific gravity of grains
8. Parboiling of rice
9. Visit to working rice, pulse and oil mill

Reference Book:

1. S.Ranganna, HandBook of Analysis and Quality Control for Fruit and Vegetable Products, Tata McGraw-Hill Publishing Company Limited, New Delhi (2004).
2. S.Sadasivam, A. Manickam, biochemical methods, New Age International Publisher, New Delhi (2004).

SEMESTER-III

SKILL DEVELOPMENT COMPONENT

FOOD CHEMISTRY AND FOOD MICROBIOLOGY PRACTICALS

Course Code	**: 18 BFP3C16P**		**Max. Marks**	**:**	**100**
Total Hours	**: 90**		**Internal Marks**	**:**	**20**
Credit	**: 6**		**External Marks**	**:**	**80**

Objectives: To enable the students to

1. Know the chemical properties of food constituents
2. Understand the preparation of media
3. Get thorough with various staining techniques, isolation and enumeration of microbes

FOOD CHEMISTRY PRACTICAL

1. Determination of Acidity & pH
2. Determination of Chloride
3. Fat Analysis: Continuous solvent extraction method
4. Instrumental methods: Refractive index,melting point,Cold Test, Cloud point,Smoke point, Flash and Fire point,
5. Estimation of Iodine Value,
6. Estimation of Saponification Value
7. Estimation of Acid Value,
8. Estimation of Peroxide Value

FOOD MICROBIOLOGY PRACTICAL

1. Study of compound microscope
2. Working and handling of common microbiological laboratory equipments and Materials
3. Sterilization techniques: Dry heat and moist heat
4. Preparation of microscopic examination
5. Preparation of pure culture: streak plate, pour plate, spread plate
6. Staining techniques – simple staining, gram staining
7. Differential staining
8. Microscopic examination of living organisms- hanging drop mount method for the demonstration of bacterial motility
9. Negative staining of bacteria

REFERENCE BOOKS:

1.Chris bell,et al.,(2006),Food microbiology and laboratory practice, Black well publishing professionals,2121 state avenue, ames, Iowa, UK.

2.Bisen P.S, et al.,(2009),Hand book of Microbiology, CBS publishers and distributors Private limited, New Delhi

3. S.Sadasivam, A. Manickam, biochemical methods, New Age International Publisher, New Delhi (2004).

SEMESTER-III

SKILL DEVELOPMENT COMPONENT

FOOD PROCESSING -I INTERNSHIP

Course Code	**:**	**18 BFP3C17I**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**180**	**Internal Marks**	**:**	**20**
Credit	**:**	**6**	**External Marks**	**:**	**80**

Objectives : To enable the students to

1. Know the functional properties of cereals, pulses and oil seeds

In Hands on training the students will learn to

1. Examine the processing of different food ingredients.

2. Explore extrusion processing and its working principles

3. Learn and understand whole grain cereals and legumes processing.

4. Handling the different food related equipment in operation

5. Make different Cereals & pulses products with quality assurance.

SEMESTER-IV

GENERAL EDUCATIONAL COMPONENT

FOOD PROCESSING –II

Course Code	**:**	**18 BFP4C19**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**45**	**Internal Marks**	**:**	**25**
Credit	**:**	**3**	**External Marks**	**:**	**75**

Objectives: To enable the students to

1. Know about the status of fruit and vegetable production in India with importance to losses.
2. Study about the processing of fruits and vegetables.
3. Study the various methods of dryings of fruits and vegetables
4. Acquire knowledge about the by-products of fruits and vegetable processing

Unit I : Current trends in fruits and vegetable processing 9 Hours

Current status of production and processing of fruits and vegetables-Structural, compositional and nutritional aspects. Quality requirements of raw materials for processing- preparation of raw material, primary processing-grading, sorting, cleaning, washing, peeling, slicing and blanching.

Unit II : Fruits and Vegetable of processing 9 Hours

Vegetables: Composition, nutritive value and functional properties. Freezing of vegetables -potato, cauliflower, carrot. Fruits: Composition, nutritive value and functional properties. Pre-processing of tomatoes –field processing, washing in lye, peeling, freeze peeling, peeling in calcium chloride solution. Preservation of fruits and vegetables - Canning, Freezing, Dehydration of Fruits and Vegetables in cabinet drier.

Unit III: Fruits and Vegetable processing 9 Hours

Recent advances in juice processing technology, application of membrane technology in processing of juices. Technology of Products: juices & pulps, concentrates & powders, squashes & cordials, nectars, fruit drinks & beverages carbonated and its quality control. Fermented products- Cider, wine, brandy

Unit IV: Dehydration of fruits and vegetable 9 Hours

Manufacturing process of juice, soup, puree, and paste. Jams, Jellies and marmalades: selection, preparation, production. Difference between jam and jelly. Theory of jell formation, failure and remedies in jam and jelly making.General principles and manufacturing processes of preserves, candied fruits, glazed fruits, crystallized fruits.

Unit V: Spices and condiments 9 Hours

Spices: Types, production, pre-harvest and post-harvest problems in processing, properties, drying, storage, health benefits; flavouring components- spice powder and paste- their processing, quality, storage. Spice based food additives; volatiles, essential oils and oleoresins-their characteristics, extraction procedure and utilization.

Text Book :

1. Lal, G., Siddappa, G.S. and Tandon, G.L. 1998. Preservation of Fruits and Vegetables. ICAR.
2.Salunkhe, D.K. and Kadam, S.S.1995. Handbook of Fruit Science &Technology: Production, Composition and Processing. Marcel Dekker.
3.Srivastava, R.P. and Kumar, S. 2003. Fruit and Vegetable Preservation - Principles and Practices. International Book Distributors.

Reference Books

1. Verma, L.R. and Joshi, V.K. 2000. Post Harvest Technology of Fruits and Vegetables. Indus Publ.
2. Desrosier, N.W. and James, N. 2004. The Technology of Food Preservation. 4th Ed. CBS.
   Minor Spices and Condiments: Crop Management and Post Harvest Technology. J.S.Purthi, ICAR publication, 1st Edition, 2001.
3. Major Spices of India: Crop Management and Post Harvest Technology. J.S.Purthi, ICAR publication, 1st Edition, 2003.

SEMESTER-IV

GENERAL EDUCATIONAL COMPONENT

GENERAL BIOCHEMISTRY

Course Code	**:**	**18 BVFP4C20**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**45**	**Internal Marks**	**:**	**25**
Credit	**:**	**3**	**External Marks**	**:**	**75**

Objectives: To enable the students to

1. Know about the functions and metabolism of nutrients in human body.
2. Aware about the deficiency of nutrients.

Unit I : Carbohydrates **9 Hours**

Carbohydrates: Classification, function, digestion, absorption and deficiency (conditions only)

Unit II: Protein and amino acids **9 Hours**

Protein: Classification, function, digestion, absorption, deficiency (conditions only). Amino acids: Classification , functions of amino acid, essential and non essential Aminoacids.

Unit III: Lipids **9 Hour**

Lipids: Classification, function, digestion, absorption, and deficiency (conditions only)**.**Essential fatty acid-functions and deficiency.

Unit IV: Enzymes **9 Hours**

Enzymes: Classification and functions of enzymes, Mechanism of enzyme action, Factors affecting enzyme activity.

Unit V: Vitamins and Minerals **9 Hours**

Vitamins: Biological functions and deficiency of fat and water soluble vitamins, vitamin interaction with nutrients. Minerals: Biological functions of minerals, Minerals interaction with other nutrients.

Text Book:

1.Ambika Shanmugam, Fundamentals of Biochemistry for Medical Students, Seventh Edition, New Age Publishing Pvt.Ltd., New Delhi (1986).

Reference Books:

1. A.C. Deb, Fundamentals of Bio chemistry, Fifth Edition , New Central Book Agency(P)td., (1992).
2. U. Sathyanarayana and U. Chakrapani, Textbook of Biochemistry, Third Edition, Books and Allied (P) Ltd, Kolkata (2010).

SEMESTER-IV:

GENERAL EDUCATION COMPONENT

FOOD SERVICE MANAGEMENT

Course Code	**:**	**18BFP4C21**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**45**	**Internal Marks**	**:**	**25**
Credit	**:**	**3**	**External Marks**	**:**	**75**

Objectives: To enable the students to

1. Understand the organisation of food service establishments
2. Know the functions of quantity food production and service
3. Understand the management process of organisation

Unit I: Introduction to Food Service Establishments **9 Hours**

Types of food service establishments. Planning for a food service unit- Planning, investment, Project report, Registration (License and Inspection).

Unit II: **Menu Planning and table setting** **9 Hours**

Menu Planning- importance, types, steps in planning. Requisites in designing a menu card, Methods of purchase, delivery, receiving, storage types. Table Setting and Arrangement - Indian and Western Styles of Table Setting, Table Appointments, Napkin folding styles, Flower arrangement, Table Etiquettes.

Unit III: Food production and service **9 Hours**

Food production- Standardization of recipes, portion control and left over foods. Food service system-Centralized and decentralized delivery systems, types of food service systems conventional, commissary, ready prepared, assembly, service styles - table, counter, tray, silver, plate, cafeteria, buffet. Specialized forms of food service - hospitals, airline, rail, homedelivery, catering and banquet, room and lounge service.

Unit IV: Food Service Management **9 Hours**

Managing an organization, Process involved, Principles of management, Functions of management- planning, organizing, directing, co-ordinating, evaluating, and controlling. Total quality management, Management by objectives. Work design, job design, work study and simplification.

Unit V: Accounting **9 Hours**

Book keeping, books of accounts, Journal, Ledger, trial balance, balance sheet. Profit analysis, food cost control.

Text Book:
Malhotra, R. K.(2002), "Food Service and catering Management" ,Anmol Publication Pvt Ltd.

Reference Book
Arora, (2007), "Food Service And Catering Management" APH Publishing.
Wentz Bill, (2007), "Food Service Management", Atlantic Publishing Company.
Malhotra, R. K.(2002), "Food Service and catering Management" ,Anmol Publication Pvt Ltd.

SEMESTER- IV

GENERAL EDUCATION COMPONENT

ENTREPRENEURSHIP SKILL IN FOOD INDUSTRY

Course Code	**:**	**18BFP4C22**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**30**	**Internal Marks**	**:**	**25**
Credit	**:**	**2**	**External Marks**	**:**	**75**

Objectives: To enable students to
1. Develop entrepreneurship skills.
2. Analyze the environment related to small scale industry and business.
3. Understand the process and procedures of setting up small food enterprises.

Unit I: Entrepreneurship **6**

Hours

Definitions, need, scope and characteristics of entrepreneurship. Entrepreneurial motivation and employment promotion. Identification of opportunities in food enterprises.

Unit II: Business, Environment for Entrepreneurs for Food Enterprises **6**

Hours

Government of India's policy towards promotion of entrepreneurship.Exposure to demand based, resource based, service based, import substitute and export promotion industries.Opportunities for Entrepreneurs in India and abroad. Woman as Entrepreneur.

Unit III: Creating and Starting the Venture **6**

Hours

Sources of new Ideas, Methods of generating ideas, creating problem solving, product planning and development process.

Unit IV: Steps for Staring a small Industry **6**

Hours

Decision to become an entrepreneur. Steps to be taken, preparation of project, report guidelines. Procedures & formalities for registration.Agencies for promotion of food processing industries. Source of machine and equipment.

Unit V: Institutional support to Entrepreneurship **6**

Hours

Role of Directorate of Industries, District Industries, Centers (DICs), Industrial Development Corporation (IDC), State Financial corporation (SFCs), Commercial banks Small Scale Industries Development Corporations (SSIDCs), Khadi and village Industries Commission (KVIC), National Small Industries Corporation (NSIC), Small Industries Development Bank of India (SIDBI)

TEXT BOOKS

1. C.B. Gupta Srinivasan, N.P. Entrepreneurial Development,6th edition, Sulthan Chand and Sons,New Delhi (1992)
2. Net Reference : rccmindore.com/wp-content/uploads/2015/06/Entreprenership.pdf
3. Entrepreneurial Development by Sarwate (Everest publication)

REFERENCE BOOKS

1.David H. Holt Entrepreneurship – Anew Venture Creation, Prentice Hall of India, New Delhi. 2002

2. Phillip Kottler Marketing Management, Prentice Hall of India Private Limited, NewDelhi. 1994

3. Vasant Desai The Dynamics of Entrepreneurial Development and Management, Himalya Publishing House Pvt. Ltd., Mumbai .2011

SEMESTER-IV

SKILL DEVELOPMENT COMPONENT

FOOD PROCESSING – II PRACTICAL

Course Code	**: 18BFP4C23P**		**Max. Marks**	**:**	**100**
Total Hours	**: 90**		**Internal Marks**	**:**	**20**
Credit	**: 6**		**External Marks**	**:**	**80**

Objectives: To enable the students to

1. Know the processing and preservation of fruits byproducts
2. Acquire skill in preparation of preserves and dehydrated products of vegetables

1. Preservation and processing of certain vegetables by drying.
2. Preparation of tomato ketchup and its preservation.
3. Preparation of tomato puree and its preservation.
4. Preparation of pickles.
5. Preparation of jam
6. Preparation of jelly
7. Preparation of marmalades
8. Preparation of squash and cordial
9. Processing and Preservation of peas by use of high temperatures (Bottling of Peas).
10. Blanching of a given sample (pea) and assessment of its adequacy.
11. Enzymatic browning of fruits and vegetables and its control.
12. Osmotic dehydration of given sample (Carrot/Grapes).
13. Preparation of amla preserve and dried fruit product (Aam papad, bars)
14. Quality analysis of spices.
15. Visit to Vegetables, Fruit and spice processing unit

Reference Book:

1. S.Ranganna, HandBook of Analysis and Quality Control for Fruit and Vegetable Products, Tata McGraw-Hill Publishing Company Limited, New Delhi (2004).
2. S.Sadasivam, A. Manickam, biochemical methods, New Age International Publisher, New Delhi (2004).

SEMESTER-IV

SKILL DEVELOPMENT COMPONENT

GENERAL BIOCHEMISTRY AND FOOD SERVICE MANAGEMENT– PRACTICALS

Course Code	**: 18 BFP4C24P**		**Max. Marks**	**:**	**100**
Total Hours	**: 90**		**Internal Marks**	**:**	**20**
Credit	**: 6**		**External Marks**	**:**	**80**

Objectives: To enable the students to

1. Identify the qualitative and quantitative abnormal constituents in urine and blood
2. Acquire skill to develop new standardised recipes

GENERAL BIOCHEMISTRYPRACTICAL

1. Quantitative analysis of Urine for sugar, protein, Bile pigments, Bile Salts,lipids

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

3. Estimation of Urine Urea (DAM Method)

4. Estimation of Blood Glucose (Folin-WU Method)

5. Estimation of Blood Urea (DAM Method)

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

7. Estimation of urinary phosphorus.

8. Estimation of urinary creatinine

FOOD SERVICE MANAGEMENT PRACTICAL

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

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

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

3. **Quantity cookery:**

a) Standardization of selected recipes and their preparation, calculation of cost and serving size per yield b) Quantity cookery: preparation of south Indian, north Indian menu for 10 members.c) Visits to any one of the well- organized food service units a) Hostel b) Hotel c) Hospital

REFERENCE BOOKS

1.West's and Woods 'Introduction to food service'2nd Edition, mac millan Publishing, New York, 1998.

SEMESTER-IV

SKILL DEVELOPMENT COMPONENT

FOOD PROCESSING – II INTERNSHIP

Course Code	**:**	**18BFP4C25I**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**180**	**Internal Marks**	**:**	**20**
Credit	**:**	**6**	**External Marks**	**:**	**80**

Objectives: To enable the students to

1. Know the processing and preservation of fruits by products
2. Acquire skill in preparation of preserves and dehydrated products of vegetables

1. Study the operating system of food processing equipments such as pulper, sealers, juice extracting machines, autoclaves, corking machines etc.
2. Preparation of Fruit Juice. Preservation of fruits juices with addition of preservative. Technology of extraction of juices from different types of fruits.
3. Handling the various methods of drying: sun drying, cabinet drying and solar drying.
4. Practical demonstration of sealing pouching machine. Examination of the tetra pack

SEMESTER-V

GENERAL EDUCATION COMPONENT

FOOD PROCESSING – III

Course Code	**: 18BFP5C26**		**Max. Marks**	**:**	**100**
Total Hours	**: 60**		**Internal Marks**	**:**	**25**
Credit	**: 4**		**External Marks**	**:**	**75**

Objectives: To enable the students to

1. Gain knowledge about the techniques in dairy and meat processing
2. Know the quality parameter and standards in dairy processing

Unit I: Introduction of diary processing **12 Hours**

Introduction-Status of Dairy Industry in India. Cooperative Dairying.Milk-Definition,Composition. Chemical and functional properties of milk components-physicochemical properties of milk protein, aggregation of Casein, micelles.

Unit II: Diary processing operations **12 Hours**

Milk processing operations-Standardization and/or processing (pasteurization, homogenization, sterilization and UHT processing), storage. Packaging and distribution of liquid milks-whole, standardized, toned, double-toned, and skim milk. Recombined, reconstituted, and flavored milks.

Unit III: Diary byproducts **12 Hours**

Skimming of milk, Cream & Cream characteristics, Ice cream manufacture, Butter making technology, processing of evaporated and concentrated milks and dried milk powder. Indigenous product- Fermented milks (Curd, yogurt etc.) and milk-products- cheeses, butter milk, lassi. Other milk products - khoa, casein, whey proteins, lactose. Milk and milk product based sweet - burfi, rasogolla, milk-cake, kalakand, ruberii .

Unit IV: Dairy Processing and quality control 12 Hours

Effect of processing of milk components and their functional properties. Milk quality control, sanitation in the dairy plant, adulteration of milk, dairy equipment maintenance and waste disposal.

Unit V: Meat processing 12 Hours

Meat Pre and post slaughter handling, meat inspection and grading. Structure and composition of meat, carcass chilling, ageing; storage of fresh meat. Processing and preservation Meat– artificial tenderizing, chilling, freezing, curing, smoking, ready-to-eat meats and meat products.Qua

Text Book:

1. Outlines of Dairy Technology by Sukumar De, Oxford University Press.
2. Principles of Dairy Processing by James N. Warner, Wiley Eastern Ltd.
3. Milk and Milk Products by Eckles, Combs; and Macy, Tata McGraw Hill.

Reference Books:

1. Technology of Indian Milk Products by Aneja et al. A Dairy India Publication.
2. Meat Science by R.A. Lawrie,Pergamon Press.
3. Principles of Meat Science by JC Forest, ED Aberle, HB Hedrick

SEMESTER-V

GENERAL EDUCATION COMPONENT

FOOD PRODUCT DEVELOPMENT

Course Code	**: 18 BFP5C27**		**Max. Marks**	**:**	**100**
Total Hours	**: 45**		**Internal Marks**	**:**	**25**
Credit	**: 3**		**External Marks**	**:**	**75**

Objectives: To enable the students to

1. Apply a product development process to generate ideas, design, develop and evaluate new products and their markets.
2. Understand the process of optimization, product launch and marketing strategy.

Unit I – Introduction to product development 9 hours

Introduction to product development, scientific method in product development, scope in developing new product, need for new products – consumer, commercial and technical.

Unit II – Stages in product development 9 hours

Stages in product development – Idea generation, development stage and commercial stage, Open Innovation Stage Gates Processes.

Unit III – Product evaluation **9 hours**

Sensory evaluation – sensory odour , flavour , mouth feel , texture , colour and taste perception , different sensory tests – affective , discrimination and descriptive . Role of sensory evaluation specialist in product development. Shelf life testing – physical, chemical and microbial requirements.

Unit IV – Marketing in food product development **9 hours**

Marketing steps, asses marketing needs and marketing analysis for new product, market segments, organizing , designing and managing new product development process. Product probability - costing and profitability and lifecycle. IPR and patenting.

Units V – Product launch **9 hours**

FSSAI certification – procedures, designing packaging material – brand name, logo, labelling – design and content, bar coding.Product launch and evaluation , trends and opportunities in developing innovative food products.

Texts books

1. Brody , A.L. and Lord , J.2008. Developing New Food Products for a changing Markertplace, 2nd Edition.CRC Press Raton.
2. FL.Campbell-Platt,G. 2009. Food Science and Technology. Blackwell Publising Ltd., Oxford, UK.
3. DeMan, J.M. 1999. Principle of Food Chemistry, 3rd Ed. Aspen publishers.

REFERENCES BOOKS

1.Brody , A.L. and Lord , J.2008. Developing New Food Products for a changing Markertplace, 2nd Edition.CRC Press Raton.

SEMESTER- V

GENERAL EDUCATION COMPONENT

NUTRITION THROUGH LIFE CYCLE

Course Code	**:**	**18BFP5C28**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**45**	**Internal Marks**	**:**	**25**
Credit	**:**	**3**	**External Marks**	**:**	**75**

Objectives: To enable students to

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

Unit I: Assessment of nutritional status and nutrition problems **9 Hours**

Direct and Indirect Assessment- Anthropometry, biochemical, clinical and diet survey. Characteristics of community- Infant Mortality Rate (IMR), Maternal Mortality Rate (MMR), morbidity and mortality. Nutrition problems - prevalence, etiology, symptoms, prophylaxis programme for Protein Energy malnutrition, Iron Deficiency Anemia, Iodine Deficiency Disorder, Fluorosis and Vitamin A deficiency

Unit II: Pregnancy and Lactation: 9 Hours

Nutrition during Pregnancy-Physiological changes during pregnancy, complications of pregnancy, nutritional requirement and dietary guidelines. Nutrition during lactation- Physiology of lactation, role of hormone in lactation. Breast Feeding- Composition of breast milk, colostrum, transition milk, foremilk, hindmilk. Advantages of breast feeding to the mother, dietary guidelines for a nursing mother.

Unit III: Infancy and Pre-school children 9 Hours

Nutrition during Infancy- Importance of breast milk to the infant. Merits and demerits of artificial feeding. Weaning foods- Definition, types of supplementary foods. Nutritional requirements of infants. Nutrition for Pre-school children- nutritional requirements of preschool children.

Unit IV: School Children and Adolescence 9 Hours

Nutrition for School children- nutritional requirement, meal planning for school children, packed lunch. Nutrition during Adolescence-Growth spurt-physiological and secondary sexual characteristics, menarche and nutritional requirements.

Unit V: Adults and Elderly 9 Hours

Nutritional needs of adults (men and women) – Nutritional requirement of adult in relation to activity pattern. Nutrition during Elderly - Physiological, psychological and socio-economic aspects influencing nutritional intake. Nutritional problems of aged (Osteoporosis, Obesity, constipation) and their management.

TEXT BOOKS

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

REFERENCE BOOKS

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

SEMESTER-V

GENERAL EDUCATION COMPONENT

MARKETING MANAGEMENT

Course Code	**:**	**18 BFP5C29**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**30**	**Internal Marks**	**:**	**25**
Credit	**:**	**2**	**External Marks**	**:**	**75**

Objectives: To enable the students to

1. Know about the various types marketing strategy involved in generating sales for a newproducts
2. Know the different ways in which a food can be marketed to give optimum visibility,
3. Understand the importance of packaging in improving sales and the latest marketing trends

Unit I : Marketing management **6 Hours**

Introduction- Definition of marketing and marketing management- Marketing concepts and functions-Marketing research – marketing mix.

Unit II: Market segmentation **6 Hours**

Concept-Need- Basis-Market targeting-Market Positioning -Understanding consumer behaviour-Buying motives- Factors influencing consumer buying decisions

Unit III: Marketing of products **6 Hours**

Product- Meaning- Product development- Product mix- PLC- Branding- brand equity-Brand loyalty-Trade mark. Packaging and labelling - Pricing of products-Factors influencing pricing-Pricing policies and Strategies-Types of pricing.

Unit IV: Logistic and supply chain management **6 Hours**

Elements-Channel of distribution types- Factors affecting the choice of a channel of distribution.

Unit V: Emerging trends in marketing **6 Hours**

Modern marketing- Direct marketing- E Marketing- Tele marketing-Viral marketing - Relationship marketing-Social marketing-Demarketing - Remarketing- Synchro marketing-Service marketing.

Text Book:

1. Phillip Kottler Marketing Management, Prentice Hall of India Private Limited, NewDelhi. 1994

Reference Book:

1. Vasant Desai The Dynamics of Entrepreneurial Development and Management, Himalya Publishing House Pvt. Ltd., Mumbai .2011

SEMESTER-V

SKILL DEVELOPMENT COMPONENT

FOOD PROCESSING – III PRACTICAL

Course Code	**: 18BFP5C30P**		**Max. Marks**	**:**	**100**
Total Hours	**: 90**		**Internal Marks**	**:**	**20**
Credit	**: 6**		**External Marks**	**:**	**80**

Objectives: To enable the students to

1. Gain knowledge about the techniques in dairy and meat processing
2. Know the quality parameter and standards in dairy and meat products

1. Determination of quality of raw milk (Lactometer reading, pH & acidity, fat contents, SNF content, specific gravity etc).
2. Determination of microbiological quality (TPC/SPC) of pasteurized and sterilized/ flavored milk samples & some milk products like ice cream.
3. Preparation of certain dairy products (eg. Khoya, paneer, flavoured milk, yogurt, cream, ice cream, srikhand etc.)
4. Preparation of milk based sweet (burfi, rasogolla, milk-cake, kalakand, ruberii etc.).
5. Determination of certain key parameters in dairy products (eg overrun in ice cream, salt content in butter, moisture content in ghee etc.)
6. Visit to a dairy/ice cream, Meat processing factory.

Reference Books:

1. Technology of Indian Milk Products by Aneja et al. A Dairy India Publication.
2. Meat Science by R.A. Lawrie,Pergamon Press.

SEMESTER- V

SKILL DEVELOPMENT COMPONENT

FOOD PRODUCT DEVELOPMENT AND NUTRITION THROUGH LIFE CYCLE PRACTICALS

Course Code	**: 18 FP5C31P**		**Max. Marks**	**:**	**100**
Total Hours	**: 45**		**Internal Marks**	**:**	**20**
Credit	**: 3**		**External Marks**	**:**	**80**

Objectives

To enable the students to

- Understand the concept of development of a new product
- Prepare new products based on special dietary requirements, functionality, convenience and improvisation of existing traditional Indian foods.

FOOD PRODUCT DEVELOPMENTPRACTICAL

Definition, Importance, objectives &Need of product development, Reasons of failure, Types and Steps of product development, Product development Tools and their use.

1. Development of new product based on special dietary requirements, functionality, convenience and improvisation of existing traditional Indian foods.
2. Screening of product concept on the basis of techno-economic feasibility.
3. Development of prototype product and Standardization of formulation process.
4. Proximate Analysis of New Product
5. Packaging, labeling and shelf-life studies
6. Cost analysis

Mini Project:

Market and literature survey to identify the concepts of new products based on special dietary requirements, functionality, convenience and improvisation of existing traditional Indian foods.

NUTRITION THROUGH LIFE CYCLE PRACTICAL

1. Planning, calculation of nutritive value and preparation of balanced meals for different age groups
   a. Pregnancy – first, second and third trimester.
   b. Lactation.
   c. Infancy- weaning foods, low cost supplementary foods.
   d. Pre-school age – 1 to 6 years
   e. School age – boys 7 to 10 years, girls 10 to 12 years
   f. Adolescence – boys 14 to 16 years, girls 16 to 18 years
   g. Adult – man and woman in relation to occupation.
   h. Elderly.
2. Planning, calculation of nutritive value and preparation of meals for nutritional problems – PEM, Vitamin A and Iron Deficiency Anemia.

REFERENCES BOOKS

1.Brody , A.L. and Lord , J.2008. Developing New Food Products for a changing Markertplace, 2nd Edition.CRC Press Raton.

2.Swaminathan,M. Advanced text book on Food and Nutrition, , An mol Publication Pvt,Ltd, Second Edition.2004.

SEMESTER- IV

SKIL DEVELOPMENT COMPONENT

FOOD PROCESSING- III INTERNSHIP

Course Code	**:**	**18BFP5C32I**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**180**	**Internal Marks**	**:**	**20**
Credit	**:**	**6**	**External Marks**	**:**	**80**

Objectives: To enable students to

1. Gain handling skills in milk and meat processing

- Basic microbiology in relation to milk quality and safety
- Fluid milk processing parameters
- Influence of raw milk quality on pasteurized milk quality and shelf-life
- Tools for assessing milk quality and shelf-life

- Milk components and advanced chemistry of cheese –making
- Enhance skills in gourmet sausages, smoked or cooked-smoked meats
- Understand the grading process and traceability of meat products and preparation for audits using best practice in FSSAI systems
- Enhance culinary skills and product knowledge.

Reference Books:

1. Technology of Indian Milk Products by Aneja et al. A Dairy India Publication.
2. Meat Science by R.A. Lawrie,Pergamon Press.

SEMESTER-VI

GENERAL EDUCATION COMPONENT

HUMAN PHYSIOLOGY

Course Code	**:**	**18 BFP6C33**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**45**	**Internal Marks**	**:**	**25**
Credit	**:**	**3**	**External Marks**	**:**	**75**

Objectives: To enable the students to

1. Understand the structure and functions of various organs in the body.
2. Understanding of the principles of nutrition and diet through the study of physiology.

Unit-I Blood constituents 6Hours

Blood- composition and functions, **RBC, WBC, Platelets**-structure and functions.

Unit-II Respiratory and cardiovascular system 6Hours

Respiratory system – structure and functions of respiratory tract, process of respiration.

Heart- structure and functions. Cardiac output, factor affecting cardiac output, heart rate, pulse rate.

Unit-III Digestive and Excretory system 6Hours

Digestive system – structural and function of gastrointestinal tract, composition and functions of secretion of saliva, gastric juice, bile, pancreatic juice and intestinal juice. Excretory system. Structure and functions of kidney, nephron.

Unit IV Reproductive and Endocrine System 6 Hours

Reproductive system: structure of male and female reproductive system, functions- spermatogenesis and oogenesis. Endocrine system – functions of hormones secreted by pituitary, thyroid, parathyroid, and pancreas and adrenal.

Unit –V Nervous system and special senses 6 Hours **Nervous system-** structure and functions- nerve cell, spinal cord, brain. Special senses-**Ear, Eye, Nose and Tongue-** structure and functions.

TEXT BOOKS

1. Chatterjee. C.C., Human Physiology, Vol-I & Vol-II, Medical Allied Agency, reprint-2004
2. Guyton, A.C., Text Book of Medical Physiology, 4th Edition W.S. Saunders Co. Philadelphia.
3. Subramanian and Mathavan kutty, S.M (2001): text book of physiology, Chand and Company, New Delhi.

REFERENCE BOOKS

1. Subramanian and Mathavan kutty, S.M (2001): text book of physiology, Chand and company, New Delhi.

SEMESTER-VI

GENERAL EDUCATION COMPONENT

DIET THERAPY

Course Code	**: 18 BFP6C34**		**Max. Marks**	**:**	**100**
Total Hours	**: 45**		**Internal Marks**	**:**	**25**
Credit	**: 3**		**External Marks**	**:**	**75**

Objectives: To enable the students to

1. Understand causative factors and metabolic disorders

2. Gain knowledge on the principles of diet therapy
3. Understand the rationale of prevention of various diseases/disorders

Unit I: Modification of diet **9 Hours**

Routine hospital diets – clear fluid diet, full fluid diet, soft diet and regular normal diet. Specially modified therapeutic diet - specification and indications (high fiber diet, bland diet, high calorie diet, low calorie diet, high protein diet, low protein diet, low fat diet and sodium restricted diet).

Unit II : Diet in Weight Management and Allergy **9 Hours**

Obesity, Underweight- Etiology, principle of diet, dietary treatment. Allergy - Definition, types, symptoms, diagnostic tests and elimination diet.

Unit III: Diet in Gastrointestinal tract and Kidney disorder **9 Hours**

Upper gastro intestinal tract disorders– etiology, symptoms, diagnosis, dietary management for gastritis and peptic ulcer. Lower gastro intestinal tract disorders – etiology, types, dietary management in constipation, diarrhoea and dysentery. Kidney- Etiology , symptoms, nutritional modification, diet planning and dialysis for kidney diseases - Nephritis , Nephrosis ,Urinary calculi , Renal failure – Acute and Chronic.

Unit IV: Diet in Diabetes and Cardiovascular disorder **9 Hours**

Diabetes Mellitus – Types, etiology, principle of diet, dietary treatment. Cardiovascular disorder- Hypertension, Atherosclerosis- Etiology, principle of diet, dietary treatment.

Unit V: Diet in Liver diseases, Cancer and role of functional foods **9 Hours**

Liver- Etiology, signs and symptoms, dietary management for fatty liver, hepatitis, and cirrhosis. Cancer – Types, etiology, dietary treatment. Functional foods – Definition, classification, uses of functional foods in the prevention and treatment of – Obesity, Diabetes mellitus, cardiovascular diseases, Cancer.

TEXT BOOKS:

1. Antia, F.P, Clinical dietetics and Nutrition ,4th Edition, Oxford University Press, Delhi,2002.
2. Joshi, S.A, Nutrition and Dietetics, 2nd edition, TATA McGraw Hill publications, New Delhi.2008.
3. Swaminathan, M. Essentials of Food and Nutrition Vol. I and II BAPPCO.,The Bangalore Printing and Publishing co., ltd., No.88, Mysore Road, Bangalore

REFERENCE BOOKS:

1. Williams,S.R.,Nutrition and Diet Therapy, 6th Edition,Times Mirror / Mosby College Publishing, St. Louis, 1989.

2. Raheena Begum, A Text Book of Foods, Nutrition and Dietetics, Sterling Publishers, New Delhi.1989.

SEMESTER-VI

GENERAL EDUCATION COMPONENT

FOOD PACKAGING AND LABELLING

Course Code	**:**	**18 BFP6C35**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**45**	**Internal Marks**	**:**	**25**
Credit	**:**	**3**	**External Marks**	**:**	**75**

Objectives: To enable the students to

1. Know the role and function of packaging
2. Study the properties of food packages
3.Technology involved in the production, shaping and printing of various packaging materials

Unit I : Concept and properties of packaging **9 Hours**

Basic concept of packaging, functions of a food package, package development factors, food package development, current status and trends in food packaging in India and abroad. Properties of Packaging Materials: Selection of packaging materials, properties of materials such as tensile strength, bursting strength, tearing resistance, puncture resistance, impact strength, tear strength, their methods of testing and evaluation.

Unit II : Packaging materials **9 Hours**

Packaging materials and forms- Glass containers and closures tin-plate containers, tin free steel containers, aluminum and other metal containers. Protective lacquers and coatings for metal containers. Wooden crates, cellulosic papers, pouches, bags and card board / corrugated paper boxes.

Unit III : Types of Packaging **9 Hours**

Rigid and flexible plastics (polyamides, polyester, PVC, PVDC, PVA, polycarbonates, olefins, cellophane, inomers, copolymers, phenoxy, acrylic, and polyurethanes) containers and films (oriented, coextruded, laminates, metallized) and their mechanical sealing and barrier properties. Retortable pouches, biodegradable and edibles packaging materials and films. Aseptic packaging.

Unit IV: Packaging Equipment **9 Hours**

Packaging equipment and machinery-Vacuum packaging machine, gas packaging machine, seal and shrink packaging machine, form and fill sealing machine, bottling machines, carton making machines.

Unit V: Food safety and labelling **9 Hours**

Food packaging systems and safety-Different forms of packaging such as rigid, semi-rigid, flexible forms and different packaging system for (a) dehydrated foods (b) frozen foods (c) dairy products (d) fresh fruits and vegetables (e) meat, poultry and sea foods. Labelling and patent : Standards, purpose, description types of labels, labelling regulation barcode, nutrition labelling, health claims, and mandatory labelling provision.

Text Book

1. Principal of Food Packaging by Sacharow & Griffin, Van Nastrand Rainhold Company, New York.

2. Food Packaging Materials by Mahadeviah & Growramma
3. A Handbook of Food Packaging by Frank A. Paine

Reference Book

1. Food Packaging Materials by N.T.Crosby
2. Canning and Aseptic Packaging by Ranganna, TMH.
3. Food Packaging: Priciples and Practices by Gordon L.Robertson
4. Food Science and Processing Technology Vol. II by Mridula Mirajkar and Sreelata Menon.

SEMESTER-VI

GENERAL EDUCATION COMPONENT

FOOD STANDARDS AND SAFETY

Course Code	**: 18 BFP6C36**		**Max. Marks**	**:**	**100**
Total Hours	**: 45**		**Internal Marks**	**:**	**25**
Credit	**: 3**		**External Marks**	**:**	**75**

Objectives: To enable the students to

1. Introduce the concept of food hygiene, and importance of safe food storage.
2. Know the importance of food laws.
3. Familiarize them with basic methods of quality testing of food.

Unit I: Food safety management system **9 Hours**

Food Safety managements system Food Quality Management-Quality Management Principles. Introduction to Food Safety -Definition - Types of hazards, biological, chemical, physical hazards -Factors affecting Food Safety -Importance of Safe Foods.

Unit II: Food Hygiene **9 Hours**

Definition, importance, environmental hygiene and sanitation, hygiene in food handling, personnel hygiene, and importance of pest and rodent control in food service units.

Unit III: Food quality management **9 Hours**

General principles for food safety and hygiene Principles of food safety and quality - Food Safety System - Quality attributes - Total Quality Management. Good Hygienic Practices, Good Manufacturing Practices. HACCP –Introduction, Seven Principles, – AOQL (Average Outgoing Quality Limit) – HACCP plan chart.

Unit IV : Food standards **9 Hours**

International bodies Structure, organization and practical operation of International Standardization Organization (ISO), Codex Alimentarius, World Trade order, World Health Organization.NATIONAL STANDARDS Food standards and Specifications-FSSAI- Structure, Organization and Functions, PFA, AGMARK, and BIS Standards.

Unit V : Quality Assurance **9 Hours**

Tools and techniques for quality management Quality functions development (QFD) – Benefits, Voice of customer, information organization, House of quality (HOQ), building a HOQ, QFD process. Failure mode effect analysis (FMEA) – requirements of reliability, failure rate, FMEA stages, design, process and documentation.

Text Books

1. Lawley, R., Curtis L. and Davis,J. The Food Safety Hazard Guidebook , RSC publishing, 2004
2. De Vries. Food Safety and Toxicity, CRC, New York, 1997

Reference Books

1. Marriott, Norman G. Principles of Food Sanitation, AVI, New York, 1985 Forsythe, S J. Microbiology of Safe Food, Blackwell Science, Oxford, 2000 &Sons; USA, 1987
2. The Food Safety and Standards act, 2006 along with Rules & Regulations 2011, Commercial Law Publishers (India) Pvt. Ltd.
3. Marriott, Norman G. Principles of Food Sanitation, AVI, New York, 1985

SEMESTER-VI

SKILL DEVELOPMENT COMPONENT

DIET THERAPY AND APPLICATION OF COMPUTER PRACTICALS

Course Code	**:**	**18BFP6C37P**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**90**	**Internal Marks**	**:**	**20**
Credit	**:**	**6**	**External Marks**	**:**	**80**

DIET THERAPY PRACTICAL

1. Planning, Nutritive value calculation and preparation of diet
   a. Obesity and underweight conditions.
   b. Diarrhoea , constipation
   c. Peptic ulcer.
   d. Liver disorder- Hepatitis, Cirrhosis
   e. Diabetes mellitus- Type I (Insulin specific), Type II (Using food exchange list)
   f. Cardiovascular diseases -Hypertension , Atherosclerosis
   g. Kidney diseases- Nephritis, Nephrosis, Nephrolitiasis
   h. Cancer
   i. Identification of functional foods and relating them to specific diseases

APPLICATION OF COMPUTER PRACTICAL

1. Working with Computer
   - Working with Files and Folders
   - Working with mail: Creating E-mail ID, composing, sending and receiving mails
   -
2. Application of Ms Word
   - Starting, Creating, Editing, Saving, Previewing and Printing a word document
   - Creating Table and working with Graphs.Tabulating nutrient content of foods and editing the Table.

3. Usage of Ms Power point
   - Starting, Creating, Inserting pictures and slides, transition and effects
   - Creating slide show presentation with animations on nutrition related topics.

4. Dietary Calculations Using Excel
   - Starting excel, working with spread sheet
   - Working with formula, functions, graphs and charts
   - Applying excel for dietary calculations.

5. Preparation of Financial Accounting using Tally.
    - Trial balance
    - Trading Accounting
    - Profit & loss account
    - Balance sheet

SEMESTER-VI

SKILL DEVELOPMENT COMPONENT

FOOD PACKAGING AND LABELLING PRACTICAL

Course Code	**:**	**18 BFP6C38P**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**90**	**Internal Marks**	**:**	**20**
Credit	**:**	**6**	**External Marks**	**:**	**80**

Objectives: To enable the students to

1. Acquire skill in developing new eco friendly packaging materials

1. Familiarization of different types of packaging material.
2. Testing of packaging materials like thickness, GSM, grease resistance, bursting strength, tearing resistance, puncture resistance.
3. Can formation, inspection of can seams, Head space and vacuum analysis, analysis of can, Measurement of tin coating weight by Clarke's method.
4. Visit to a package manufacturing plant.
5. Vacuum packaging and determination of storage life Testing the compression strength of the boxes
6. Packaging of food material in seal and shrink packaging machine and study its shelf life, Testing of strength of glass containers by thermal shock test, Testing of strength of filled pouches by drop tester
7. Packaging of powder foods and estimation of shelf-life

Text Book

1. Principal of Food Packaging by Sacharow & Griffin, Van Nastrand Rainhold Company, New York.

SEMESTER-VI

SKILL DEVELOPMENT COMPONENT

FOOD PACKAGING AND LABELLING INTERNSHIP

Course Code	**:**	**18 BFP6C39I**	**Max. Marks**	**:**	**100**
Total Hours	**:**	**180**	**Internal Marks**	**:**	**20**
Credit	**:**	**6**	**External Marks**	**:**	**80**

Objectives: To enable the students to

1. Acquire skill in developing new eco friendly packaging materials

- Study physical and chemical properties of the packaging materials used for foods in relation to polymer processing, food properties and processing.
- Know the principles and practices for the testing of packaging materials and package designs.
- Mass transfer in food packaging.
- Principles of design and technology used to produce laminated packaging materials, active and smart packaging, and edible fiPlms.
- Preservation, packaging and shelf life testing for a selection of foods.
- Costs, waste minimisation and sustainable packaging technologies.
- Advances in packaging science and technology.
- Regulatory aspects of packaging and labelling.