ST. TERESA'S COLLEGE, ERNAKULAM

(AUTONOMOUS)

Affiliated to Mahatma Gandhi University, Kottayam

CURRICULUM FOR

B.VOC FOOD PROCESSING TECHNOLOGY

Under Choice Based Credit & Semester System & Outcome Based Education

(2018 Admissions)

B.Voc. FOOD PROCESSING TECHNOLOGY

PROGRAM SPECIFIC OUTCOMES

PSO1: Generalize the processing technology of various foods and its by-products.

PSO2: Explain the designing of the food plant and operation of food processing equipment.

PSO3: Determine the physical, chemical, microbial and nutritional characteristics of foods and its effect on health

PSO4: Apply the basic knowledge on managerial and communication skills to initiate a project/ enterprise.

PSO5: Evaluate the safety, quality and emerging technologies in the food processing industry.

SEMESTER I

Course Code	Course Title	Credits	Course Type
VFPT1S01B18	Bakery and Confectionery Technology	5	Skill course
VFPT1S02B18	Principles of Food Preservation	5	Skill course
VFPT1S03B18	Food Chemistry	5	Skill course
VFPT1SP01B18	Bakery and Confectionery Technology (Practical)	3	Skill course
EN1A01B18	Fine-tune Your English	4	Common course
VFPT1G01B18	Food Science and Nutrition, I	4	General course
VFPT1G02B18	Entrepreneurship Development and Project Management	4	General course
VFPT1SI01B18	Internship	1	Skill course

SEMESTER I

SKILL COURSE 01

VFPT1S01B18– BAKERY AND CONFECTIONERY

Credits: 5

Total Lecture Hours: 75

Course Outcomes:

CO1: Review the manufacturing of raw and refined sugar.

CO2: Identify the classification of confectionery.

CO3: Illustrate the properties of wheat.

CO4: Describe the principles of baking and bread manufacturing.

CO5: Explain the process of cake and biscuit manufacturing

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 U	3	2	2	1	2
CO2 U	2	2	2	1	2
CO3 U	2	1	2	1	1
CO4 U	3	2	2	2	2
CO5 U	3	2	2	2	2

Syllabus Content:

Module I: Manufacture of Sugar **14 Hours**

Sugarcane, jaggery, Khand sari sugar, raw sugar, refined sugar, white sugar, beet sugar, manufacture of sugar from sugar cane, refining of sugar.

Module II: Classification of confectionery **12 Hours**

Sugar boiled confectionery- crystalline and amorphous confectionery, rock candy, hard candy, lemon drop, china balls, soft candy, lollypop, marshmallows, fudge, cream, caramel, toffee, lozenges, gumdrops, honeycomb candy.

Module III: Properties of wheat **15 Hours**

Wheat – Properties, Quality – Hardness, Gluten strength, protein content, soundness. Methodology and approaches to evaluate bread and bread – wheat quality – processing factors, product factors.

Module IV: Principles of baking and Bread manufacturing **20 Hours**

Major baking ingredients and their functions, role of baking ingredients in improving the quality of bread. Characteristics of good flour used for making bread, biscuits and cakes. Ingredients used for bread manufacture, methods of mixing the ingredients, dough development methods - straight dough, sponge dough, moulding, proofing, baking, packing, spoilage, bread staling, methods to reduce bread staling and spoilage.

Module V: Cake and Biscuit manufacturing **14 Hours**

Processing of cakes and biscuits- ingredients, development of batter, baking and packing, Spoilage in cakes and biscuits.

SEMESTER I

SKILL COURSE 02

VFPT1S02B18 –PRINCIPLES OF FOOD PRESERVATION

Credits: 5

Total Lecture Hours: 75

Course Outcomes:

CO1: Explain different types and mechanisms of food spoilage

CO2: Discuss the role of preservatives in food preservation. .

CO3: Identify the methods of high temperature preservation of foods. .

CO4: Describe the preservation of foods by low temperature. .

CO5: Illustrate the methods of moisture removal to increase the shelf life of foods. .

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 U	2	1	2	1	2
CO2 U	2	1	2	1	2
CO3 U	2	3	2	1	2
CO4 U	2	3	2	1	2
CO5 U	2	3	2	1	2

Syllabus Content:

Module I: Food Spoilage **12 Hours**

Definition, types of spoilage - physical, enzymatic, chemical and biological spoilage. Mechanism of spoilage and its end products, shelf life determination.

Module II: **Preservation by using Preservatives** **13 Hours**

Food preservation: Definition, principles, importance of food preservation, traditional and modern methods of food preservation. Food additives – definition, types, Class I and Class II preservatives.

Module III: **Preservation by use of high temperature** **20 Hours**

Pasteurization: Definition, types, Sterilization, Canning - history and steps involved, spoilage encountered in canned foods, types of containers used for canning foods. Food irradiation – Principles, merits and demerits, effects of irradiation and photochemical methods.

Module IV: Preservation by use of Low Temperature **16 Hours**

Refrigeration - advantages and disadvantages, freezing: Types of freezing, common spoilages occurring during freezing, difference between refrigeration and freezing.

Module V: Preservation by Removal of Moisture **14 Hours**

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

SEMESTER I

SKILL COURSE 03

VFPT1S03B18 – FOOD CHEMISTRY

Credits: 5

Total Lecture Hours: 75

Course Outcomes:

CO1: Determine the moisture content and water activity in different types of food.

CO2: Explain the structure, physical and chemical characteristics of carbohydrates.

CO3: Explain the basic functions of proteins like enzymes.

CO4: Identify the changes that occur to macronutrients during processing.

CO5: Describe the relevance of micronutrients in the food industry.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 A	2	1	3	1	1
CO2 A	2	1	3	1	1
CO3 U	2	1	2	1	1
CO4 U	2	1	2	1	1
CO5 U	2	1	2	1	2

Syllabus Content:

Module I: Water **13 Hours**

Introduction to food chemistry, structure of water molecule, hydrogen bonding, effect of hydrogen bonding on the properties of water, moisture in foods, free water, bound water, water activity, estimation of moisture in foods, determination of moisture and water activity.

Module II: Carbohydrates **16 Hours**

Nomenclature, composition, sources, structure, reactions, functions, classification - monosaccharide, disaccharides, oligosaccharides and polysaccharides. Properties of Starch – gelatinisation, gel formation, syneresis**,** starch degradation, dextrinization, retrogradation, Qualitative and quantitative tests of carbohydrates.

Module III: Proteins **18 Hours**

Nomenclature, sources, structure, functions, classification - essential and non-essential amino acids, Physical and chemical properties of proteins and amino acids, functional properties - denaturation, hydrolysis, changes in proteins during processing. Enzymes - Specificity, mechanism of enzyme action, factors influencing enzymatic activity, controlling enzyme action, enzymes added to food during processing, enzymatic browning.

Module IV: Fats and oils **15 Hours**

Nomenclature, composition, sources, structure, functions, classification, essential fatty acids. Physical and chemical properties - hydrolysis, hydrogenation, rancidity and flavour reversion, emulsion and emulsifiers, saponification value, acid value and iodine value, smoke point.

Module V: Pigments, colours and flavours in food **13 Hours**

Micro nutrients: Vitamins and minerals, Pigments indigenous to food, structure, chemical and physical properties, effect of processing and storage, colours added to foods, flavours- vegetable, fruit and spice flavours, flavours of milk and meat products, effect of processing on flavour components.

SEMESTER I

SKILL COURSE 04

VFPT1SP01B18 – BAKERY AND CONFECTIONERY TECHNOLOGY (PRACTICAL)

Credits: 2

Total Lecture Hours: 60

Course Outcomes:

CO1: Identify and explain baking terms, ingredients and equipment used in baking.

CO2: Illustrate scaling and measuring of ingredients.

CO3: Practice baking various products.

CO4: Design and set up a small-scale processing unit.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 U	3	3	2	1	2
CO2 A	2	3	2	1	3
CO3 A	3	2	3	2	2
CO4 C	2	3	1	3	2

Syllabus Content:

1. Preparation of ghee biscuits
2. Preparation of melting marvels
3. Preparation of sweet and salt biscuits
4. Preparation of bread
5. Preparation of pizza
6. Preparation of hot cross buns (sweet buns)
7. Preparation of jamnut cookies
8. Preparation of vanilla cake
9. Preparation of cake.
10. Visit to production unit of a bakery.

SEMESTER I

SKILL COURSE 05

VFPT1SI01B18– INTERNSHIP

Credits: 1

Total Lecture Hours: 30

Course Outcomes:

CO1: Integrate academic and practical skills.

CO2: Develop problem solving skills in the industry.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 C	2	2	3	3	3
CO2 C	2	2	3	3	3

SEMESTER I

COMMON COURSE I

EN1A01B18 - FINE-TUNE YOUR ENGLISH

Credits: 4

Total Lecture Hours: 60

Course Outcomes:

CO1. Recognize the basics of English grammar.

CO2. Choose the appropriate word classes.

CO3. Identify common errors in the use of English language in various contexts.

CO4. Apply the rules of grammar to comprehend, speak, and write grammatically correct English.

CO5. Compose materials for business communication.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 R	1	1	1	2	1
CO2 A	1	1	1	3	1
CO3 U	1	1	1	2	1
CO4 A	1	1	1	3	1
CO5 C	1	1	1	2	1

Syllabus Content:

Module I: Grammar **12 Hours**

Articles, The Verb, Active and Passive Voice, Tenses, Concord, Modal Auxiliaries, The Adverb, The Preposition, Conjunction, Idioms, Phrasal Verbs, Direct and Indirect Speech.

Module II: Listening **10 Hours**

Active listening, Barriers to listening, Listening and note taking, listening to announcements, Listening to news on the radio and television.

Module III: Speaking **10 Hours**

Brief introduction to the Phonetic script, Falling and rising tones, participating in conversations, Small Talk, Making a short formal speech, telephone skills.

Module IV: Reading **15 Hours**

Reading: theory and Practice, Scanning, surveying a textbook using an index, reading for information, understanding text structure, Locating main points, Making inferences, Reading graphics, Reading for research.

Module V: Writing **13 Hours**

Describing people, place, events and things, Short Stories, Vocabulary and Comprehension, Guide to letter writing. Learning Resources

SEMESTER I

GENERAL COURSE 01

VFPT1G01B18– FOOD SCIENCE AND NUTRITION I

Credits: 4

Total Lecture Hours: 60

Course Outcomes:

CO1: Explain the relevance of nutrition in maintaining health.

CO2: Differentiate between the types of malnourishments.

CO3: Describe the basic characteristics and novel concepts of food.

CO4: Examine the symptoms due to vitamin – mineral deficiency and toxicity.

CO5: Summarize the changes in BMR during various physiological conditions.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 A	2	1	3	1	2
CO2 U	2	1	2	1	1
CO3 U	2	1	2	1	2
CO4 A	2	1	3	1	2
CO5 U	1	1	2	1	1

Syllabus Content:

Module I: Introduction to Nutrition **8 Hours**

Definition of nutrition and health, inter-relationship between nutrition and health. Malnutrition: Definition and types. Reference man and reference woman.

Module II: Food and water **12 Hours**

Definition of food, classification of foods based on origin, pH, nutritive value. Basic five food groups, food guide pyramid. Functions of foods. New concepts of food: health foods, ethnic foods, organic foods, functional foods, nutraceuticals, fabricated foods, extruded foods, convenience

foods, junk foods, GM foods and proprietary foods. Water: functions, sources, requirement, water balance, toxicity and deficiency.

Module III: Vitamins **15 Hours**

Classification, structure, function, sources, general causes for loss in foods, bioavailability, enrichment, fortification and restoration. Units of measurement. Deficiency and toxicity disorders.

Module IV: Minerals **10 Hours**

Classification of minerals. Functions, sources, bioavailability and deficiency of the following minerals- Calcium, Iron, Iodine, Fluorine, Sodium, Potassium.

Module V: Energy **15 Hours**

Units of energy, food as a source of energy, basal metabolic rate, factors affecting BMR, total energy Requirement.

SEMESTER I

GENERAL COURSE 02

VFPT1G02B18– ENTREPRENEURSHIP DEVELOPMENT AND PROJECT MANAGEMENT

Credits: 4

Total Lecture Hours: 60

Course Outcomes:

CO1: Illustrate the importance of entrepreneurs in the economic development of the nation

CO2: Examine the concept of entrepreneur and the qualities essential for an entrepreneur

CO3: Discuss the basic steps for starting an enterprise of their own.

CO4: Explain step by step procedure of managing a project .

CO5: Examine the different schemes introduced by government to accelerate entrepreneurial growth .

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 A	2	2	1	3	2
CO2 A	2	2	1	3	2
CO3 U	3	3	1	3	2
CO4 U	3	3	2	3	2
CO5 A	2	2	1	3	1

Syllabus Content:

Module I: Introduction to Entrepreneurship **18 Hours**

Meaning, definition and concepts, characteristics, functions, entrepreneurial traits and motivation, role of entrepreneur in economic development, factors affecting entrepreneurial growth. Types of entrepreneurs - Intrapreneurship, Women entrepreneurship, significance, problems, solutions to the problems

Module II: Entrepreneurial Development Programme **10 Hours**

Objectives, Steps, Need for training- target group- Contents of the training programme-Special Agencies for Entrepreneurial Development and Training-DIC.

Module III: Project **12 Hours**

Meaning, Features, Classification, Project identification, Stages in project identification, Project Life Cycle, Project formulation- Elements, Feasibility Analysis-Network Analysis-Project Planning.

Module IV: Setting up of micro small and medium enterprises **10 Hours**

Setting up of micro small and medium enterprises, location significance, Green channel, Bridge capital, Seed capital assistance, Margin money scheme, Sickness, Causes-Remedies.

Module V: Role of institutions/schemes in entrepreneurial development **10 Hours**

SIDCO, SIDBI, NIESBUD, EDII, SISI, NREG Scheme- SWARNA JAYANTHI, Rozgar Yojana Schemes.

SEMESTER II

SEMESTER II

Course Code	Course Title	Credits	Course Type
VFPT2S04B18	Dairy Technology	05	Skill Course
VFPT2S05B18	Packaging Technology	05	Skill Course
VFPT2S06B18	Sanitation and hygiene	05	Skill Course
VFPT2SP02B18	Dairy Technology (Practical)	02	Skill Course
VFPT2SI02B18	Internship	01	Skill Course
EN2A03B18	Issues that Matter	04	Common course
VFPT2G03B18	Food Science and Nutrition II	04	General Course
VFPT2G04B18	Business Communication	04	General Course

SEMESTER II

SKILL COURSE – 06

VFPT2S04B18 – DAIRY TECHNOLOGY

Total Credits: 5

Total Lecture Hours: 75

Course Outcomes

CO 1: Describe the composition and physicochemical properties of milk..

CO 2: Explain the equipment and steps in milk processing.

CO 3: Discuss the processing of special milks

CO4: Prepare different varieties of dairy products

CO 5: Summarise the cleaning system of dairy plants.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1U	PSO2A	PSO3U	PSO4A	PSO5E
CO1U	1	2	1	1	1
CO2U	3	1	2	1	2
CO3U	3	2	1	1	1
CO4A	3	2	2	1	2
CO5U	1	1	2	1	2

Syllabus Content:

Module I: Introduction **15 Hours**

Milk - Definition, sources, and composition of milk, factors effecting composition of milk, physiochemical properties of milk, grading of milk-definition and types of grades, collection and transportation of milk.

Module II: Processing of market milk **20 Hours**

Flowchart of milk processing, Reception, Different types of cooling systems. Clarification and filtration process, standardization- Pearson's square method, pasteurization-LTLT, HTST and UHT process- continuous pasteuriser, Sterilisation and Homogenisation, Cream separation- centrifugal cream separator, bactofugation.

Module III: Special milks **10 Hours**

Skim milk, evaporated milk, condensed milk, standardized milk, toned milk, double toned milk, flavoured milk, reconstituted milk.

Module IV: Indigenous and Fermented milk products **20 Hours**

Product description, methods for manufacture of butter, cheese, ice cream, khoa, channa, paneer, shrikhand, ghee. Spray drying system: dried milk- whole milk and skim milk powder. Instantization of milk.

Module V: In-Plant cleaning system **10 Hours**

Introduction to Cleaning in- place (CIP) system - cleaning procedure, Cleaning efficiency, Methods of cleaning in food industry, cleaning solutions – Detergents, Sanitizers. SIP system of dairy plant, Personal hygiene in dairy plant.

SEMESTER II

SKILL COURSE – 07

VFPT2S05B18 – PACKAGING TECHNOLOGY

Total Credits: 5

Total Lecture Hours: 75

Course Outcomes

CO1: Enumerate the various functions of packaging

CO2: Illustrate deteriorative reactions and shelf life of foods

CO3: Classify packaging materials and their properties.

CO4: Discuss the various special packaging used in the food industry.

CO5: Explain the labelling and safety concerns in the food pack.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1U	PSO2A	PSO3U	PSO4A	PSO5E
CO1R	2	2	1	1	2
CO2A	1	3	1	1	2
CO3An	2	1	1	1	2
CO4A	1	2	1	1	3
CO5A	1	1	1	2	3

Syllabus Content :

Module I: Introduction to packaging **10 Hours**

Definition, Functions of packaging – Containment, Protection, Preservation, Promotion, Convenience, Communication. Requirements of effective package, Types of food packaging- primary, secondary and tertiary packaging.

Module II: Deteriorative Reactions and shelf life of foods **10 Hours**

Introduction, deteriorative Reactions in food- factors affecting deterioration of foods physical changes, biological changes, chemical changes. Shelf life of foods – Definition, intrinsic and extrinsic factors controlling the rate of reactions. Shelf life determination tests.

Module III: Packaging Materials and their properties **15 Hours**

Rigid containers- Glass, Wooden boxes, metal cans- Aluminium and tin plate containers, Semi rigid containers- paperboard cartons, Flexible packaging- paper, plastic pouches. Low density polyethylene, High density polyethylene and Polypropylene. Packaging materials for dairy products, bakery and confectionary, granular products, fruits and vegetables.

Module IV: Special Packaging **20 Hours**

Aseptic packaging, Active packaging, Intelligent packaging, Modified atmospheric packaging and controlled atmospheric packaging, Shrink packaging, stretch packaging, Biodegradable packaging, Edible packaging, Tetrapacks.

Module V: Labelling and safety concerns in food pack **20 Hours**

Printing process, inks, adhesives, labelling, coding- bar codes, Food packaging closures of glass and plastic containers, Legislative and safety aspects of food packaging, Machineries used in Food Packaging, Package testing-Thickness – Paper density - Basis weight – Grammage - Tensile Strength - Gas Transmission Rate (GTR) - Water Vapour Transmission Rate (WVTR).

SEMESTER II

SKILL COURSE - 08

VFPT2S06B18 – SANITATION AND HYGIENE

Total Credits: 5

Total Lecture Hours: 75

Course Outcomes

CO1: Explain in detail about Sanitation and health followed in the food industry.

CO2: Discuss on various types of hygiene practices that should be followed in food industries

CO3: Summarize on various types of Environmental sanitation followed in food industries

CO4: Apply various hygiene practices in the food industry.

CO5: Explain Sanitary standards and regulations followed in food industries.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1U	PSO2A	PSO3U	PSO4A	PSO5E
CO1U	2	2	2	1	3
CO2U	2	2	2	1	2
CO3U	2	2	2	1	2
CO4A	3	2	3	1	2
CO5U	2	2	2	1	2

Syllabus Content:

Module I: Sanitation and Health **15 Hours**

Definition, importance of sanitation, application of sanitation to food industry and food service establishments. Microorganisms and their characteristics, control of microbial growth in food. Food contamination and spoilage, food borne diseases.

Module II: Hygiene and food handling **13 Hours**

Purchasing and receiving safe food, food storage, sanitary procedures in food preparation, serving and displaying of food, special food operations.

Module III: Environmental Sanitation **14 Hours**

Location and layout of premises, constructional details, sanitary requirements for equipment, guidelines for cleaning equipment, cleaning procedures, pest control, water supply, storage and waste disposal, environmental pollution.

Module IV: Hygiene Practices in food industry **18 Hours**

Introduction, necessity, personnel hygiene, sanitary practices, management and sanitation, safety at work place.

Module V: Sanitation regulations and Standards **15 Hours**

Introduction, regulatory agencies, control of food quality, local health authority. Food sanitation checklists.

SEMESTER II

SKILL COURSE - 09

VFPT2SPO2B18 – DAIRY TECHNOLOGY (PRACTICAL)

Credits: 2

Total Lecture Hours: 60

Course Outcomes:

CO1: Identify the different equipment used in dairy processing

CO2: Analysing the chemical analysis of milk.

CO3: Experimenting the processing of dairy products.

CO4: Preparing a small- scale processing unit

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	2	1	2
CO2	1	3	1	1	2
CO3	3	2	3	1	2
CO4	2	1	3	2	2

Syllabus Content

1. Milk Testing - Platform Tests.
2. Determination of Activity (Titrable Acidity) of Milk.
3. Determination of fat and SNF content in milk.
4. Clot on boiling test for milk.
5. Determination of specific gravity of milk.
6. Detection of Addition of Starch in Milk.

7. Preparation of Lassi.
8. Preparation of khoa.
9. Preparation of Basundi.
10. Preparation of chakka and shrikand.
11. Preparation of kalakand.
12. Preparation of cooking butter.
13. Preparation of ghee.
14. Preparation of flavoured milk.
15. Visit to milk product development centre.

SEMESTER II

SKILL COURSE -10

VFPT2SI02B18– INTERNSHIP

Credits: 1
Total Lecture Hours: 30

Course Outcomes:

CO1: Correlate academic and practical skills

CO2: Employing problem solving skills in the industry .

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1An	2	2	3	3	3
CO2Cr	2	2	3	3	3

SEMESTER II

COMMON COURSE -02

EN2A03B18 - ISSUES THAT MATTER

Credits: 4

Total Lecture Hours: 90

Course Outcomes:

CO1: Identify the major issues of contemporary significance

CO2: Discuss the consequences of war and refugee crisis with respect to the psychological dimension

CO3: Employ theoretical learning in classrooms to current developments in the world

CO4: Critique the diverse experiences both historical and contemporary to create a more informed vision of the future

CO5: Develop oneself as a conscious, concerned, conscientious human being

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	2	1
CO2	1	1	1	1	1
CO3	1	1	1	2	1
CO4	1	1	1	2	1
CO5	1	1	1	2	1

Syllabus Content:

Module 1 **18 hours**

"The Unsurrendered People" – Kenzaburo Oe "The Old Prison" – Judith Wright "War" – Luigi Pirandello

Module 2 **18 hours**

Persuasions on the Power of the Word:"On Censorship" – Salman Rushdie "Peril" – Toni Morrison "The Burning of the Books" – Bertolt Brecht "The Censors" – Luisa Valenzuela

Module 3 **18 hours**

"The Poisoned Bread" – Bandhu Madhav "A Trip Westward" – Zitkala-Sa "The Pot Maker" – Temsula Ao

Module 4 **18 hours**

"Does it Matter?" – Richard Leakey "On Killing a Tree" – Gieve Patel "Hagar: A Story of a Woman and Water" (Gift in Green (chapter 2)) – Sarah Joseph

Module 5 **18 hours**

"Understanding Refugeeism: An Introduction to Tibetan Refugees in India" – Mallica Mishra"Refugee Blues" – W.H Auden"The Child Goes to the Camp" (from Palestine's Children) – Ghassan Kanafani

SEMESTER II

GENERAL COURSE - 03

VFPT2G03B18 – FOOD SCIENCE AND NUTRITION II

Total Credits: 4

Total Lecture Hours: 60

Course Outcomes

CO1:Explain the relevance and various methods of body composition analysis.

CO2:Describe the utilization of carbohydrates in the human body.

CO3:Summarize the basic mechanisms of protein digestion and synthesis.

CO4:Discuss the utilization of lipids and pathways of cholesterol metabolism.

CO5:Distinguish between the disease conditions related to deficiency of metabolic enzymes.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1U	PSO2A	PSO3U	PSO4A	PSO5E
CO1A	1	3	1	1	2
CO2U	2	3	1	1	2
CO3U	2	2	1	1	2
CO4U	2	2	1	1	2
CO5U	2	2	1	1	2

Syllabus Content:

Module I: Body Composition **12 Hours**

Introduction, five levels of body composition, body compartments, Estimation of body composition (direct and indirect methods), Body Composition changes. Status/Length, Weight, Body Mass Index, Circumference measurements, Skinfold measurements.

Module II: Carbohydrates **13 Hours**

Definition, classification, digestion, absorption, transport, distribution, storage and excretion. Glycemic Index and Glycemic load. Metabolic utilization and regulation of blood glucose concentration, Non- glycemic carbohydrates- Fibre - properties, Physiological and metabolic effects, Nutritional and health significance, requirements. Resistant starch – factors influencing resistant starch content in foods and potential health benefits. Fructooligosaccharides and High Fructose Corn Syrup.

Module III: Proteins **13 Hours**

Definition, classification of amino acids – Essential and non essential, structure of proteins, digestion, absorption, transport, distribution, storage and excretion. Protein Metabolism – Transamination, Deamination and Urea Cycle, Amino acid pool, Protein biosynthesis.

Module IV: **Lipids** **13 Hours**

Definition, classification, structure, physical and chemical properties. Digestion, absorption, transport, distribution, storage and excretion Metabolism of Lipids, Cholesterol biosynthesis and regulation. Ketone bodies, Prostaglandins. Plasma lipoproteins and Hyperlipidemias. Regulation of Lipid metabolism.

Module V: **Inborn errors of metabolism** **9 Hours**

Definition, Inborn errors of carbohydrate metabolism - Glycogen storage diseases, fructosuria, galactosemia. Inborn errors of protein metabolism - phenyl ketonuria, cystinuria, albinism, alkaptonuria, maple syrup disease.

SEMESTER II

GENERAL COURSE - 04

VFPT2G04B18 – BUSINESS COMMUNICATION

Total Credits: 4

Total Lecture Hours: 60

Course Outcomes

CO1: Recall that communication is the life blood of all businesses and the base for all human relations.

CO2: Explaining how to improve oral communication with the effective use of non- verbal communication.

CO3: Practice the steps of giving a good oral presentation.

CO4: Summarize the concept of groups and teams and tells the importance of group decision making in business.

CO5: Identifying the new methods of business communication.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1U	PSO2A	PSO3U	PSO4A	PSO5E
CO1U	1	1	1	3	2
CO2A	1	1	1	3	2
CO3A	1	1	1	3	2
CO4U	1	1	1	3	2
CO5An	1	1	1	3	2

Syllabus Content:

Module I: Basis of Communication **13 Hours**

Meaning, importance and process, need and objectives of communication, 7Cs of communication, barriers of communication, how to overcome communication barrier.

Module II: Means/Media of Communication **10 Hours**

Verbal and nonverbal communication channel of formal and informal communication. Types of communication. downward, upward, Horizontal or lateral, Diagonal or cross.

Module III: Listening as a communication tool **15 Hours**

Importance types of listening, Barriers to effective listening. How to make listening effective. Speeches and presentation – characteristics of a good speech. How to make effective presentation-planning, preparation, organizing, rehearing and delivery.

Module IV: Groups **12 Hours**

Importance of features, advantage and disadvantages techniques of group decision making-Brainstorming sessions, Nominal group technique, Delphian Technique, solving problems in groups.

Module V: New Trends in Business communication **10 Hours**

E mail, teleconferencing, video conferencing, SMS.

SEMESTER III

SEMESTER III

Course Code	Course Title	Credits	Course Type
VFPT3S07B18	Technology of Fish, Meat and Egg Processing.	5	Skill course
VFPT3S08B18	Technology of Spices and plantation crops	5	Skill course
VFPT3S09B18	Technology of Fermented Foods	5	Skill course
VFPT3SP03B18	Chemical and Microbial Analysis of Food	2	Skill course
VFPT3G05B18	Food Microbiology	4	General course
VFPT3G06B18	Food additives and flavouring technology	4	General course
VFPT3G07B18	Business Management	4	General course
VFPT3SI03B18	Internship	1	Skill course

SEMESTER III

SKILL COURSE - 11

VFPT3S07B18 – TECHNOLOGY FISH, MEAT AND EGG PROCESSING

Total Credits: 5

Total Lecture Hours: 75

Course Overview and Context

CO1: Describe the structure, composition and nutritional quality of animal products.

CO2: Explain processing and preservation of fish food products.

CO3: Preparing meat food products and explaining the different preservation methods.

CO4: Describe the structure, composition and nutritional quality of egg and preservation of egg food products.

C05: Discussing the various animal food products.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 A	PSO3 U	PSO4 A	PSO5 E
CO1 U	1	1	3	1	1
CO2 U	2	2	1	2	1
CO3 A	2	3	2	1	2
CO4 A	2	3	1	1	2
CO5 A	3	2	2	1	2

Syllabus Content :

Module I: Compositional and Nutritional aspect of Animal foods **20 Hours**

Fish - Classification of fish (fresh water and marine), composition, spoilage of fish - microbiological, physiological, biochemical. **Meat** - Definition of carcass, concept of red meat and white meat, composition of meat, marbling in meat, post mortem changes in meat - rigor mortis, tenderization of meat, ageing of meat. **Egg**- composition and nutritive value, egg proteins, characteristics of fresh egg, deterioration of egg quality.

Module II: Fish Processing **10 Hours**

Preservation of fish-Chilling, Freezing, curing, drying, salting - salting methods: brining, pickling, curing and canning of fish. Smoking - smoke production, smoke components, quality, safety and nutritive value of smoked fish, pre - smoking processes, smoking process control.

Module III: Meat processing **20 Hours**

Meat Quality - colour, flavour, texture, Water Holding Capacity (WHC), Emulsification capacity of meat. Tests for assessment of raw meat - TVN, FFA, PV, Nitrate and nitrite in cured meat. **Preservation of meat** -Refrigeration and freezing, thermal processing - canning of meat, dehydration, meat curing.

Module IV: Egg processing **10 Hours**

Egg-Composition and nutritive value. Factors affecting egg quality. Preservation of eggs - Refrigeration and freezing, thermal processing, dehydration, coating.

Module V: Products from fish, meat and egg **15 Hours**

Fishery products: Surimi - Process, traditional and modern production lines, quality of surimi products. Fish protein concentrates (FPC), fish protein extracts (FPE). **Meat products:** Sausages - processing, RTE meat products. **Egg** products– Egg powder, frozen egg pulp, designer eggs.

SEMESTER III

SKILL COURSE - 12

VFPT3S08B18 – TECHNOLOGY OF SPICES AND PLANTATION CROPS

Total Credits: 5

Total Lecture Hours: 75

Course Outcomes

CO1:Distinguish between spices and explain the general processing steps.

CO2: Apply the systematic steps of spice processing in the processing unit.

CO3:Categorize various spice extractives and experiment on value added products processing

CO4:Evaluate the processing of cashew nuts and its by-products.

CO5:Experimenting on the processing of various products and by-products from sugarcane and cocoa.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 A	PSO3 U	PSO4 A	PSO5 E
CO1 U	3	2	3	1	2
CO2 A	3	2	2	1	3
CO3 An	2	2	3	1	3
CO4 E	3	2	3	1	2
CO5 An	3	2	3	1	3

Syllabus Content:

Module I: Spice processing **18 Hours**

Introduction, classification, composition and functions. Major international quality specifications of spices. Spice processing, spice reconditioning, spice grinding, post-processing treatments. Introduction to Gas chromatography, HPLC, AAS, Spectrophotometer.

Module II: Processing of Major Spices **15 Hours**

Major spices: Pepper, cardamom, ginger, clove, nutmeg, vanilla, cinnamon, chilli and turmeric – method of manufacture; chemistry of the volatiles; enzymatic synthesis of flavour identical.

Module III: Spice extractives **12 Hours**

Value added spice products: Spice volatile oils, spice oleoresins, Use of spice extractives, replacement of spices with oils and oleoresins, alternative products, Ground spices, processed spices, organic spices, curry powders.

Module IV: Plantation crops- cashew processing **15 Hours**

Composition, Structure and characteristics of cashew nut, uses, Traditional method of cashew processing, General processing, Cashew apple processing , cashew by product - CNSL.

Module V: Sugarcane and Cocoa processing **15 Hours**

Production and processing of sugarcane, Cocoa: varieties, Processing of cocoa – Fermentation and Drying, storage. Manufacture of chocolate- conching, enrobing, milk chocolate, white chocolate, dark chocolate, cocoa butter, wafer coated chocolate, cocoa powder.

SEMESTER III

SKILL COURSE - 13

VFPT3S09B18- TECHNOLOGY OF FERMENTED FOODS

Total Credits: 5

Total Lecture Hours: 75

Course outcomes:

CO1: Describe the range of fermentation process and classify them.

CO2: Illustrate microbial growth kinetics.

CO3: Analyse the various sources of media and inocula for fermentation.

CO4: Explain the function of the fermenter and sterilization process.

CO5: Categorise various fermented food products.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 A	PSO3 U	PSO4 A	PSO5 E
CO1 U	3	2	1	1	1
CO2 U	2	1	1	1	1
CO3 A	2	2	2	1	1
CO4 A	2	2	3	1	2
CO5 A	3	2	2	1	1

Syllabus Content

Module I: Introduction to fermentation processes **12 Hours**

Range of fermentation processes – Microbial biomass, Microbial enzymes, Microbial metabolites, Recombinant products. Classification of fermentation process– Lactic acid fermentation, alcoholic fermentation. Importance of fermentation in food industry - Flavour enhancement, Nutritional value, Preservation, Antibiotic properties.

Module II: Microbial growth kinetics **16 Hours**

Batch culture, Continuous culture, Comparison of batch and continuous culture in industrial processes - Biomass productivity, Metabolite productivity, Continuous brewing, Fed-batch culture - variable volume fed- batch culture, Fixed volume fed-batch culture, Application of fed-batch culture, Examples of the use of fed-batch culture.

Module III: Media and Inocula for fermentation **15 Hours**

Typical media, medium formulation, water, energy sources - carbon sources, nitrogen sources, minerals. Growth factors, nutrient recycle oxygen requirements, antifoams, medium optimization. Inoculum – Criteria for transfer of inoculum, development of inocula for yeast, bacterial and mycelia process, aseptic inoculation of plant fermenters.

Module IV: Fermenter and sterilization process **15 Hours**

Instrumentation of fermenter, basic functioning of fermenter, recovery and purification of fermented products. Sterilization – Introduction, Sterilization of fermenter, sterilization of feeds, sterilization of liquid wastes

Module V: Fermented food products **17 Hours**

Fermented meat products – Cured- raw meat, semidry fermented sausages, dry – fermented sausages, mold ripened sausages. Fermented soy products – Soy sauce, fermented whole soy beans, fermented tofu, Tempeh. **Fermented vegetables** – Chinese pickles, Kimchi, Sauerkraut. **Fermented cereal products** –Sourdough bread, croissants, rye bread, hamburger bun, Danish pastry, beer.

SEMESTER III

SKILL COURSE - 14

VFPT3SP03B18– CHEMICAL AND MICROBIAL ANALYSIS OF FOODS (PRACTICAL)

Total Credits: 2

Total Laboratory Hours: 60

Course Overview and Context

CO1: Analyse the chemical constituents in spices.

CO2: Prepare fermented foods.

CO3: Experimenting the concepts of food microbiology.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 U	PSO4 A	PSO5 E
CO1 An	2	1	2	1	2
CO2 Ap	3	2	2	1	1
CO3 An	2	2	3	1	3

Syllabus Content:

1. Detection of papaya seeds in black pepper.
2. Detection of powdered bran and sawdust in spices
3. Preparation of fermented foods
4. Introduction to the Basic Microbiology Laboratory Practices and Equipments
5. Functioning and use of compound microscope
6. Cleaning and sterilization of glassware
7. Preparation and sterilization of nutrient broth .
8. Preparation of slant, stab and plates using nutrient agar.
9. Standard Plate Count Method.

10. Visit to Meat Products of India.

SEMESTER III

SKILL COURSE - 15

VFPT3SI03B18– INTERNSHIP

Credits: 1

Total LectureHours:30

Course Outcomes:

CO1: Construct academic and practical skills.

CO2: Develop problem solving skills in the industry.

CO3: Practicing communication skills.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 A	PSO3 U	PSO4 A	PSO5 E
CO1 U	2	2	3	3	3
CO2 U	2	2	3	3	3
CO3 A	2	2	1	3	2

SEMESTER III

GENERAL COURSE – 05

VFPT3G05B18- FOOD MICROBIOLOGY

Total credits: 04

Total Lecture Hours: 60

Course Outcomes:

CO 01: Explain the changes caused by microorganisms in food.

CO 02: Identify the different microorganisms and their characteristics.

CO 03: Describe the methods to control microbial growth.

CO 04: Analyse the spoilage of various food products.

CO 05: Describe the beneficial uses of microorganisms.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 A	PSO3 U	PSO4 A	PSO5 E
CO1 U	1	2	3	2	2
CO2 U	1	2	2	1	2
CO3 U	2	1	3	2	3
CO4 AN	2	3	2	1	2
CO5 U	3	2	1	1	1

Syllabus Content:

Module I: Introduction to food microbiology **9 Hours**

Discovery, current status, role of food microbiology, sources of microorganisms in food, changes caused by microorganisms - food fermentation, putrefaction, lipolysis. Growth and survival of microorganisms in foods, biological, chemical and physical changes caused by microorganisms, physical and chemical methods to control microorganisms.

Module II: Characteristics of microorganisms **11 Hours**

Classification of microorganisms, nomenclature, morphology – yeast and moulds, bacterial cells, viruses. Important microbes in food, microbial growth characteristics – Microbial reproduction, nature of growth in food. Food hygiene and sanitation: Contamination during handling and processing and its control; indicator organisms.

Module III: Food preservation **10 Hours**

Factors influencing microbial growth in food: Intrinsic and extrinsic factor – Hydrogen ion concentration, Moisture requirement, concept of water activity, temperature, oxidation reduction potential, inhibitory substances and biological structure. Principles of different food preservation methods.

Module IV: Spoilage in different food groups **16 Hours**

Food spoilage – Introduction, spoilage in cereals, vegetables and fruits, meat, eggs, poultry, fish, milk and milk products, canned foods, nuts and oil seeds, fats and oil seeds. Definition - food infection and food intoxication.

Module V: Beneficial uses of microorganisms **14 Hours**

Microorganisms used in food fermentation, mechanisms of nutrient transport, application in genetics, intestinal bacteria and probiotics, food bio preservatives of bacterial origin, food ingredients and enzymes of microbial origin. Economic importance of microorganisms.

SEMESTER III

GENERAL COURSE - 06

VFPT3G06B18– FOOD ADDITIVES AND FLAVOUR TECHNOLOGY

Total Credits: 4

Total Lecture Hours: 60

Course Outcomes

CO1: Explain the relevance and role of food additives in food processing.

CO2: Examine the function of food additives added during processing of food.

CO3: Distinguish between the flavours formed during processing and explain the extraction methods.

CO4: Select appropriate sources and methods to derive food additives from macronutrients.

CO5: Illustrating toxic food additives and predicting the formation of such compounds during processing.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 A	PSO3 U	PSO4 A	PSO5 E
CO1 U	2	2	3	1	2
CO2 A	2	2	3	1	3
CO3 An	2	2	3	1	3
CO4 An	3	2	3	1	2
CO5 A	2	1	3	1	3

Syllabus Content:

Module I: Introduction to Food Additives **10 Hours**

Role of Food Additives in Food Processing, functions -Classification -Intentional & Unintentional Food Additives. Safety evaluation of Food Additives, Beneficial and Toxic Effects. Food

Additives - Generally recognized as safe (GRAS), Tolerance levels & Toxic levels in Foods.

Module II: **Types of food additives** , **15 Hours**

Preservatives, antioxidants, colours and flavours (synthetic and natural), sequestrants, humectants, hydrocolloids, sweeteners, acidulants, buffering salts, anticaking agents – uses and functions in formulations; indirect food additives.

Module III: Flavour technology **12 Hours**

Types of flavours, flavours generated during processing – reaction flavours, flavour composites, stability of flavours during food processing, analysis of flavours, extraction techniques of flavours, flavour emulsions; essential oils and oleoresins.

Module IV: Derived food additives **10 Hours**

Proteins, starches and lipids as functional ingredients; isolation, modification, specifications, functional properties and applications in foods and as nutraceuticals. Manufacturing and applications of fibres from food sources, fructooligosaccharides.

Module V: Food additives as toxicants **13 Hours**

Artificial colours, preservatives, sweeteners; toxicants formed during food processing such as nitrosamines, maillard reaction products acrylamide, benzene, heterocyclic amines and aromatic hydrocarbons; risk of genetically modified food, food supplements, persistent organic pollutants, toxicity implications of nanotechnology in food.

SEMESTER III

GENERAL COURSE -07

VFPT3G07B18- BUSINESS MANAGEMENT

Total Credits: 04

Total Lecture Hours: 60

Course Outcomes

CO1: Describe the primary functions of management and the roles of managers in organization

CO2: Distinguish the work of major contributors to the field of management and the general principles of management. .

CO3: Explain how managers align the planning process with company mission, vision, and values.

CO4: Identify common organizational structures and the advantages and disadvantages of each.

CO5: Discuss the importance of leadership and motivation in organizations .

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 A	PSO3 U	PSO4 A	PSO5 E
CO1 U	1	2	1	3	1
CO2 U	1	1	1	3	1
CO3 A	1	2	1	3	1
CO4 U	1	1	1	3	1
CO5 U	1	1	1	3	1

Syllabus Content:

ModuleI: Management **12 Hours**

Introduction, Meaning, nature and characteristics of Management - Scope and functional areas of management - Management as a science art or profession - Management & Administration – Principles of management - Social responsibility of management.- Contributions of F. W. Taylor and Henry Fayol - Emergence of Japan as an industrial giant.

Module II: Planning **8 Hours**

Nature, importance and purpose of planning - Planning process, objectives - Types of plans MBO- Features-steps.

Module III: Organising and Staffing **12 Hours**

Nature and purpose of organisation, Principles of organisation - Types of organization, Organisation Chart- Organisation manual-Departmentation, Committees Authority- Delegation of Authority- Responsibility and accountability-Centralisation Vs decentralisation of authority - Nature and importance of staffing - Process of selection & recruitment.

Module IV: Directing **16 Hours**

Meaning and nature of directing - Motivation- meaning - importance-Theories of Motivation (Maslow, Herzberg, McGregor, X & Y theory) Leadership-Meaning-Styles, Managerial Grid by Blake and Mounton - Likert's Four level model-Coordination- Meaning and importance.

Module V: Controlling **14 Hours**

Meaning and steps in controlling - Essentials of a sound control system - Methods of establishing control-Control by Exception.

SEMESTER IV

SEMESTER IV

Course Code	Course Title	Credits	Course Type
VFPT4S10B18	Technology of Cereal, Pulses and Oilseeds.	5	Skill Course
VFPT4S11B18	Technology of Beverages	5	Skill Course
VFPT4S12B18	Food Product design and Development	5	Skill Course
VFPT4SP04B18	Cereal, Pulses and Oilseeds Technology	3	Skill Course (practical)
VFPT4G08B18	Food Plant designing	4	General Course
VFPT4G09B18	By product utilization and Waste Management	4	General Course
VFPT4G10B18	Marketing Management	4	General Course
VFPT4SI04B18	Internship	1	Skill Course

SEMESTER IV

SKILL COURSE - 16

VFPT4S10B18– TECHNOLOGY OF CEREALS, PULSES AND OILSEEDS

Total Credits: 5

Total Lecture Hours: 75

Course outcomes

CO 1: Describe the composition of paddy .

CO 2 : Explain the operations and equipments involved in paddy processing .

CO 3 : Explain the steps involved in wheat milling .

CO 4 : Describe the process of pulse milling and explaining the different products from pulses .

CO 5 : Analyse the different methods of oil extraction, refining and practicing

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 A	PSO3 U	PSO4 A	PSO5 E
CO1 U	3	2	2	1	2
CO2 U	3	3	1	1	2
CO3 A	3	2	2	1	2
CO4 A	3	2	2	1	2
CO5 A	3	1	2	1	2

Syllabus Content

Module I : Paddy Processing **15 Hours**

Composition and Quality characteristics. Curing of Paddy. Parboiling Processes- soaking, steaming, drying, CFTRI and pressure parboiling process, Paddy Dryer - LSU Dryer. Production of Flattened Rice and Puffed Rice from Paddy.

Module II: Rice Milling **20 Hours**

Paddy Dehusking Processes. Rice Mill Flow Chart. Engelberg Huller Mills. Modern Rice Mills – Their Components - Pre Cleaners, rubber roll Shellers, Paddy Separator – Satake type, Polishers - Cone polishers, glazing, Extraction of rice bran oil and uses of rice bran in food industry.

Module III: Wheat milling **10 Hours**

Wheat - composition and nutritional value, wheat milling process - cleaning conditioning/hydrothermal treatment, milling-break roll and reduction rolls.

Module IV: Milling of Pulses **10 Hours**

Varieties-chemical composition and structure-dry milling and wet milling process of pulses, processed products of pulses.

Module V: Oil seed processing **20 Hours**

Introduction- methods- hydraulic press- screw press – principle and working, solvent extraction methods, Clarification, degumming, neutralization, bleaching, deodorization techniques/process, blending of oils. Hydrogenation, Fractionation, Winterization.

SEMESTER IV

SKILL COURSE - 17

VFPT4S11B18 – TECHNOLOGY OF BEVERAGES

Credits: 5

Total Lecture Hours: 75

Course Outcomes:

CO1: Describe the relevance and functioning of the beverage industries.

CO2: Explain the process involved in manufacturing of different beverages.

CO3: Preparing tea and coffee-based beverages.

CO4: Explain the different methods and technology for manufacturing alcoholic beverages and evaluating the best quality methods.

CO5: Explain the major steps involved in manufacturing and testing the quality of packaged drinking water.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 A	PSO3 U	PSO4 A	PSO5 E
CO1 U	2	3	2	2	3
CO2 A	3	2	2	1	2
CO3 A	3	2	2	1	2
CO4 E	3	2	2	1	2
CO5 A	3	2	2	1	2

Syllabus content

Module I: Introduction to beverages **15 Hours**

Types of beverages and their importance, status of beverage industry in India, Manufacturing technology for juice-based beverages, technology of still, carbonated, low-calorie and dry beverages, sports drinks, role of various ingredients of soft drinks, carbonation of soft drinks.

Module II: **Manufacturing process of beverages** **10 Hours**

Beverages based on tea, coffee, cocoa, spices, plant extracts, herbs, nuts, Dairy-based beverages.

Module III: **Types of coffee and tea**
20 Hours

Chemical composition and processing of tea and coffee and their quality assessment. Types of tea: black tea, green tea, oolong tea. Types of coffee: Vacuum coffee, drip coffee, iced coffee. Espresso coffee, instant coffee. Decaffeination of Coffee types of decaffeination: Roselius method, swiss water process, direct and indirect method, triglyceride method, carbon dioxide method.

Module IV: Alcoholic beverages **15 Hours**

Types, manufacture and quality evaluation; the role of yeast in beer and other alcoholic beverages, ale type beer, lager type beer, technology of brewing process, equipments used for brewing and distillation, wine and related beverages, distilled spirits.

Module V: Packaged drinking water **15 Hours**

Definition, manufacturing processes, quality evaluation of raw and processed water, methods of water treatment, quality standards of bottled water. Types of water - Mineral water, natural spring water, flavoured water, carbonated water.

SEMESTER IV

SKILL COURSE - 18

VFPT4S12B18– FOOD PRODUCT DESIGN AND DEVELOPMENT

Total Credits: 5

Total Lecture Hours: 75

Course Outcomes:

CO 1: Explain the concept of a new product development.

CO 2: Describe the processing of a new product.

CO 3: Develop the knowledge base required for accomplishing a product development.

CO 4: Recall the methods to introduce a new product in the market.

CO 5: Develop new products.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 A	PSO3 U	PSO4 A	PSO5 E
CO1 U	2	1	1	3	2
CO2 U	2	2	2	2	2
CO3 A	1	2	2	2	2
CO4 R	1	1	1	2	2
CO5 C	2	2	2	3	2

Syllabus content

Module I: Concept of product development **16 Hours**

Need, importance and objectives of formulation for new product development. Product success and failure, factors for success, process of product development, managing for product's success.

Innovation strategy - possibilities for innovation, building up strategy, product development programme.

Module II: Product development process **14 Hours**

Ideas, Formulation based on sources availability and cost competitiveness for concept developments of new products, Product strategy, product design and process development, product commercialization, product launch and evaluation.

Module III: Knowledge base for product development technology **18 Hours**

Adaptable technology and sustainable technology for standardized formulation for process development. Knowledge and the food system, knowledge management, knowledge for conversion of product concept to new product, technological knowledge - product qualities, raw material properties, processing, packaging requirement, distribution and marketing. Process control parameters and scale up, production trials for new product development at lab and pilot scale

Module IV: Role of consumers in product development **12 Hours**

Consumer behaviour, food preferences, avoiding acceptance, integration of consumer needs in product development and sensory needs.

Module V: Managing the product development process **15 Hours**

Principles of product development management, people in product development management, designing the product development process, key decision points. Quality assessment: Quality assessment of new developed products. Market testing and marketing plan.

SEMESTER IV

SKILL COURSE - 19

VFPT4SP04B18– TECHNOLOGY OF CEREALS, PULSES AND OILSEEDS (PRACTICAL)

Total Credits: 2

Total Laboratory Hours: 60

Course Outcomes:

CO1: Test the physical properties of cereal flours.

CO2: Corelating working of a rice milling station by providing field visits.

CO3: Examine the working of a oil expelling unit station.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 A	PSO3 U	PSO4 A	PSO5 E
CO1 U	1	1	3	2	2
CO2 U	2	3	1	2	2
CO3 A	2	3	2	2	2

. **Syllabus Content**

1. Physical characteristics of Wheat.
2. Physical characteristics of Rice.
3. Estimation of Gluten Content of flour.
4. Estimation of moisture content.
5. Estimation of ash content.
6. Estimation of acid insoluble ash.
7. Determination of alcoholic acidity.
8. Determination of gelatinization temperature of flours.

9. Determination of sedimentation power of flour.
10. Visit to rice mill station.
11. Visit to oil expelling unit.

SEMESTER IV

SKILL COURSE- 20

VFPT4SI04B18– INTERNSHIP

Credits: 1

Total Lecture Hours: 30

Course Outcomes:

CO1: Correlate academic and practical skills.

CO2: Employing problem solving skills in the industry.

CO3: Develop communication skills.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 A	PSO3 U	PSO4 A	PSO5 E
CO1 U	2	2	3	3	3
CO2 U	2	2	3	3	3
CO3 A	2	2	1	3	2

SEMESTER IV
GENERAL COURSE - 08

VFPT4G08B18- FOOD PLANT DESIGNING

Total Credits: 4

Total Lecture Hours: 60

Course Outcomes:

CO1: Explain the concepts of plant layout and its design in food industries.

CO2: Examine location theories and models utilized for choosing plant location.

CO3: Discuss the various classical types of plant layouts.

CO4: Generalise the different building materials and designing utilities suitable for a plant.

CO5: Describe safety aspects of plant layout in different food processing industries.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 A	PSO3 U	PSO4 A	PSO5 E
CO1 U	2	3	1	1	1
CO2 U	1	2	1	1	1
CO3 A	1	3	1	2	1
CO4 A	2	2	1	1	2
CO5 A	2	2	1	1	2

Syllabus Content

Module 1: Introduction **10 Hours**

Definition, Basic concepts of plant layout and design with special reference to food process industries. Application of HACCP concept, ISO, FPO & MPO requirements in food plant layout and design.

Module II : Plant Location **10 Hours**

Influence of location on plant layout, location factors, location theory and models, Economic plant size, types of manufacturing processes like continuous, repetitive and intermittent processes.

Module III: Plant Layout **10 Hours**

Preparation of a Plant Layout, Plant Layout problem, importance, objectives, classical types of layouts. Evaluation of layout. Advantages of good layout

Module IV: Plant Building **15 Hours**

Considerations in building design, type of factory buildings, choice of building construction, material for floors, foundation, walls, doors, windows, drains etc, ventilation, fly control, mold prevention and illumination in food processing industries.

Module V: Plant layout & Equipment Layout **15 Hours**

Plant layout and design of bakery and biscuit industries; fruits and vegetables processing industries including beverages; milk and milk products; meat, poultry and fish processing industries.

SEMESTER IV

GENERAL COURSE – 09

VFPT4G09B18 – BYPRODUCT UTILIZATION AND WASTE MANAGEMENT

Credits: 4

Total Lecture Hours: 60

Course Outcomes:

CO1: Identify the types of waste and its magnitude.

CO2: Describe the characteristics of waste.

CO3: Analyze the various effluent treatment methods.

CO4: Examine the waste utilization of agro industries.

CO5: Examine the waste utilization of animal and marine industry.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 U	PSO4 A	PSO5 E
CO1 U	2	1	2	1	1
CO2 U	3	2	2	1	1
CO3 A	1	3	1	1	2
CO4 A	1	2	1	1	2
CO5 A	1	2	1	1	2

Syllabus Content

Module I: Introduction **10 hours**

Types of waste and magnitude of waste generation in different food processing industries, concept, scope and importance of waste management and effluent treatment.

Module II: Waste characterization **10 Hours**

Temperature, pH, Oxygen demands (BOD, COD, TOD), fat, oil and grease content, metal content, forms of phosphorus and sulfur in waste waters, microbiology of waste, other ingredients like insecticide, pesticides and fungicides residues

Module III: Effluent Treatment **20 Hours**

Pretreatment of waste: sedimentation, coagulation, flocculation and floatation Secondary treatments: Biological oxidation trickling filters, activated sludge process), industrial wastewater treatment: characteristics of industrial wastewater, treatment levels

Module IV: Waste utilization of agro industries **10 Hours**

Characterization and utilization of byproducts from cereals (breweries), pulses, oilseeds, fruits & vegetables (wineries) and plantation crops (sugar industries).

Module V: Waste utilization of animal and marine product industries **10 Hours**

Characterization and utilization of byproducts from dairy, eggs, meat, fish and poultry

SEMESTER – IV

GENERAL COURSE - 10

VFPT4G10B18 – MARKETING MANAGEMENT

Total Credits: 4

Total Lecture Hours: 60

Course Outcomes:

CO1: Identify the importance of marketing in food industry.

CO2: Describe the new trends in marketing.

CO3: Examine the components of marketing mix.

CO4: Examine the different pricing strategies and distribution strategies.

CO5: Analyse the various steps in new product development.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 A	PSO3 U	PSO4 A	PSO5 E
CO1 U	1	2	1	3	1
CO2 U	1	2	1	3	1
CO3 A	1	2	1	3	1
CO4 A	1	1	1	3	1
CO5 An	1	1	1	3	1

Syllabus Content

Module I: Marketing management **10 Hours**

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

Module II: Market segmentation **12 Hours**

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

Module III: Marketing of products **18 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.

Module IV: Logistic and supply chain management **10 Hours**

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

Module V: Emerging trends in marketing **10 Hours**

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

SEMESTER V

SEMESTER V

Course code	Course Title	Credits	Course Type
VFPT5G11B18	Environmental Studies and Human Rights	4	General Course
VFPT5S13B18	Fruit and Vegetable Processing	5	Skill Course
VFPT5S14B18	Engineering properties of foods	5	Skill Course
VFPT5S15B18	Sensory Evaluation of foods	5	Skill Course
VFPT5SP05B18	Processing of fruits and vegetable	3	Skill Course(Practical)
VFPT5G12B18	Food Processing equipments	4	General Course
VFPT5G13B18	Product and brand Management	4	General Course
VFPT5SI05B18	Internship	1	Skill Course

SEMESTER V

SKILL COURSE - 21

VFPT5S13B18 - PROCESSING OF FRUITS AND VEGETABLES

Credits: 5

Total Lecture Hours: 75

Course Outcomes:

CO1: Discuss the status of fruit and vegetable production in India with importance to losses

CO2: Identifying different types of spoilage in fruits and vegetables.

CO3: Prepare various fruit and vegetable products.

CO4: Experimenting the various methods of preservation of fruits and vegetables

CO5: Analyse the processing of fruits and vegetables

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 U	1	1	1	1	2
CO2 U	1	1	3	1	1
CO3 U	3	1	1	3	1
CO4 U	2	1	1	3	1
CO5 U	3	1	1	3	1

Syllabus Content

Module I: Introduction **15 Hours**

Composition and nutritive value of fruits and vegetables. Factors effecting composition and quality of fruits and vegetables. Quality requirements of raw materials for processing; sourcing and receiving at processing plants, primary processing: grading, sorting, cleaning, washing, peeling, slicing and blanching

Module II: Spoilage of fruits and vegetables **15 Hours**

Different types of spoilages in fruits and vegetables. Spoilage during storage of fruits and vegetables and their prevention. General methods of preservation of whole fruits/vegetables and processed fruits and vegetables. Spoilage of pickles. Methods of preparation, curing techniques, defects and remedies. Types of preservatives commonly used in Fruits and vegetables processing industry, limits of usage of preservatives.

Module III: Processing of fruits and vegetables **20 Hours**

Dehydration of fruits and vegetables using various drying technologies like sun drying, solar drying (natural and forced convection), osmotic, tunnel drying, fluidized bed drying, freeze drying, convectional and adiabatic drying; applications to raisins, dried figs, vegetables, intermediate moisture fruits and vegetables. Fruit powders using spray drying. Technology of extraction of juices from different types of fruits.

Module IV: Manufacture of Fruit products **15 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

Module V: Manufacture of vegetable products **15 Hours**

Manufacturing process of sauce, ketchup, vegetable juices and concentrated products

SEMESTER V

SKILL COURSE - 22

VFPT5S14B18– ENGINEERING PROPERTIES OF FOODS

Total Credits: 5

Total Lecture Hours: 75

Course Outcomes:

CO1: Explain various physical properties of food materials.

CO2: Identify different methods of determining thermal properties of foods.

CO3: Illustrate the aerodynamic and frictional properties of foods.

CO4: Predict the rheological behaviour and textural properties of foods.

CO5: Identify the types of electrical and optical properties of foods.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 U	1	2	3	1	1
CO2 U	1	2	2	1	1
CO3 U	1	2	2	1	1
CO4 U	1	2	3	1	1
CO5 U	1	2	2	1	1

Syllabus Content

Module I: Physical Properties of Foods **15 Hours**

Methods of estimation of – Shape- roundness, sphericity, roundness ratio, size, volume- platform scale method, density, specific gravity-apparatus, porosity and surface area.

Module II: Thermal Properties of Foods 15 Hours

Definitions - specific heat, enthalpy, conductivity and diffusivity, surface heat transfer coefficient. Measurement of thermal properties like specific heat, thermal conductivity and thermal diffusivity

Module III: Aerodynamic properties and frictional properties of Foods 15Hours

Aerodynamic property-definition-drag coefficient, terminal velocity - application in handling and separation of food materials. Frictional property-coefficient of friction, angle of repose, angle of internal friction, application in food handling and storage

Module IV: Rheology and texture of foods 20 Hours

Rheology- rheological classification-viscoelasticity-viscometers. Hookean body, St Venant body and Newtonian body. Texture of foods- methods of textural evaluation- subjective and objective method-texture profile method

Module V: Electrical, optical properties and mechanical damage 15 Hours

Electrical and optical property- importance and its application. Mechanical damage-causes of mechanical damage-methods for detection and evaluation of mechanical damage.

SEMESTER V

SKILL COURSE - 23

VFPT5S15B18– SENSORY EVALUATION OF FOODS

Total Credits: 5

Total Lecture Hours: 75

Course Outcomes:

CO1: Describe the human senses and sensory perception.

CO2: Review the arrangements for sensory evaluation.

CO3: Classify the statistical methods for Sensory Evaluation.

CO4: Analyze the Subjective and Objective methods in evaluation.

CO5: Illustrate the application of sensory evaluation.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 R	1	1	2	1	1
CO2 U	1	3	1	2	2
CO3 A	1	2	3	1	2
CO4 A	1	2	2	1	3
CO5 Ap	1	1	1	2	1

Syllabus Content

Module I: Introduction 10 Hours

Definition of sensory evaluation; basic tastes; human senses and sensory perception; threshold; psychophysics, Tongue surface

Module II: Arrangements for Sensory Evaluation Test controls 15 Hours

Environment and test room design; product controls: sample preparation and presentation; panelist controls; factors influencing measurements: psychological and physiological errors

Module III: Statistical Methods for Sensory Evaluation 20 Hours

Classification of test methods; discrimination tests: paired-comparison, duo-trio and triangle tests; affective tests: qualitative (interview and focus group) and quantitative tests (paired preference and acceptance tests); Two sample test, Ranking test, Two sample difference test, numeric scoring test, hedonic ranking test

Module IV: Subjective and objective methods 15 Hours

Texture analyser- mechanical characteristics- chewiness, brittleness, and geometric characteristics, Sensory panel-types-criteria for panel selection

Module V: Applications of Sensory Analysis in the Food Industry 15 Hours

Quality control; storage stability testing; product development and consumer acceptance testing

SEMESTER V

SKILL COURSE - 24

VFPT5SP05B18– PROCESSING OF FRUITS AND VEGETABLES (PRACTICAL)

Total Credits: 2

Total Laboratory Hours: 60

Course Outcomes:

CO1: Examine the Handling and operating of food processing equipment and Instruments.

CO2: Analyse the quality of fruit and vegetable products.

CO3: Preparing different fruit and vegetables products.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 U	1	3	1	2	2
CO2 U	1	1	3	2	1
CO3 U	3	1	1	1	1

Syllabus Content

1. Handling and operating of food processing equipments and Instruments

- Pulper
- Sealers
- Juice extracting machines
- Autoclaves
- Corking machines

- Refractometer
- Salinometer
- Hydrometers
- Jelmeter
- Thermometer
- Vacuum gauge, pressure gauge, seam checking gauge
- Electronic weighing balance

2. Quality analysis

- Quality evaluation of fruits and vegetables.
- Quantitative analysis of cut fruits and vegetable yield.
- Effects of pretreatment on quality of cut fruits and vegetables.
- Refrigeration storage of fruits and vegetables
- Determination of Maturity indices of fruits & vegetables.

3. Quality Testing

- Determination of Degree Brix (TSS), pH and % acidity in fruits and vegetable products.
- Estimation of benzoic acid, sulphur dioxide and KMS in terms of ppm present in fruits and vegetable products.
- Estimation of reducing and non reducing sugars in fruit and vegetable products
- Estimation of chloride content in food products.

4. Preservation techniques

- Extraction of juice by different methods.
- Preservation of fruits juices with addition of preservative.
- Preparation of fruit and synthetic beverages.
- Preparation of carbonated beverages.

5. Product Preparation

- Preparation of tomato juices, puree, sauces, ketchups, soup, paste.
- Comparison of juice/pulp extraction methods on quality and yield of tomato pulp.
- Preparation of jam, jelly and marmalades.
- End point determination in preparation of high sugar product.
- Preparation of preserves, candies, crystallized and glazed fruits and fruit bars.
- Effects of pre- treatment and process variables on quality of preserve and candied fruits.
- Preparation of chutney
- Preparation of sauerkraut, gherkins, cauliflower, lime, mango and mixed pickles.

SEMESTER V

GENERAL COURSE - 11

VFPT5G11B18 - ENVIRONMENTAL STUDIES AND HUMAN RIGHTS

Total Credits: 4
Total Lecture Hours: 60 (4 Hours/ Week)

Course Outcomes:

CO1: Discuss the scope and significance of environmental studies.

CO2: Summarize various types of ecosystem.

CO3: Explain biodiversity and its conservation.

CO4: Explain various types of pollution.

CO5: Summarize the Human rights provided in the constitution of India.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 U	1	1	1	3	1
CO2 U	1	1	1	3	1
CO3 U	1	1	1	3	1
CO4 U	1	1	1	3	1
CO5 U	1	1	1	3	1

Syllabus Content

Module I: Multidisciplinary nature of environmental studies 10hours
Definition, scope and importance - Need for public awareness. Natural Resources-: Renewable and non-renewable resources: Natural resources and associated problems - Forest resources, Water resources, Mineral resources, Food resources, Energy resources, Case studies, Land resources

Module II: Ecosystems **10hours**

Concept of an ecosystem - Structure and function of an ecosystem- Producers, consumers and decomposers - Energy flow in the ecosystem - Ecological succession - Food chains, food web sand ecological pyramids. Introduction, types, characteristic features, structure and function of the given ecosystem:- Forest ecosystem

Module III: Biodiversity and its conservation **10 hours**

Introduction, Biogeograhical classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega-diversity nation Hot-sports of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India

Module IV: Environmental Pollution **15 hours**

Definition, Causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste Management, Disaster management, Social Issues and the Environment, Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people: its problems and concerns, Case studies, Environmental ethics. Environment Protection Act - Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness

Module V: Human Rights **15 hours**

An Introduction to Human Rights, Meaning, concept and development, Three Generations of Human Rights (Civil and Political Rights; Economic, Social and Cultural Rights). Human Rights and United Nations: contributions, main human rights related organs - UNESCO, UNICEF, WHO, ILO, Declarations for women and children, Universal Declaration of Human Rights. Human Rights in India, Environment and Human Rights - Right to Clean Environment and Public Safety. Protection of Environment Conservation of natural resources and human rights: Reports, Case studies and policy formulation. Conservation issues of western ghats - mention Gadgil committee report, Kasthurirengan report. Over exploitation of ground water resources, marine fisheries, sand mining

SEMESTER V

GENERAL COURSE - 12

VFPT5G12B18 – FOOD PROCESSING EQUIPMENTS

Total Credits: 4
Total Lecture Hours: 60 (4 Hours/ Week)

Course Outcomes:

CO1: Ilustrate the steps in production planning and criteria for designing different food processing equipments.

CO2: Describe the working of mechanical separation and transport equipments.

CO3: Interpret the hygiene and safety considerations in the food industry.

CO4: Illustrate the working of thermal processing and refrigeration equipments.

CO5: Discuss the features and operation of food packaging machineries.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 U	1	3	1	1	1
CO2 U	1	3	1	1	1
CO3 U	1	2	1	1	1
CO4 U	1	3	1	1	1
CO5 U	1	3	1	1	1

Syllabus Content

ModuleI:Introduction to equipments used in food industry 10 Hours

Equipments: Types, planning, factors affecting selection and purchase

Module II: Mechanical Equipments 16 Hours

Transport equipments: Fluid food transport equipment, mechanical conveyors. Storage equipments: Solid and liquid food storage equipments. Processing equipments: Size reduction, homogenization, mixing and foaming equipments. Separation equipments: Grading and sorting equipments.

Module III: Heat exchangers, dryers and evaporators 12Hours

Heat transfer equipments: Heat exchangers. Food evaporation equipments: food evaporators, evaporator components. Food dehydration equipments – Food dehydration principle, food dryers, hygiene and safety considerations.

Module IV: Refrigeration and thermal processing equipments 12 Hours

Refrigeration and freezing equipments: Refrigerants, freezers, chillers. Thermal processing equipments: sterilizers, pasteurizers, blanchers.

Module V: Food packaging Equipments 10 Hours

Introduction, preparation of food containers, filling equipments, closing equipments, group packaging.

SEMESTER V

GENERAL COURSE - 13

VFPT5G13B18– PRODUCT AND BRAND MANAGEMENT

Total Credits: 4

Total Lecture Hours: 60

Course Outcomes:

CO1: Explain the importance of concentrating on the product component of the marketing mix.

CO2: Restate the fact that brand is not just a name or sign, it is the identity of a product .

CO3: Examine the basic concepts of product development and the possible errors that could come up.

CO4: Explain the significance of Ecommerce in today's fast changing world and its applications to business.

CO5: Preparing an effective website for Ecommerce.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 U	1	1	1	3	1
CO2 U	1	1	1	3	1
CO3 U	1	1	1	3	1
CO4 U	1	1	1	3	2
CO5 U	1	1	1	3	2

Syllabus Content

Module I: Product management **13 Hours**

Introduction and importance of product management-role of a product manager- product plan and its components- product policy-kind of product teams- product Management audit-product line; additions, alterations and deletions.

Module II: New product development **13 Hours**

New product demand forecasting models-product portfolio-perceptual mapping- stages in new product development-new product launch; strategies, mistakes, successes and failures

Module III: Brand management **13 Hours**

Strategic issues in brand management- concepts & principles of brand management-Brand positioning- brand stretching- brand equity;its components & measurement- multibtanding-rebranding

Module IV: Overview of Ecommerce **10 Hours**

Introduction to ecommerce- its concepts, features & functions- operation of ecommerce- infrastructure of ecommerce-application of ecommerce in direct marketing and selling- types of ecommerce; B2B, B2C,C2C,C2B- Electronic data interchange

Module V: Setting Up of Ecommerce Business **12 Hours**

Setting up of ecommerce business-web development-promotion of web sites-trust building, marketing & branding- introduction to electronic online transactions: management & control- product delivery settlement-ERP and its components.

SEMESTER V

SKILL COURSE -25

VFPT5SI05B18 - INTERNSHIP

Credits: 1

Total Lecture Hours: 30

Course Outcomes:

CO1: Integrate academic and practical skills.

CO2: Develop problem solving skills in the industry.

CO3: Develop communication skills.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PS04 A	PSO5 E
CO1 C	2	2	3	3	3
CO2 C	2	2	3	3	3
CO2 C	2	2	1	3	2

SEMESTER VI

Course code	Course Title	Credits	Course Type
VFPT6S16B18	Unit Operations in Food Industry	5	Skill Course
VFPT6S17B18	Food Quality Assurance	3	Skill Course
VFPT6SPRB18	Project and Viva voce	10	Project
VFPT6G14B18	Emerging Technologies in food industry	4	General Course
VFPT6G15B18	Food service management	4	General Course
VFPT6G16B18	Personality Development	4	General Course

SEMESTER VI

SKILL COURSE -21

VFPT6S16B18- UNIT OPERATIONS IN FOOD INDUSTRY

Total Credits: 5

Total Lecture Hours: 75 (5 Hours/ Week)

Course Outcomes:

CO1: Employ the various modes and applications of heat transfer

CO2: Illustrate the working of evaporation equipment

CO3: Explain the different types of crystallizers and distillation equipments

CO4: Analyse the working of extraction and extrusion equipments

CO5: Discuss the mechanism of material handling and mechanical separation equipments

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 A	2	2	2	2	1
CO2 A	2	2	2	2	1
CO3 U	3	3	2	1	1
CO4 A	2	2	2	1	1
CO5 U	2	1	2	1	1

Syllabus Content

Module I: Heat Transfer in Food Processing **10 Hours**

Modes of heat transfer-conduction, convection and radiation- heat exchangers- plate heat exchanger-tubular heat-scraped surface heat exchanger.

Module II: Evaporation **15 Hours**

Basic principle, need for evaporation, single effect, multiple effect, heat economy, type of evaporator-long tube, short tube, agitated film evaporator.

Module III: Distillation and crystallization **15 Hours**

Simple distillation, flash distillation, steam distillation, fractional distillation Crystallisation -theory, tank crystallizer and scraped surface crystallizer.

Module IV: Extraction and extrusion **15 Hours**

Solid Liquid extraction-leaching, Liquid-Liquid extraction, Super critical fluid extraction, single screw extruder, twin screw extruder

Module V: Mechanical separation and material handling **15 Hours**

Sedimentation, Centrifugal separation, filtration, Mixing, Material handling-Belt conveyor, Screw Conveyor, bucket elevator and pneumatic conveyor

SEMESTER VI

SKILL COURSE - 22

VFPT6S17B18 - FOOD QUALITY ASSURANCE

Total Credits: 4

Total Lecture Hours: 60 (4 Hours/ Week)

Course Outcomes:

CO1: Explain the principles and framework of food safety.

CO2: Summarize food laws and regulations governing the quality of foods.

CO3: Employ preventive measures and control methods to minimize microbiological hazards and maintain quality of foods.

CO4: Explain the wide variety of parameters affecting food quality.

CO5: Discuss Intellectual property rights.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 U	3	2	2	1	1
CO2 U	3	2	1	1	1
CO3 A	1	1	3	2	1
CO4 U	3	2	2	1	1
CO5 U	3	2	1	1	1

Syllabus Content

Module I: Concept of quality **6 hours**

Quality attributes- physical, chemical, nutritional, microbial, and sensory; their measurement and evaluation; Sensory *vis-àvis* instrumental methods for testing quality.

Module II: **Concepts of quality management** **12 Hours**

Objectives, importance and functions of quality control, Quality management systems in India, Sampling procedures and plans, Food Safety and Standards Act, 2006, Domestic regulations, Global Food safety Initiative, Various organizations dealing with inspection, traceability and authentication, certification and quality assurance - PFA, FPO, MMPO, MPO, AGMARK, BIS; Labeling issues, International food standards.

Module III: HACCP system **7 Hours**

Hazard analysis Critical Control Point: Definition, principles, Guidelines for the application of HACCP system.

Module IV: Food Quality Laws and Regulations **12 Hours**

Quality assurance, Total Quality Management, GMP/GHP, GLP, GAP, Sanitary and hygienic practices, HACCP, Quality manuals, documentation and audits; Indian & International quality systems and standards like ISO and Food Codex, Export import policy, export documentation, Laboratory quality procedures and assessment of laboratory performance, Applications in different food industries, Food adulteration and food safety.

Module V: Intellectual Property Rights **8 Hours**

IPR – Introduction, History in India, Laws related to IPR, Copyright, patent, trademark, designs, geographical indications of food, World Intellectual Property Organization (WIPO), Commercialization of Intellectual Property Rights (IPR), important websites.

SEMESTER VI

GENERAL COURSE - 14

VFPT6G14B18 - EMERGING TECHNOLOGIES IN FOOD INDUSTRY

Total Credits: 4

Total Lecture Hours: 60 (4 Hours/ Week)

Course Outcomes

CO1: Discuss about emerging / alternative technologies applied to food processing.

CO2: Relate Quality in existing Food technologies.

CO3: Discuss economics and commercialization of newer technologies.

CO4: Illustrate working principle of minimal processing.

CO5: Evaluvate nanotechnology and antimicrobial technologies.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 U	3	3	1	1	3
CO2 A	1	1	3	3	1
CO3 U	3	3	1	1	1
CO4 A	1	1	3	3	2
CO5 E	1	1	1	1	3

Syllabus Content

Module I: Membrane separation process **10 Hours**

Membrane Technology-process- Micro-filtration, Ultra-filtration, Nano-filtration and Reverse Osmosis-adva- ntages-equipment.

Module II: High pressure processing and microwave heating 15 Hours

Microwave heating of foods- Mechanism of Heat Generation-Working of microwave oven,High Pressure processing: Concept-Equipment for HPP Treatment-Mechanism of Microbial Inactivation and its Application in Food , dielectric heating of foods

Module III: Irradiation and PEF and ohmic heating 15 hours

Pulsed electric field – equipment –mechanism of PEF-advantages, Ohmic heating of foods- mechanism-principle-advantages, applications. Irradiation- principle- types of irradiation-advantages-applications

Module IV: Osmotic dehydration of foods and minimal processing 10 hours

Principle – Mechanism of osmotic dehydration – Effect of process parameters on mass transfer – Methods to increase the rate of mass transfer – Applications – Limitations of osmotic dehydration – Management of osmotic solutions. Minimal proceesing-principle- methods- advantages

Module V: Nanotechnology and antimicrobial technology 10 hours

Role of Antimicrobial agents in food –Plant and animal derived antimicrobials – Antimicrobial enzymes, antimicrobial food packaging, nanotechnology-application of nanotechnology in food industry.

SEMESTER VI

GENERAL COURSE - 15

VFPT6G15B18– FOOD SERVICE MANAGEMENT

Total Credits: 4

Total Lecture Hours: 60 (4 Hours/ Week)

Course Outcomes

CO1: Summarize the characteristics of various food service establishments.

CO2: Examine the functioning of food service establishments.

CO3: Focus the different types of food service and delivery systems.

CO4: Evaluate the process involved and management of an organization.

CO5: Prepare the financial transactions of an organization.

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 U	3	3	2	3	2
CO2 A	2	2	3	3	2
CO3 A	2	3	1	3	2
CO4 E	2	2	2	1	3
CO5 A	1	2	3	3	2

Syllabus Content

Module I: Introduction to Food Service Establishments **8 Hours**

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

Module II: **Menu Planning and table setting** **14 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.

Module III: Food Service and Delivery system **15 Hours**

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.

Module IV: Food Service Management **15 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.

Module V: Accounting **8 Hours**

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

SEMESTER VI

GENERAL COURSE – 16

VFPT6G16B18– PERSONALITY DEVELOPMENT

Total Credits: 4

Total Lecture Hours: 60 (4 Hours/ Week)

Course Outcomes

CO1: Recognize the various leadership styles and its application

CO2: Execute the strategies to improve interpersonal relations

CO3: Examine the stressors and ways to manage stress as well as conflicts in organizational context

CO4: Recognize the importance of time management

CO5: Discuss the process of motivation through different theories

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 U	3	2	1	1	1
CO2 A	1	1	3	2	1
CO3 A	1	1	3	2	1
CO4 U	3	2	1	1	1
CO5 U	3	1	1	2	1

Syllabus Content

Module I: Leadership **12 Hours**

Introduction to Leadership, Leadership Power, Leadership Styles, Leadership in administration

Module II: Interpersonal Relations **12 Hours**

Introduction to Interpersonal Relations, Analysis of different ego states, Analysis of Transactions, Analysis of Strokes, Analysis of Life position

Module III: Stress and Conflict Management **12 Hours**

Introduction to Stress, Causes of Stress, Impact Stress, Managing Stress. Conflict: Introduction to Conflict, Causes of Conflict

Module IV: Time Management **12 Hours**

Time as a Resource, Identify Important Time Management Wasters, Individual Time Management Styles, Techniques for better Time Management.

Module V: Motivation **12 Hours**

Introduction to Motivation, Relevance and types of Motivation, Motivating the subordinates, Analysis of Motivation.

SEMESTER VI

PROJECT

VFPT6SPRB18 - PROJECT AND VIVA VOCE

Total Credits: 10

Total Lecture Hours: 60 (8 Hours/ Week)

Course Outcomes

CO1: Articulate the ability to develop and analyse an innovative food product

CO2: Execute the strategies to improve the skill on product development and handling of equipments

CO3: Examine the ways to manage and control the food cost

CO4: Practice of time management and methods of market analysis of a product

CO5: Invention of novel process and design applicable to the food industry

Mapping of Course Outcomes with Program Specific Outcomes

Mapping	PSO1 U	PSO2 U	PSO3 A	PSO4 A	PSO5 E
CO1 A	3	3	3	3	3
CO2 A	3	3	2	2	2
CO3 An	3	3	2	3	2
CO4 A	2	2	2	3	2
CO5 C	3	3	3	1	2