
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: Summarize 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	PSO1 U	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.
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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 Unsundered 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- glyceic 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, rehearsing 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 Outcomes:

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

CO5: 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 Outcomes:

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:

CO1: Explain the changes caused by microorganisms in food.

CO2: Identify the different microorganisms and their characteristics.

CO3: Describe the methods to control microbial growth.

CO4: Analyse the spoilage of various food products.

CO5: 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:

Module I: 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 Mouton - 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 oil extraction process

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
Hours

10

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: Evaluating the different methods and technology for manufacturing alcoholic beverages and testing 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
Hours

15

B. Voc Food Processing Technology

St. Teresa's College (Autonomous), Ernakulam

Semester IV

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: Correlating 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: Analysing location theories and models utilized for choosing plant location.

CO3: Discuss the various classical types of plant layouts

CO4: Designing a suitable plant and building materials for construction.

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: Analysing the waste utilization of agro industries

CO5: Analyse 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	3
CO4 A	1	2	1	1	3
CO5 A	1	2	1	1	3

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: Discussing the components of marketing mix

CO4: Analysing 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.	