

**Kavayitri Bahinabai Chaudhari  
North Maharashtra University, Jalgaon**



**'A' Grade**

**NAAC Re-Accredited**

**(3<sup>rd</sup> Cycle)**

**Faculty of Science**

**Syllabus**

**F.Y.B.Voc.**

**Food Processing and Technology**

**W.E.F. June 2018**

# Bachelor of Vocation (Food Processing and Technology) Course Structure

(W.E.F. June 2018)

Year	Name of the course	NSQF Level Certificate	Cumulative Credits
F.Y. B. Voc.	Diploma	Level-V	60 Credits
S.Y. B. Voc.	Advanced Diploma	Level-VI	120 Credits
T.Y. B. Voc.	B Voc Degree	Level-VII	180 Credits

<b>Eligibility for Level V</b>	
Eligibility:	10+2 in any stream or equivalent
Pattern:	Semester
Medium of Instruction:	English

- Duration of Period: 45 Lectures of 60 minutes or 60 Lectures of 45 min.
- Theory and Practical examination will be conducted at the end of every semester
- Each theory and practical course will be of 100 marks (40% marks -internal examination and 60% marks –external examination )
- Medium of instruction: The medium of instruction for the course shall be English.

## F. Y. B. Voc. (Food Processing and Technology) Level V

(w. e. f. June 2018)

### Semester I

#### General Education Component

Paper No	Paper Code	Title of Paper	Mode	Credits	Marks
1	FPT-101	Communication Skill I	Theory	3	100
2	FPT-102	Computer Application I	Theory	3	100
3	FPT-103	Practical Course on Communication Skill I	Practical	3	100
4	FPT-104	Practical Course on Computer Application I	Practical	3	100

#### Skill Development Component

Paper No	Paper Code	Title of Paper	Mode	Credits	Marks
5	FPT-105	Bakery and Confectionery Technology	Theory	3	100
6	FPT-106	Food Microbiology	Theory	3	100
7	FPT-107	Food Chemistry	Theory	3	100
8	FPT-108	Practical Course on Bakery and Confectionery Technology	Practical	3	100
9	FPT-109	Practical Course on Food Microbiology	Practical	3	100
10	FPT-110	Practical Course on Food Chemistry	Practical	3	100
<b>Total</b>				<b>30</b>	<b>1000</b>

### Semester II

#### General Education Component

Paper No	Paper Code	Title of Paper	Mode	Credits	Marks
1	FPT-201	Communication Skill II	Theory	3	100
2	FPT-202	Computer Application II	Theory	3	100
3	FPT-203	Practical Course on Communication Skill II	Practical	3	100
4	FPT-204	Practical Course on Computer Application II	Practical	3	100

#### Skill Development Component

Paper No	Paper Code	Title of Paper	Mode	Credits	Marks
5	FPT-205	Dairy Technology	Theory	3	100
6	FPT-206	Introduction to Food Processing	Theory	3	100
7	FPT-207	Food Processing Equipments	Theory	3	100
8	FPT-208	Practical Course on Dairy Technology	Practical	3	100
9	FPT-209	Practical Course on Introduction to Food Processing	Practical	3	100
10	FPT-210	Practical Course on Food Processing Equipments	Practical	3	100
<b>Total</b>				<b>30</b>	<b>1000</b>

# **SEMESTER I**

## **FPT – 101 : Communication Skills I**

### **Objectives -**

- 1.To Understand the Concept Process, Importance and Objectives of Communication
- 2.To Know the Principles Of Effective Communication.
- 3.To acquire Communication Skills.
- 4.To Study Various Types Of Business Letters.
- 5.To Develop Skills To Draft Letters.
- 6.To Acquaint with Modern Technology In Communication.

### **Unit 1.**

**( Lectures 9 )**

Meaning , Definition & Scope of Communication

Types of Communication

Importance of Communication

Process of Communication

### **Unit 2**

**( Lectures 9 )**

Importance of Effective Communication

Benefits of Effective Communication

7c of Effective Communication

Better public speaking

### **Unit 3**

**( Lectures 9 )**

Writing Skills

Reading Skills

Speaking Skills

Listening Skills

**Unit 4****( Lectures 9 )**

Presentation Skills

Planning Skills

Documentation Skills

Process of preparing Effective business Messages

**Unit 5****( Lectures 9 )**

Job Application Process

File Arrangement Skills

Resume Writing Skills

Improving Oral Presentation/Communication

**References :**

1. Bovee, Courtland, John Thill & Mukesh Chaturvedi. Business Communication Today : Dorling kindersley, Delhi
2. Kaul, Asha: Business Communication: Prentice-Hall of India, Delhi
3. Monippally, Matthukutty M. Business Communication Strategies. Tata McGraw -Hill Publishing Company Ltd., New Delhi
4. Sharma, Sangeeta and Binod Mishra. Communication Skills for Engineers and Scientists: PHI Learning Pvt. Ltd., New Delhi.
4. Basics of Business Communication – Lesikar & Fl atley, Tata McGraw Hills
6. Business Communication – Sushmita Day & Others, Reliable Publications, Mumbai
7. Business Communication – N.Gupta, P.Mahajan, Sa hitya Bhavan Publication, Agra.
8. Business Communication – U.S.Rai, S.M.Rai, Hima laya Publishing House, Mumbai.

# FPT-102: Computer Application I

## Objective:

- To familiarize the Students with basics of Internet.
- To understand the use of Office application.
- To know the role of word processor, Spread sheet, presentation in industry .

## UNIT I – A. Computer Basics

(7 Lectures)

1. Overview of computers
2. Uses of computer
3. Input and Output Devices
4. Understanding Input, Process and Output
5. Computer Hardware and Software
6. Advantages and disadvantages

## UNIT II -- Operating System

(7 Lectures)

1. Overview of Operating System
2. Basic Operations
  - a. How to start a computer
  - b. How to logoff and hibernate a laptop
  - c. How to connect a headset to computer
  - d. Learn to interact with computers
3. Personalizing Desktop
  - a. Changing the Desktop Background

## UNIT III – Microsoft Office 2013 –Word Part I

(7 Lectures)

- 1: Introduction to Microsoft Word 2013
- 2: Working with Documents and the Keyboard
- 3: Navigating Through a Word Document
- 4: Basic Text Editing
- 5: Text Formatting
- 6: Paragraph Formatting
- 7: More Ways to Format Text and Paragraphs
- 8: Style Formatting
- 9: Page Formatting
- 10: Templates

**UNIT IV – Microsoft Office 2013 –Word Part II**

**(8 Lectures)**

- |                                       |   |
|---------------------------------------|---|
| 1: Working With Graphics and Pictures | 2: Tables                                       |
| 3: Desktop Publishing                 | 4: Long Documents                               |
| 5: Technical Documents                | 6: Mail Merge                                   |
| 7: Proofing, Printing, and Publishing | 8: Comparing, Merging, and Protecting Documents |
| 9: Customizing and Expanding Word     |   |

**UNIT V - Microsoft Office 2013 – Power Point Part I**

**(8 Lectures)**

- |   |   |
|---|---|
| 1: Introduction to Microsoft Word 2013    | 2: The Basics of Creating Presentations |
| 3: Applying Themes and Layouts to Slides  | 4: Working with Objects                 |
| 5: Entering, Editing, and Formatting Text | 6: Working in Outline View              |
| 7: Proofing Presentations                 | 8: Notes                                |

**UNIT VI - Microsoft Office 2013 – Power Point Part II**

**(8 Lectures)**

- |   |                                      |
|---|--------------------------------------|
| 9: Inserting Pictures, Graphics, Shapes, and Other Things |                                      |
| 10: Inserting Tables into Presentations                   | 11: Charts and Smart Art             |
| 12: Adding Sound and Video                                | 13: Adding Transitions and Animation |
| 14: Master Slides   | 15: Printing and Running Slide Shows |
| 16: Saving, Sharing, and Exporting Presentations          |                                      |

**Books for Reference**

1. Step by Step Microsoft Word 2010
2. Step by Step Microsoft Excel 2010
3. Step by Step Microsoft PowerPoint 2010

## **FPT-103: Practicals on Communication Skills I**

### **List of Practicals:**

1. Presentation skills
2. Listening skills
3. Preparing File and Documentation
4. Preparation of Effective business messages
5. Resume writing skills
6. Telephonic Conversation
7. Non verbal communication
8. Group Discussion on burning issues
9. Debating Competition on burning issues
10. Elocution Competition on burning issues
11. News Room Communication
12. Power point presentation
13. Quotation writing skills
14. Interpersonal communication on particular topic
15. Personal Interview techniques
16. Group Interview
17. Walk in Interview
18. Corporate meeting-Vertical and horizontal communication
19. Function wise communication process
20. Use of Informal communication



## **FPT-104: Practicals on Computer Application I**

### **Objective:**

- To familiarize the Students with basics of Internet.
- To understand the use of Office application.
- To know the role of word processor, Spread sheet, presentation in industry .

### **List of the practicals:**

1. Write 10 lines or 10 sentences and then change the font, style, color and size of each sentence. Make each one different than previous and next.
2. Decorate word document with page border, content border, add pattern and write beautiful text in it.
3. Create Table in word and format it (e.g. Time Table, Mark sheet etc.).
4. Design Happy Birthday Message by using Word Art and print it.
5. Get the newspaper and see the text based advertisement and Design that advertisement in Microsoft Word.
6. Insert Images and Practice on Format Menu and Image options.
7. Perform Mail Merge in word.
8. Create a slide show in power point (use at least 5 slides)
9. Create a slide show, make use of Images, sound and hyperlinks.
10. . Applying the animations to slide by using presentation program
11. Creation of Personal resume for Job purpose
12. Writing official letters in Microsoft word
13. Draw pie chart in Microsoft word
14. Draw bar chart in Microsoft word
15. Connoting of wireless devices to computer  
(Blue tooth, Wi-Fi, wireless head set, wireless speakers projector)

### **Books for Reference**

1. Step by Step Microsoft Word 2010
2. Step by Step Microsoft Excel 2010
3. Step by Step Microsoft PowerPoint 2010

## FPT-105: Bakery and Confectionery Technology

### Course Overview

- To highlight the processing methods used in baking and confectionery industries.
- To know about the various types of food products made using baking technology.
- To have a basic idea about baking and confectionery manufacture and quality control.
- To know about the importance of each ingredient in the bakery and how it effects the overall product and its sensory and quality parameters.
- To be able to start a small scale bakery and confectionery unit

### Syllabus Content

**Unit I: Manufacture of Sugar** 5 Hours

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

**Unit II: Classification of confectionery** 10 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.

**Unit III: Properties of wheat** 10 Hours

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

**Unit IV: Principles of baking and Bread manufacturing** 15 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.

**Unit V: Cake and Biscuit manufacturing** 5 Hours

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

### Learning Resources Reference books:

1. Zhou. W, Hui Y,H; (2014), "Bakery Products Science and Technology", 2nd Edition, Wiley Blackwell Publishers,
2. Pyle, E. J. and Gorton, L.A.(2009), "Baking Science & Technology" Vol.1 Fourth Edition,Sosland Publications.
3. Stanley P. Cauvain, Linda S. Young, (2008), "Baked Products: Science Technology and Practice". John Wiley & Sons Publishers

# FPT-106 Food Microbiology

## Course Content (45 Lectures)

Objective: To make students understand the food and industrial microbiology and to make them aware about the importance of food quality control by avoiding pathogenic microbial attack.

### Course Overview

- Recognize and describe the characteristics of important pathogens and spoilage microorganisms in foods.
- Understand the role and significance of intrinsic and extrinsic factors on growth and response of microorganisms in foods.
- Identify ways to control microorganisms in foods.
- Describe the beneficial role of microorganisms

**UNIT I:** Characteristics of microorganisms 15 Hours

Classification of microorganisms, nomenclature, morphology – yeast and moulds, bacterial cells, viruses., microbial growth characteristics – Microbial reproduction, Contamination during handling and processing and its control; indicator organisms.

**UNIT II:** Introduction to food microbiology 15 Hours

Discovery, current status, role of food microbiology, sources of micro organisms 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.

**UNIT III:** Spoilage in different food groups 8Hours

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

**UNIT IV:** Beneficial uses of microorganisms 07 Hours

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

## References

1. Ray , Bibek; Arun Bhunia,(2013), “Fundamental Food Microbiology”, CRC Press.
2. Adams ,Martin R, Maurice O Moss, Peter McClure (2015), “Food Microbiology”, Royal Society of Chemistry, Cambridge.
3. Jay, James M.(2012), “Modern Food Microbiology”, Springer Science & Business Media., Maryland.

# FPT-107 Food Chemistry

## Course Content (45 Lectures)

Objective: To explain the chemical composition and functional properties of food.

### Course Overview

- To study about the major and minor components of food and their properties
- To know about the changes that occurs in foods during processing.
- To study the classification, structure and chemistry of the various food components.
- To understand the changes that occurs in the different constituents during storage and ways and means to prevent it.

### Unit I: Water

10 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.

### Unit II: Carbohydrates

10 Hours

Nomenclature, composition, sources, structure, functions, classification - monosaccharide, disaccharides, oligosaccharides and polysaccharides. Properties of Starch – gelatinisation, gel formation, dextrinisation, retrogradation,

### Unit III: Proteins

10 Hours

Nomenclature, sources, structure, functions, classification and chemical properties of proteins.

Enzymes - Specificity, mechanism of enzyme action, factors influencing enzymatic activity, , enzymes added to food during processing, enzymatic browning.

### Unit IV: Fats and oils

8Hours

Nomenclature, composition, sources, structure, functions, classification, essential fatty acids. Physical and chemical properties - hydrolysis, hydrogenation, rancidity and flavor reversion.

### Unit V: Pigments, colours and flavours in food

7Hours

Micro nutrients: Vitamins and minerals, Pigments indigenous to food, structure, chemical and physical properties, , flavours- vegetable, fruit and spice flavours, flavours of milk and meat products.

### Reference Books:

1. Yildiz, Fatih (2009), "Advances in Food Biochemistry", CRC Press, New York.
2. Damodaran,S., Parkin , K L.,Fennema, O R., (2008), "Fennema's Food Chemistry"- 4th edition, CRC press, New York
3. Campbell, M K and Farrell, S O (2006), "Biochemistry", 5th edition, Cengage LearningPublishers, USA.
4. Manay, N.S. Shadaksharaswamy, M. (2004), "Foods- Facts and Principles", New age international publishers, New Delhi.
5. Meyer, L.H. (2002), "Food Chemistry". CBS publishers and Distributors, New Delhi.

## **FPT-108 Practical Course on Bakery and Confectionery Technology**

### **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

## **FPT-109 Practical Course on Food Microbiology**

### **Syllabus Content**

1. Use and Care of Compound Microscope with functions of each part
2. Preparation of culture media.
3. To sterilize the media and equipment.
4. To prepare serial dilutions.
5. Plating techniques(Streak Plate Technique)
6. Plating techniques(Spread Plate Technique)
7. Culturing the bacteria on a solid media by using serial dilution method and determining the number of viable cells in the culture (standard plate count).
8. Introduction to microscopy and to study cell morphology with simple staining.
9. To study cell morphology and cell arrangement with negative stain.
10. Study of Gram characteristics of bacteria using Gram's staining

## **FPT-110 Practical Course on Food Chemistry**

### **Syllabus Content**

1. Use of hand glove, Use of pipette aid, Preparation of standard solutions and buffers, Dilution approaches
2. Determination of acidity of the given sample of water.
3. Determination of alkalinity of the given sample of water.
4. Determination of the total hardness of Water.
5. Determination of pH of the given sample of Water.
6. Determination of Conductivity of the given sample of Water.
7. Quantitative analysis reducing sugar by DNSA method
8. Quantitative analysis of total carbohydrate by Phenol sulphuric acid method
9. Quantitative analysis of protein by Folin-Ciocalteu method
10. Determination of Iodine number and acid number of lipid sample

### **Reference Books:**

1. Parija, S.C. (2005) Text Book of Practical Microbiology, 1st edition, Ahuja Publishing House, New Delhi.
2. Harley, J. P. and Prescott, L. M. (2002) Laboratory Exercises in Microbiology, 5th edition, The McGraw-Hill Companies, London.
3. Benson, H. (2001) Microbiological Applications Lab Manual, 8th edition, The McGraw-Hill Companies, New Delhi
4. Aneja, K.R. (1996) Experiments in Microbiology, 3rd edition, Wishwa Prakashan, New Delhi
5. Plummer, D.T. (2001) An Introduction to Practical Biochemistry, 3rd edn., McGraw Hill Ltd. New Delhi
6. Sawhey, S.K. and Singh, R. (2002) Introductory Practical Biochemistry, Narosa Publication House, New Delhi.
7. Jayramann, J. (2008) Laboratory Manual in Biochemistry, New Age International, New Delhi.

# **SEMESTER II**

## **FPT – 201 : Communication Skills II**

### **Objectives -**

- 1.To Understand the Concept Process, Importance and Objectives of Communication
- 2.To Know the Principles Of Effective Communication.
- 3.To acquire Communication Skills.
- 4.To Study Various Types Of Business Letters.
- 5.To Develop Skills To Draft Letters.
- 6.To Acquaint with Modern Technology In Communication.

### **Unit 1.**

**( Lectures 9 )**

Project Proposals

Referencing

Writing for media

Social media and its effects

### **Unit 2**

**( Lectures 9 )**

Introduction and importance of business correspondence

Parts of business letters

Format- Complete Block and Modified Block

Principles of business correspondence

### **Unit 3**

**( Lectures 9 )**

Business letters

Presentation and Group discussion skills

Interview Techniques

Participation in Meetings

**Unit 4****( Lectures 9 )**

The Role of technology in communication

Blogging and Emailing

Video Conferencing

Technical writing

**Unit 5****( Lectures 9 )**

Grammar – Introduction , common errors

Concord (subject –verb agreement)

Lexicon

Synonyms, Antonyms and One word substitution

**References :**

1. Bovee, Courtland, John Thill & Mukesh Chaturvedi. Business Communication Today  
: Dorling kindersley, Delhi
2. Kaul, Asha: Business Communication: Prentice-Hall of India, Delhi
3. Monippally, Matthukutty M. Business Communication Strategies. Tata McGraw  
-Hill Publishing Company Ltd., New Delhi
4. Sharma, Sangeeta and Binod Mishra. Communication Skills for Engineers and Scientists: PHI  
Learning Pvt. Ltd., New Delhi.
4. Basics of Business Communication – Lesikar & Fl atley, Tata McGraw Hills
6. Business Communication – Sushmita Day & Others, Reliable Publications, Mumbai
7. Business Communication – N.Gupta, P.Mahajan, Sa hitya Bhavan Publication, Agra.
8. Business Communication – U.S.Rai, S.M.Rai, Hima laya Publishing House, Mumbai.



## **FPT-202: Computer Application II**

### **UNIT I - Concepts of network**

**[12 lectures]**

- 1) What is Computer Network?
- 2) Types of Networks (with Features and Application): LAN, WAN, MAN Wired Network, Wireless Network, MANET, Internet
- 3) Study of Web Browsers
- 4) Search Engines
- 5) E-mail – drafting, saving & sending email (with attachment)

### **UNIT II – Computer virus**

**[11 lectures]**

- 1) Computer virus : Indication of computer virus
- 2) Types of viruses : Boot sector virus , program virus, macro virus, worms, multipartite virus  
Polymorphic virus, malware: spyware, adware, Antivirus
- 3) Computer Ethics: spamming, Phishing, Hacking, software piracy

### **UNIT III – Microsoft Excel Part I Basic**

**[11 lectures]**

- 1) Basic text and cell formatting
- 2) Basic arithmetic calculation
- 3) Creating tables, adding and editing records in table
- 4) Conditional formatting
- 5) Importing data and text to columns

### **Unit IV - Microsoft Excel Part II**

**[11 lectures]**

Advanced Excel capabilities

- 1) Data Analysis tools and Techniques:, Advanced Filter Command, IF Condition Command
- 2) Sorting table data
- 3) Functions i) Mathematical ii) String iii) IF, AND, OR iii) searching: match, search
- 4) Pivot tables
- 5) Recording and editing Macros
- 6) Creating charts and graphs in excel

### **Reference Books:**

- 1) Problem Solving Cases in Microsoft Access and Excel (English) 9th Edition by Gerard S. Cook, Joseph Brady, Ellen Monk, Course Technology
- 2) Learning MS-PowerPoint & MS-Access by RohitKhurana, APH Problem Solving Cases in Microsoft Access and Excel (English) 9th Edition by Gerard S. Cook, Joseph Brady, Ellen Monk, Course Technology

## **FPT-203: Practicals on Communication Skills II**

### **List of the practicals:**

- 1.Preparing project reports
- 2.Discussion on Cyber crime
- 3.Group discussion on the uses of social media
- 4.Presentation on the role of Print and electronic media.
- 5.Prepare a matter of news event
6. Practical on blog writing
- 7.Preparing an E-mail
- 8.Discussion on importance of meeting
- 9.Practical on Book reviews
- 10.Presentation on various technical devices of communication
- 11.Preparing a complaint letter
- 12.Word play (Synonyms-antonyms)
- 13 Technical Descriptions
- 14.Effective manual writing
- 15.Presentation on useful techniques of meeting
- 16.Confidential discussion
- 17.Preparation of various business letters
- 18.Various plays on Effective communication
- 19.Mock Interview II
- 20.Power point presentation on burning is

## FPT-204: Practicals on Computer Application II

### List of Practicals :

1. Create your email account; send mail to your friend.
2. Sending mail to more than one person.
3. Send and receive files from mail. (mail with attachment)
4. Create a table in excel and format it.
5. Create table and apply sum, average, max and min on this table.
6. Create table and sort data in ascending and descending order.
7. Draw a bar chart for given data.
8. Draw pie chart for given data.
9. Create table , Insert data and apply conditional formatting.
10. Practical on Connecting networks in LAN
11. Practicals on Different web browsers
12. Preparing mark sheets in Microsoft excel
13. Preparing Pivot tables for given data.
14. Settings for printing of documents in excel.
15. Preparation of Balance sheet in excel.

## FPT-205 Dairy Technology

### Course Overview

- To understand about the products that can be made from milk.
- To understand the processing and storage of dairy products.
- To know about the quality control measures applied in dairy industries.
- To have a basic idea about their processing and products which can be made at a small scale

### Syllabus Content

#### **Unit I:** Introduction

10 Hours

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

#### **Unit II:** Processing of market milk

15 Hours

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

**Unit III: Special milks**

10 Hours

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

**Unit IV: Indigenous and Fermented milk products**

10 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.

References

1. Joshi.V.K., (2015), "Indigenous Fermented Foods of South Asia", CRC Press.
2. Alan H. Varnam, (2012), "Milk and Milk Products: Technology, chemistry and microbiology", Springer Science & Business Media Publishers.
3. Robinson, R. K., (2012), "Modern Dairy Technology: Volume 2 Advances in Milk Products", Springer Science & Business Media Publishers.

## **FPT-206: Introduction to Food Processing**

Objective: To acquaint with principles of different techniques used in processing and preservation of foods.

**UNIT I**

5 lectures

Introduction: Definition and scope of Food Science and Technology, Sources of food, scope and benefit of industrial food preservation, perishable, non perishable food, causes of food spoilage.

**UNIT II**

15 lectures

Thermal processing methods of preservation: Principle: Canning, blanching, pasteurization, sterilization, evaporation. Use of low temperature: Principle and effect on quality. Chilling, cold storage, freezing. Preservation by drying dehydration and concentration: Principle, Methods and effect on quality. Preservation by radiation: Definition, Methods of Irradiation, Direct & Indirect effect, measurement of radiation dose, dose distribution, effect on microorganisms.

**UNIT III**

5 lectures

Presentation of foods by Preservatives: chemicals, antioxidants, mould inhibitors, antibodies, acidulates etc.

Preservation by salt & sugar: Principle, Method and effect on food quality.

**UNIT IV**

5 lectures

Preservation by fermentation: Definition, Advantages, disadvantages.

**UNIT V**

15 lectures

Recent methods in preservation: Pulsed electric field processing, High pressure processing, processing using ultrasound, dielectric, ohmic and infrared heating.

**Reference Books**

1. Food Science by B. Srilakshmi, publishing, New Age International (P) ltd. publications.
2. Food Science by N.N. Potter, CBS publishing.
3. Food Science by S. Manay, New Age International (P) Ltd. Publications
4. Food microbiology by V. Ramesh, MJP publishing.
5. Food microbiology by W.C. Frazier, 1st Edition by McGraw Hill Pub. Co. New York.
6. Modern Food Microbiology, J.M. Jay. CBS publisher.
7. Food Processing Technology by P.J.Fellows, Woodhead publishing Ltd.
8. Food Science by N.N. Potter, CBS publishing.
9. Physical principles of Food Preservation. Vol. II by M. Karel, O.R. Fenema and D.B. Lurd, Maroel, Dekker Inc. New York.

**FPT-207: Food Processing Equipments****Objective**

Plan and carry out a course of action demonstrating the ability to manage time, money, energy/effort, energy/fuel, ingredients and equipment, according to a given situation

**UNIT I**

5 lectures

Principle considerations of agricultural and food Processing Equipments.

**UNIT II**

10 lectures

Food Processing equipments: Types and Principle of dryers. Types of heat exchanger, Principle of heat Exchangers and Evaporators, pasteurizer, Blancher, Retorts and boilers. Low Temperature processing equipment: Refrigeration system and freezer.

**UNIT III**

10 lectures

Material handling equipments like belt conveyor, screw conveyor, bucket elevator and pneumatic conveyors.

**UNIT IV**

10 lectures

Mechanical separation: filtration, sieving, centrifugation sedimentation;

**UNIT V**

10 lectures

Equipments for size reduction, Mixing, and Extrusion etc.

## Reference Books

1. S. K. Sharma, S.J. Mulvaney, and S.S.H. Rizvi, Food Process Engineering: Theory and Laboratory Experiments, Wiley and Sons, 2000
2. H. Pandey, H.K. Sharma, R.C. Chouhan, B.C. Sarkar and M.C. Bera, Experiments in Food Process Engineering, CBS Publishers and Distributors, 2004
3. M.A. Rao, S.S. H. Rizvi and A.K. Dutta, Engineering properties of Foods, 3rd ed., Marcel Dekker, 2005.

## FPT-208 Practical Course on Dairy Technology

- To gain knowledge about preparation of some dairy products
- To perform chemical analysis of milk sample
- To understand different processing equipment in dairy plant

### Syllabus Content

1. Determination of Activity (Titrable Acidity) of Milk.
2. Determination of fat and SNF content in milk.
3. Determination of specific gravity of milk.
4. Detection of Addition of Starch in Milk.
5. Preparation of Lassi.
6. Preparation of khoa.
7. Preparation of Basundi.
8. Preparation of chakka and shrikand.
9. Preparation of kalakand.
10. Preparation of cooking butter.
11. Preparation of ghee.
12. Preparation of flavoured milk.
13. Visit to milk product development centre.

## **FPT-209 Practical Course on Introduction to Food Processing**

1. To study the effect of enzymatic browning in fruits and vegetables.
2. To study different types of blanching of fruits and vegetables.
3. Preservation of food by high concentration of sugar i.e. jam. or salt/acid i.e. pickle.
4. Preservation of food by drying in a cabinet drier.
5. Preservation of fruits & vegetables by freezing.
6. Preservation of milk by pasteurization and sterilization.
7. To study the gelatinization temperature range and % sag of various cereal starches.
8. To study the factors affecting gelatinization of cereal starches.
9. To study fermentation in cereals and pulses.
10. To detect the adulteration in fats and oils by qualitative tests.
11. To detect the presence of adulterants in milk.

## **FPT-210 Practical Course on Food Processing Equipments**

1. Study of dryers, and its efficiency
2. To study elevating and conveying equipment's,
3. Sieve analysis and determination of its efficiency.
4. To study extrusion technology and pasta making.
5. Mixing index determination for solid mixing
6. Dehydration of fruits & Vegetables
7. Milling of rice with emphasis on quality and recovery.
8. Study of processed food samples available in market pasteurized milk, ketchup, squash, jelly, biscuit, soybean oil.
9. Visit to food processing plants