

CURRICULUM FOR SIX MONTH CERTIFICATE COURSE

FOR

COMMUNITY DEVELOPMENT THROUGH POLYTECHNIC SCHEME

IN

FOOD PROCESSING & PRESERVATION

UNDER DEVELOPMENT

Prepared By

CURRICULUM DEVELOPMENT CELL

**INSTITUTE OF RESEARCH, DEVELOPMENT TRAINING,U.P.,
KANPUR-208002**

SIX MONTH CERTIFICATE COURSE
IN
FOOD PROCESSING & PRESERVATION

Sl. No.	Module	Name of Module	Duration
1.	Module 1	Food Preservation	8 weeks
2.	Module 2	Bakery & Confectionary	8 weeks
3.	Module 3	Milk & Dairy Product	8 weeks

MAIN FEATURES OF THE CURRICULUM

1. Title of the Course : Certificate course in Food Processing & Preservation
2. Duration of the Course : Six Month
3. Type of the Course : Full Time Institutional
4. Entry Qualification : 10 + with Science II and Mathematics II

Module-1: Food Preservation

Theory:

1. **Importance of Food Preservation Technology:**
 - Importance of Food Preservation Technology
 - Common terms used in Food Processing
2. **Categorisation of food :**
 - Food groups on the basis of pH value, technology, physiology changed conditions
3. **Principles of food preservation :**
 - Principle of preservation , Different food Preservation techniques
4. **Drying/ Dehydration of fruits & vegetables:**
 - Principle of food drying/dehydration
 - General Process of fruit drying
 - General Process of vegetable drying
 - General methods of food drying dehydration, sun drying, mechanical drying etc.
 - Types of dryers
 - Quality characteristics of dried fruits and vegetables
 - Treatments prior to drying
6. **Pickles:**
 - Principle of pickle production
 - Theory of different types pickle production
 - Fermented, oil, vinegar pickles
7. **Ketchup, Sauce, and chutney:**
 - Different types of tomato products
 - Preparation of tomato products.
 - Principle and preparation methods of tomato ketchup, sauce, puree, paste, chutneys
8. **Canning fruits & vegetables:**
 - Canning process flow diagramme for fruits & vegetables
 - Pretratments.
 - Canning machinery
 - Knowledge of chemicals required
 - Canning of fruits & vegetables
9. **Jam, jelly and Marmalade:**
 - Principle of jam and jelly preparation
 - Flow diagram for preparation of jam and jellies.
 - Test of pectin for jam and jelly preparation
10. **Fruit preserves, glazed fruits, fruit bar and toffees:**
 - Principle and methods for production of glazed fruits, candy, fruit bar and toffees

- 11. Vinegar production:**
 - Principle of vinegar production.
 - Different types of vinegars.
 - Factors involving good quality vinegar.

- 12. Wastes:**
 - Wastes from fruits and vegetables.

- 13. Utilization from fruit and vegetables:**
 - Processing techniques for proper utilization of wastes from fruits and vegetables.

- 14. Quality Control:**
 - Quality factors in fruit and vegetable processing & preservation

- 15. Nutritional qualities and composition of fruits and vegetables:**
 - Analytical methods for evaluation of chemical and nutritional composition of fruits and vegetables

- 16. Storage and packaging:**
 - Need and importance of storage and packaging Methods
 - Storage techniques for fruits, vegetables and grains
 - Cold storage, refrigeration
 - Packaging materials used
 - Selection of appropriate packing method

Practicals:

1. Identification of different food products available in market
2. Categorise the food items based on properties
3. Principle of preservation
4. Different food Preservation techniques
5. Using dryers dry fruits & vegetables
6. Carry out treatment prior to drying Production of different types pickle e.g. fermented, oil, vinegar pickles from fruits and vegetables, mixed pickles
7. Preparation of tomato ketchup, sauce, puree, paste, chutneys
8. Operation of canning machinery
9. Canning operations
10. Canning of seasonal fruits & vegetables
11. Preparation of seasonal fruits
12. Preparation of different fruit jams like, mango, apple, pineapple, banana, amla, guava, papaya, mixed fruit etc
13. Preparation of jelly from fruits like, apple, guava, jackfruit etc.
14. Preparation of jam and jelly marmalades
15. Testing of pectin in fruits
16. Testing of end point in jam and jelly Preparation of glazed fruits, candy, fruit bar and toffees.
17. Preparation of synthetic vinegar
18. Preparation of fermented vinegar
19. Preparation of different fruit vinegar, flavoured vinegars
20. Preparation of products from wastes e.g. Vinegar from pineapple waste, pectin from citrus fruits wastes, vinegar and protein isolate mango kernel, starches
21. Tests for quality evaluation
22. Analysis of fruits and vegetables for their quality
23. Pack the given food products and seal

Sl. No.	Trainees Kit Item/ Specification	Quantity proposed for a batch of 16 trainees
1.	Hand operated moisture meter (to be shared)	04
2.	Litmus papers	16
3.	Product catalogue of different product	As required
4.	Hand sealing machine (to be shared)	04
5.	Bottle cap tightening machine (to be shared)	04
6.	Hand operated plastic packaging machine (to be shared)	04
7.	Food colour packets	As required
8.	Preservatives packets	As required
9.	Spring balance (to be shared)	04
10.	Fruit knife (to be shared)	08
11.	Spoons (different sizes)	16 sets
12.	Measuring glass (to be shared)	08
13.	Hand gloves	16
14.	Apron	16
15.	Cap	16
16.	Boots	16
17.	Hand bag big size	16

Sl. No.	Equipment, Machine & Tools Item/ Specification	Quantity proposed for a batch of 16 trainees
1.	Cabinet dryer (Electrical)	01
2.	SS trays	As required
3.	Lemon squeezer	06
4.	Bottle washer	02
5.	Crown corking machine (Hand operated/ pedal operated)	01
6.	Baby Fruit pulper	02
7.	Mixer-grinder/Food processors	04
8.	Water purifier	02
9.	Sulfuring chamber	01
10.	Blancher cum sterilizer	01
11.	Oven : 5 KW,	01
12.	Hand / table model refractometer : Abbes type, 0-32; 28-70. 58-90 of 0-100 (Bench type)	02
13.	Storage Bins of different capacity :	As required
14.	Electronic balance	01
15.	Electric oven : For moisture determination, 0-250 °C, digital display, 2'X2'X2'	02
16.	Moisture box : Aluminum, 100 g capacity cylindrical	02
17.	Vinegar generator :	01
18.	Fermenter :	01
19.	Vegetable slicing machine	01
20.	Automatic pouch machine/ filler sealer machine : including a batch coding, perforation and notching unit	01
21.	Pulping machine for fruits and vegetables	01
22.	Fruit mill Junior Model, 0.5 Ton/h with 1 hp motor.	01

23.	Gel meter .	01
24.	Auto clave : For Sterilization of cans,	01
25.	Vacuum pan	01
26.	Vernier Caliper : 15 cm. 0.01 mm LC	04
27.	Screw Gauge : Micrometer, 0.001 mm LC, 10 cm cap	04
28.	Steel Scale : 12 “ standard steel	04
29.	Steel tape : Scales 1 meter, and of 50 ft	04
30.	Weight box : For balances	01
31.	Cutting equipments : Different knives, Cutters for fruits / Vegetables	04 sets
32.	Sinks : standard size	02
33.	Hot plate : Electrical 2 KW	02
34.	Pickle Mixer : Rotatory type, Contact Parts of SS	02
35.	Heat sealing machine : Hand / pedal operated	01
36.	Tank SS : 50 liters capacity, cylindrical with cap	01
37.	Syrup tanks : 50, 100 lit capacity SS	01
38.	Pressure cooker : 5 Kg and 10 Kg SS	01 each
39.	Liquid filling machine : 200 ml, 500 ml, 1000 ml. Manual	01 each
40.	SS Filter : Sieve type cloth filter, hydraulic,	01
41.	Sugar coating pan : SS, Revolving type with speed control,	01
42.	Bottle opener : Heavy duty, Stainless Steel	04
43.	Burette : 50 ml digital Automatic/ ordinary glass	06
44.	Pipette : 5-50 ml capacities	06
45.	Lab glass wares : Different sizes and types	As required
46.	Working tables : Stainless Steel Size 6’ X 3’	01
47.	Improved stoves : Made of MS with proper safety Measures	02

48.	Stainless steel/ Aluminum pots : Different Capacities	As required
49.	Stainless steel knives : 12-15 cm blade	As required
50.	Spoons : Stainless steel, various shapes and sizes	As required
51.	Household sieves : Stainless steel	As required
52.	Wooden spoons : Different sizes	As required
53.	Hand operated pulp extractor : Made of stainless steel	01
54.	Solar dryer (cabinet type) : Complete with solar box, Size approx 6' X 3'	01

A)		Furniture	
Class Room	:		01 No
• Instructor Chair & Table	:		08 Nos.
• Dual Desk	:		
Workshop/Lab	:		04 Nos.
• Suitable Work tables	:		16 Nos.
• Stools	:		01 No.
• Discussion Table	:		
Tool Cabinet	:		01 No.
Trainees Locker with space for 16	:		01 No.
First Aid Box	:		01 No.
Book Shelf (glass panel)	:		01 No.
Storage rack	:		01 No

Module-2: Bakery and Confectionary

Theory

1. **Bakery and confectionery in food industry:**
 - Importance of bakery and confectionery in food industry
 - Industrially important cereals
2. **Bakery Products:**
 - Flour
 - Different industrially important bakery products.
 - Flours for the bakery products
 - Quality of flour for the production of bakery items.
 - Bread
 - Principle involved for bread production
 - Different types of breads and their uses
 - Ingredients used in bread production
 - Biscuit and cookies
 - Basic method of biscuit production.
 - Ingredients for biscuit production.
 - Machinery involved in biscuit production
 - Factors affecting the quality of product
2. **Cake:**
 - Methods for the production of cakes
 - Ingredients for cake production
 - Machinery involved in cake production
 - Factors affecting the quality
3. **Starch:**
 - Availability of starch in different cereals
 - Extraction of starch
 - Different products of grain starch
4. **Quality standards:**
 - Quality standards and evaluation of product
5. **Primary processing equipment:**
 - Equipment used e.g. flour mill, mixer, molding machines, oven balance, packing machines
 - Location of faults
 - Safety
6. **Storage and packaging**
 - Need and importance of storage and packaging for bakery items
 - Methods of storage & packaging

PRACTICALS: Bakery and Confectionary

1. Production of quality flour for bread, biscuit and cakes.
2. Production of plain, fermented, malt, rye flour.
3. Flour, fat, bakers yeast, sugar and salt, I.S.I. standards for flour, fat, Baker's yeast.
4. Use of different food machinery for bread production.
5. Production of plain bread, fermented bread, protein rich bread and special breads
6. Production of different types of popular biscuits.
7. Production of different types of specialized biscuits.
8. Production of different types of other products like cookies, crackers.
9. Production of different types of popular cakes.
10. Production of different types of specialized cakes.
11. Preparation of corn starch, starch biscuits, Namkins, snacks.
12. Testing of raw material and product for their quality.
13. Handling of equipment safely.
14. Fault identification and removal of faults.
15. Pack the given food products and seal.

Sl. No.	Trainees Kit Item/ Specification	Quantity proposed for a batch of 16 trainees
1.	Hand operated moisture meter (to be shared)	04
2.	Moulds of biscuit & breads (to be shared)	08
3.	Spring balance (to be shared)	04
4.	Bread cutting knife	16 sets
5.	Knife of different size (set)	16 sets
6.	Spoons	16 sets
7.	Measuring glass (to be shared)	08
8.	Fruit knife	16 sets
9.	Dies (to be shared)	04
10.	Hand gloves	16
11.	Apron	16
12.	Cap	16
13.	Boots	16
14.	Hand bag	16

Sl. No.	Equipment, Machine & Tools Item/ Specification	Quantity proposed for a batch of 16 trainees
1.	Flour mill/ mini grain mill : Standard size	01
2.	Planetary mixer : 3 gear,	01
3.	Moulding machines	01
4.	Sheeting machine	01
5.	Bread cutting machine	01
6.	Oven : Standard size with temperature control	01
7.	Packing machine	01
8.	Electronic balance	01
9.	Physical balance	01
10.	Working table SS	01
11.	Toffee dies	01
12.	Biscuit moulds of different sizes :	As required
13.	Cake dies	As required
14.	Electric oven	01
15.	Moisture box	01
16.	Flash evaporator	01
17.	Can body reformer	01
18.	Can seamer	01
19.	Exhaust box	01
20.	Auto Clave	01
21.	Cup sealer	01
22.	Vacuum pan	01
23.	Vernier Caliper : 15 cm. 0.01 mm LC	02
24.	Screw Gauge : Micrometer, 0.001 mm LC, 10 cm cap	02

25.	Steel scale : 12 “ standard steel	04
26.	Steel tape : Scales 1 meter, and of 50 ft	04
27.	Weight box : For balances up to 2 Kg	02
28.	Cutting equipments : Different knives, Cutters for fruits /Veg	As required
29.	Sinks : standard size	01
30.	Hot plate : Electrical 2 KW	01
31.	Pickle Mixer : Rotatory type, Contact Parts of SS	01
32.	Heat sealing machine : Hand / pedal operated	01
33.	Tanks SS : 50 liters capacity, cylindrical with cap	01
34.	Syrup tanks : 50-100 lit capacity SS	01
35.	Pressure Cooker : 5 Kg and 10 Kg SS	01 each
36.	Liquid filling machine : For filling liquid in bottles, 200 ml, 500 ml, 1000 ml. Manual	01 each
37.	SS Filter : Sieve type cloth filter, hydraulic,	01
38.	Sugar coating pan : SS, Revolving type with speed control,	01
39.	Bottle opener : Heavy duty, Stainless Steel	01
40.	Burette : 50 ml digital Automatic/ ordinary glass	06
41.	Pipette : 5-50 ml capacities, glass	04
42.	Working tables : Stainless Steel Size 6’ X 3’	01
43.	Improved stoves : Made of MS with proper safety Measures, Valves etc	02
44.	Stainless steel / Aluminum pots : Different Capacities	01 set
45.	Wooden spoons : Different sizes	01 set
46.	Solar dryer (cabinet type) : Complete with solar box, Size approx 6’ X 3’	01

Class Room <ul style="list-style-type: none"> • Instructor Chair & Table • Dual Desk 	01 No 08 Nos.
Workshop/Lab <ul style="list-style-type: none"> • Suitable Work tables • Stools • Discussion Table 	04 Nos. 16 Nos. 01 No.
Tool Cabinet	01 No.
Trainees Locker with space for 16	01 No.
First Aid Box	01 No.
Book Shelf (glass panel)	01 No.
Storage rack	01 No.

Module-3: Milk and Dairy Products

Theory

1. **Dairy industry**
2. **Milk:**
 - Property of milk
 - Quality of raw milk
 - Products made from the milk
 - Introduction to different dairy products useful for marketing.
- Processing of Milk
 - Principle of milk processing
 - Method of production of pasteurized milk
 - Standard, toned, double toned flavoured milks.
 - Ingredients of special milks, fermented milk
- Dairy Products
 - Preparation methods of Cheese, Chhana, Mawa,
 - Preparation methods of Dahi, Srikhand, Cream, buttermilk
- Ghee
 - Different methods of Ghee production
 - Quality of ghee
- Butter
 - Method of butter production
 - Quality of butter
- Dairy sweets
 - Preparation methods of different dairy based sweets
 - Storage of sweets.
- Ice-cream
 - Principle of ice-cream production
 - Method of ice-cream production
 - Quality of ice cream
 - Different types of ice creams
- Other Dairy products
 - Different dairy products like dried milk, condensed milk
3. **Processing equipment:**
 - Equipment used e.g. Cream Separator, deep fridge, cheese vat, pasteurizer, kettle, butter churner, boiler,(optionally mini dairy plant)
 - Maintenance of equipment
 - Safety
4. **Storage and packaging:**
 - Need and importance of storage and packaging
 - Methods

PRACTICAL LIST: Milk and Dairy Products

1. Importance of dairy industry.
2. Introduction to operation flood (white revolution).
3. Testing of milk for its quality.
4. Primary processing of market milk.
5. Storage of milk
6. Production of pasteurized milk.
7. Production of standard, toned, double toned.
8. flavoured milks, fermented milk.
9. Storage of products.
10. Preparation of Cheese, Chhana, Mawa.
11. Preparation of Dahi, Srikhand, Ghee, Cream, buttermilk etc.
12. Production of Ghee by different methods.
13. Preparation of butter.
14. Test of quality of butter.
15. Preparation of different dairy based sweets.
16. Preparation of ice cream.
17. Quality evaluation of ice cream.
18. Storage of ice-cream.
19. Preparation of different dairy products like dried milk, condensed milk, cheese.
20. Handling of equipment safely.
21. Fault identification and removal of faults.
22. Safe operation.
23. Pack the given food products and seal.

Sl. No.	Trainees Kit Item/ Specification	Quantity proposed for a batch of 16 trainees
1.	Lactometer (to be shared)	04
2.	Dairy product catalogue of different product	02 sets
3.	Packaging machine hand operated (to be shared)	04
4.	Milk testing kit (to be shared)	04
5.	Hand operated weighting unit (to be shared)	04
6.	Hand operated sealing machine (to be shared)	04
7.	Fat measuring kit (to be shared)	04
8.	Electric Kettle (to be shared)	04
9.	Moisture box (to be shared)	04
10.	Measuring glass (to be shared)	08
11.	Hand gloves	16
12.	Apron	16
13.	Cap	16
14.	Boots	16
15.	Hand bag	16

Sl. No.	Equipment, Machine & Tools Item/ Specification	Quantity proposed for a batch of 16 trainees
1.	Mini dairy plant : Complete Mini-processing unit for milk.	01
2.	Milk Chiller : For chilling milk up to a temperature of about –10 °C	01
3.	Milk cans : Made of steel/ Aluminium, 40 –100 lit capacity	As required
4.	Cream separator : Motor operated, Centrifugal, capacity up to 1-2 Kg/ cream per min.	01
5.	Cheese vat : Made of heavy Stainless steel (306), size approx. 4'X 2.5'X 1' with proper outlet and taps	01
6.	Plate pasteurizer	01
7.	Butter churner	01
8.	Boiler	01
9.	Deep fridge	01
10.	Steam jacketed kettle with surface scrapper	01
11.	Mawa machine	01
12.	Crown capping machine	01
13.	Form fill seal machine	01
14.	Ice cream plant	01
15.	Cenfrifuge : For Fat estimation in milk,	01
16.	Gerber tubes for fat estimation	01
17.	Electric oven	01
18.	Moisture box	01
19.	Automatic pouch machine / filler sealer machine	01
20.	Kettle	01
21.	Flash evaporator .	01

22.	Can body reformer	01
23.	Can seamer	01
24.	Exhaust box.	01
25.	Cup sealer	01
26.	Vacuum pan	01
27.	Vernier caliper : 15 cm. 0.01 mm LC	02
28.	Screw Gauge : Micrometer, 0.001 mm LC, 10 cm cap	04
29.	Steel scale : 12 “ standard steel	02
30.	Steel tape : Scales 1 meter, and of 50 ft	02
31.	Weight box : For balances	01
32.	Cutting equipments : Different knives, Cutters for fruits /Veg	As required
33.	Sinks : standard size	01
34.	Hot plate : Electrical 2 KW	01
35.	Pickle mixer : Rotatory type, Contact Parts of SS	01
36.	Heat sealing machine : Hand / pedal operated	01
37.	Tanks SS : 50 liters capacity, cylindrical with cap	01
38.	Syrup tanks : 50, 100 lit capacity SS	01
39.	Pressure cooker : 5 Kg and 10 Kg SS	01
40.	Liquid filling machine : For filling liquid in bottles, 200 ml, 500 ml, 1000 ml. Manual	As required
41.	SS filter : Sieve type cloth filter, hydraulic,	01
42.	Sugar Coating pan : SS, Revolving type with speed control,	01
43.	Bottle opener : Heavy duty, Stainless Steel	01
44.	Burette : 50 ml digital Automatic/ ordinary glass	01

45.	Pipette : 5-50 ml capacities, glass	As required
46.	Lab glasswares : Different sizes and types	As required
47.	Working tables : Stainless Steel Size 6' X 3'	01
48.	Improved stoves : Made of MS with proper safety Measures, Valves etc	01
49.	Stainless steel / Aluminum pots : Different Capacities	As required
50.	Wooden spoons : Different sizes	As required

A)		Furniture	
Class Room	:	01 No	
• Instructor Chair & Table	:	08 Nos.	
• Dual Desk			
Workshop/Lab	:	04 Nos.	
• Suitable Work tables	:	16 Nos.	
• Stools	:	01 No.	
• Discussion Table			
Tool Cabinet	:	01 No.	
Trainees Locker with space for 16	:	01 No.	
First Aid Box	:	01 No.	
Book Shelf (glass panel)	:	01 No.	
Storage rack	:	01 No.	