

Syllabus for Food Material Packaging and Labeling Technician

Course Name	Food Material Packaging and Labeling Technician
Sector	Food Processing
Course Code	FPT/2023/FPLT/206
Level	3
Occupation	Food Material Packaging and Labeling Technician
Job Description	The Food Material Packaging and Labeling Technician is responsible for accurately packaging and labeling food products. They conduct quality checks on packaging materials, operate and maintain packaging equipment, ensure compliance with food safety regulations and maintain detailed records of production.
Course Duration	Total Duration 390 Hrs (T-120, P-180, OJT-60 and ES-30)
Trainees' Entry Qualification	Grade 10 OR Grade 8 with two year of (NTC/ NAC) after 8 th OR Grade 8 pass and pursuing continuous schooling in regular school with vocational subject OR 8th grade pass with 2 yrs relevant experience OR Previous relevant Qualification of NSQF Level 2 with one yr experience OR Previous relevant Qualification of NSQF Level 2.5 with 6 months experience
Trainers Qualification	BE BTECH IN FOOD TECHNOLOGY/ BE BTECH IN FOOD TECH AND BIO CHEMICAL ENGG/ B.SC HONS IN FOOD AND NUTRITION/ DIPLOMA IN FOOD PROCESSING/PACKAGING TECHNOLOGY/ ITI IN FOOD AND BEVERAGE TRADET/B.SC IN HOME SCIENCE 2 YRS FOR BE/BTECH/DEGREE IN HOTEL MANAGEMENT, 3 YRS FOR DIPLOMA/ B.SC, 3 YRS FOR ITI

Structure of Course:

Module No.	Module name	Outcome	Theory (Hrs)	Practical (Hrs)	Total (Hrs) [Multiple of 30]
1	Introduction to Food Packaging	Describe the fundamental of packaging technology and packaging materials.	20	10	30
2	Packaging Materials and Packaging Equipment	Interpret different processes related to the manufacturing of packaging material, methods of packaging, packaging technique and equipment.	30	60	90
3	Different Methods of Packaging	Explain interaction between package-flavour, gas storage	30	60	90

Module No.	Module name	Outcome	Theory (Hrs)	Practical (Hrs)	Total (Hrs) [Multiple of 30]
		systems for food storage, scavengers and emitters for improving the food quality and use of green plastics for reducing the pollution.			
4	Testing and Regulation of Packaging Materials	Identify suitable packaging materials by test-analysis and through legal specifications	30	30	60
5	Labeling, storage, transport and distribution of Packaging materials	Demonstrate Labeling, storage, transport and distribution of Packaging materials	10	20	30
6	OJT	Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).		60	60
7	Employability Skill	As per NCVET guided curriculum	30	--	30
TOTAL:			150	180	390

SYLLABUS:**Module No. 1: Introduction to Food Packaging**

Outcome: Describe the fundamentals of packaging technology and packaging materials.

Theory Content:

- 1.1 Discuss on basic functions of packaging; Different forms of packaging - Rigid, semirigid and flexible, Primary, secondary and tertiary;
- 1.2 Explain Primary Packaging Materials (Paper and paper based packaging materials, Plastic as packaging materials);
- 1.3 Explain Secondary Packaging Material (Folding carton); Transport packaging materials (corrugated fiber board boxes, wooden boxes).
- 1.4 Describe Ancillary Packaging Materials (Printing inks, varnishes, lacquers and adhesives);
- 1.5 Describe Glass packaging materials (Composition, properties),
- 1.6 Describe Aluminium foil, Metal packaging materials. (Manufacture of tin plate, TFS, fabrication, corrosion and remedial measures).
- 1.7 Discuss on Different types of packaging materials – Polymer, paper, metal, glass – Fundamental properties (Barrier, mechanical, thermal and optical), merits and demerits and uses.

- 1.8 Discuss on Cellulosic and Polymeric packaging materials and forms: Food grade polymeric packaging materials, Rigid plastic packages. Films: Multilayer films, Oriented, Co-extruded films, Laminates and Metalized
- 1.9 Discuss on Polymeric materials, their mechanical sealing and barrier properties: Cellophane, Olefins, Polyamides, Polyesters, PVC, PVDC, PVA, Inomers, Copolymers, Polycarbonates, Phenoxy, Acrylic and Polyurethane.

Practical Content:

- 1.1 Identify primary, secondary and tertiary packaging materials
- 1.2 Calculate the packaging material requirement for all categories of packaging, such as primary, secondary and tertiary for completing the order.
- 1.3 Demonstrate Ancillary Packaging Materials
- 1.4 Demonstrate Different types of packaging materials – Polymer, paper, metal, glass
- 1.5 Demonstrate Food grade polymeric packaging materials,
- 1.6 Check mechanical sealing and barrier properties of Polymeric materials
- 1.7 Inspect the packaging material quality to company standards.

Module No. 2: Packaging Materials and Packaging Equipment

Outcome: Interpret different processes related to the manufacturing of packaging material, methods of packaging, packaging technique and equipment.

Theory Content:

- 2.1 Describe Laminates, metalized films, composite material, biodegradable material (biocomposites);
- 2.2 Explain Manufacturing of paper as packaging material (Schematic diagram).
- 2.3 Describe Composition, Properties of Glass containers;
- 2.4 explain manufacturing of glass bottles container (Schematic diagram), Bottle making and Closures for glass containers.
- 2.5 Explain Manufacturing of Bulk containers, Tin-plate containers, Tin free steel containers,
- 2.6 Explain manufacturing of metal cans and aluminium can (Schematic diagram).
- 2.7 Discuss on Packaging equipments – Form-fill-seal machine (Horizontal and vertical), Filling equipments, Sealing machine. Bottle filling machine, capping machine, labelling equipments, strapping, cartooning machineries.
- 2.8 Discuss on Green plastics for food packaging (Problems of plastic packaging wastes, range of biopolymers, developing biodegradable plastic materials, bio composite)
- 2.9 select packaging materials for different food sectors – Dehydrated foods, Frozen foods, Dairy products, bakery and confectionary products, cereal and pulses, Edible oils and Fats, ground and whole spices, Fresh fruits, Vegetables, Meat, fish, Poultry, Sea foods, Dry premixes, Instant foods, extruded foods, snack foods, alcoholic and non-alcoholic beverage, carbonated beverages, fruits and vegetable products.

Practical Content:

- 2.1 Demonstrate feeding food product to conveyors, hoppers or other feeding devices for packaging.
- 2.2 Demonstrate feeding the packaging materials.
- 2.3 Demonstrate setting controls and regulate speed of packaging line conveyor.
- 2.4 Demonstrate removing packaged product (i.e. primary packaging material) from the machine.
- 2.5 Demonstrate checking the weight of the packed pouch/containers and adjust controls if required.
- 2.6 Demonstrate glue/paste label on the primary packaging material (in case of bottles).

- 2.7 Demonstrate checking the quality of the secondary packaging materials.
- 2.8 Demonstrate placing the filled primary packaging materials (bottles, pouches) manually in secondary packaging material (carton/crate).
- 2.9 Demonstrate checking the quality of the tertiary packaging materials.
- 2.10 Demonstrate placing the product in tertiary packaging material.
- 2.11 Demonstrate removing tertiary packed product from the packaging machine.
- 2.12 Demonstrate Form-fill-seal machine (Horizontal and vertical), Filling equipments, Sealing machine. Bottle filling machine, capping machine, labelling equipments,
- 2.13 Demonstrate cleaning of machineries used with recommended sanitizers following CIP (clean-in-place) procedure.

Module No. 3: Different Methods of Packaging

Outcome: Explain interaction between package-flavour, gas storage systems for food storage, scavengers and emitters for improving the food quality and use of green plastics for reducing the pollution.

Theory Content:

- 3.1 Discuss on Vacuum packaging, Modified and control atmosphere packaging, shrink packaging, aseptic packaging.
- 3.2 Describe Advanced packaging techniques (active and intelligent packaging), Active Packaging Techniques and intelligent Packaging Techniques,
- 3.3 Discuss Oxygen, ethylene and other scavengers (selecting right types of oxygen scavenger, ethylene scavenging technology, carbon dioxide),

Practical Content:

- 3.1 Demonstrate Vacuum packaging
- 3.2 Demonstrate Modified and control atmosphere packaging,
- 3.3 Demonstrate aseptic packaging
- 3.4 Demonstrate Active Packaging Techniques and intelligent Packaging Techniques
- 3.5 Demonstrate Oxygen scavenging technology
- 3.6 Demonstrate ethylene scavenging technology

Module No. 4: Testing and Regulation of Packaging Materials

Outcome: Identify suitable packaging materials by test-analysis and through legal specifications

Theory Content:

- 4.1 Evaluate of mechanical, optical and barrier properties like WVTR, GTR, bursting strength, tensile strength, tearing strength, drop test.
- 4.2 Explain Time Temperature indicators (Defining and classifying TTIs, Requirements for TTIs, Using TTIs to monitor shelf life during distribution).
- 4.3 State the freshness indicator in packaging (Compounds indicating the quality of packaged food products, freshness indicators, pathogen indicators).
- 4.4 Explain Packaging-flavour interaction (Factors affecting flavour absorption, role of food matrix, role of differing packaging materials, sensory quality).

4.5 Describe Moisture regulation (Silica gel, clay, molecular sieve, humectants, salts)

4.6 Discuss Packaging regulations as per FSSAI, The Standards of Weights and Measures Act, 1976 and the Standards of Weights and Measures (Packaged Commodities) Rules, 1977 (SWMA). The Prevention of Food Adulteration Act, 1954 and the Prevention of Food Adulteration Rules, 1955 and its first amendment, 2003 (PFA). The Fruit Products Order, 1955 (FPO), The Meat Food Products Order, 1973 (MFPO), The Edible Oil Packaging Order, 1998, The Agmark Rules, The Solvent Extraction Oil. Deoiled Meat and Edible Flour (control) Order 1967, The Milk & Milk Products Order 1992, Infant milk substitute, Feeding Bottles and Infant Foods Act 1992.

Practical Content:

4.1 Demonstrate mechanical, optical and barrier properties like WVTR, GTR, bursting strength, tensile strength, tearing strength, drop test of packaging materials.

4.2 Demonstrate Time Temperature indicators for monitor shelf life during distribution of packet food.

4.3 Demonstrate freshness indicator in packaged food products

4.4 Demonstrate moisture regulation in packaged food products

4.5 Demonstrate Packaging regulations as per FSSAI

Module No. 5: Labeling, storage, transport and distribution of Packaging materials

Outcome: Demonstrate Labeling, storage, transport and distribution of Packaging materials

Theory Content:

5.1 Describe the method of Printing on packaging material, barcodes, RFID, QR codes,

5.2 Describe the method of Labelling, Objective of labeling, Three Kinds of Labels-rand Label, Description Label, Grade Label, Declarations on Labelling, Contents in a food label, food safety and standards (packaging and labeling) regulations, 2011.

5.3 Discuss on Environment and cost considerations of packaging materials

5.4 Describe the method of Transport of packaging material to industry, transport of packaged foods. Storage and shelf-life study of packaged foods.

5.5 Discuss supply chain for perishable foods, role of packaging in the supply chain, creating integrated packaging, storage and distribution.

Practical Content:

5.1 Demonstrate method of Printing on packaging material, barcodes, RFID, QR codes

5.2 Demonstrate method of Labelling on packaging material

5.3 Demonstrate method of Transport of packaging material to industry

5.4 Demonstrate supply chain for perishable foods

Module No. 6: OJT

Outcome: Work in real job situation with special emphasis on basic safety and hazards in this domain

Practical Content:

Assessor will check report prepared for this component of Practical training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for **60 Hours.**)

Module No. 7: Employability Skills (30 Hrs)

Key Learning Outcomes:

Introduction to Employability Skills Duration: 1 Hour

1. Discuss the importance of Employability Skills in meeting the job requirements

Constitutional values - Citizenship Duration: 1 Hour

2. Explain constitutional values, civic rights, duties, citizenship, responsibility towards society etc. that are required to be followed to become a responsible citizen.
3. Show how to practice different environmentally sustainable practices

Becoming a Professional in the 21st Century Duration: 1 Hours

4. Discuss 21st century skills.
5. Display positive attitude, self -motivation, problem solving, time management skills and continuous learning mindset in different situations.

Basic English Skills Duration: 2 Hours

6. Use appropriate basic English sentences/phrases while speaking

Communication Skills Duration: 4 Hour

7. Demonstrate how to communicate in a well -mannered way with others.
8. Demonstrate working with others in a team

Diversity & Inclusion Duration: 1 Hour

9. Show how to conduct oneself appropriately with all genders and PwD
10. Discuss the significance of reporting sexual harassment issues in time

Financial and Legal Literacy Duration: 4 Hours

11. Discuss the significance of using financial products and services safely and securely.
12. Explain the importance of managing expenses, income, and savings.
13. Explain the significance of approaching the concerned authorities in time for any exploitation as per legal rights and laws

Essential Digital Skills Duration: 3 Hours

14. Show how to operate digital devices and use the associated applications and features, safely and securely
15. Discuss the significance of using internet for browsing, accessing social media platforms, safely and securely

Entrepreneurship Duration: 7 Hours

16. Discuss the need for identifying opportunities for potential business, sources for arranging money and potential legal and financial challenges

Customer Service Duration: 4 Hours

17. Differentiate between types of customers
18. Explain the significance of identifying customer needs and addressing them
19. Discuss the significance of maintaining hygiene and dressing appropriately

Getting ready for apprenticeship & Jobs Duration: 2 Hours

20. Create a biodata
21. Use various sources to search and apply for jobs
22. Discuss the significance of dressing up neatly and maintaining hygiene for an interview
23. Discuss how to search and register for apprenticeship opportunities

Learning Outcome – Assessment Criteria

Module No.	Learning Outcome	Assessment Criteria
1	Describe the fundamentals of packaging technology and packaging materials.	<p>After completion of this module students will be able to:</p> <ol style="list-style-type: none"> 1.1 Identify primary, secondary and tertiary packaging materials 1.2 Demonstrate the packaging material requirement for all categories of packaging, such as primary, secondary and tertiary for completing the order. 1.3 Identify, select and classify Ancillary Packaging Materials 1.4 Demonstrate Different types of packaging materials – Polymer, paper, metal, glass 1.5 Demonstrate Food grade polymeric packaging materials, 1.6 Check mechanical sealing and barrier properties of Polymeric materials 1.7 Inspect the packaging material quality to company standards.
2	Interpret different processes related to the manufacturing of packaging material, methods of packaging, packaging technique and equipment.	<p>After completion of this module students will be able to:</p> <ol style="list-style-type: none"> 2.1 Explain feeding food product to conveyors, hoppers or other feeding devices for packaging. 2.2 Demonstrate feeding the packaging materials. 2.3 Apply setting controls and regulate speed of packaging line conveyor. 2.4 Perform removing packaged product (i.e. primary packaging material) from the machine. 2.5 Check the weight of the packed pouch/containers and adjust controls if required. 2.6 Explain glue/paste label on the primary packaging material (in case of bottles). 2.7 Check the quality of the secondary packaging materials. 2.8 Perform placing the filled primary packaging materials (bottles, pouches) manually in secondary packaging material (carton/crate). 2.9 Check the quality of the tertiary packaging materials. 2.10 Perform placing the product in tertiary packaging material. 2.11 Perform removing of tertiary packed product from the packaging machine. 2.12 Explain working principle of Form-fill-seal machine (Horizontal and vertical), Filling equipment, Sealing machine. Bottle filling machine, capping machine,

Module No.	Learning Outcome	Assessment Criteria
		labelling equipment, strapping, cartooning machineries. 2.13 Perform cleaning of machineries used with recommended sanitizers following CIP (clean-in-place) procedure.
3	Explain interaction between package-flavour, gas storage systems for food storage, scavengers and emitters for improving the food quality and use of green plastics for reducing the pollution.	After completion of this module students will be able to: 3.1 Describe Vacuum packaging 3.2 Explain Modified and control atmosphere packaging, 3.3 Illustrate aseptic packaging 3.4 Interpret Active Packaging Techniques and intelligent Packaging Techniques 3.5 Describe Oxygen scavenging and ethylene scavenging technology
4	Identify suitable packaging materials by test-analysis and through legal specifications	After completion of this module students will be able to: 4.1 Perform WVTR, GTR, bursting strength, tensile strength, tearing strength, drop test of packaging materials. 4.2 Monitor Time Temperature indicators for shelf life during distribution of packet food. 4.3 Demonstrate freshness indicator in packaged food products 4.4 Describe Packaging-flavour interaction of different packaging materials 4.5 Explain moisture regulation in packaged food products 4.6 Exhibit Packaging regulations as per FSSAI
5	Demonstrate Labeling, storage, transport and distribution of Packaging materials	After completion of this module students will be able to: 5.1 Demonstrate method of Printing on packaging material, barcodes, RFID, QR codes 5.2 Illustrate method of Labelling on packaging material 5.3 Exhibit method of Transport of packaging material to industry 5.4 Describe supply chain for perishable foods
6	OJT	Assessor will check report prepared for this component of Practical training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for 60 Hours.)
7	Employability Skill	As per NCVET guided curriculum

List of Tools, Equipment & materials needed for 30 Trainees (Practical)

Sl No	Items Name	Specification	Qty
1	Can pressure gauge	Can pressure gauge both for 300 and 401 can	01
2	Can Vacuum gauge	Can Vacuum gauge both for 300 and 401 can	01
3	Can cutter / opener	Can cutter / opener both for 300 and 401 can	01
4	Hot sealing machine for sealing	Hot sealing machine for sealing of Aluminum foil over plastic cup	01
5	Vacuum Packaging Machine All SS Single Chamber Trolley Mounted type	<p>Vacuum Packaging Machine All SS Single Chamber Trolley Mounted type</p> <p>Standard Features :</p> <p>High density see through lid. Aluminium lid with high density see through cut out.</p> <p>SS lid with or without high density see through cut out.</p> <p>Salient Features :</p> <p>Digital microprocessor based controller having 9 memories and sealing accuracy upto 1/100th of a second. Inert gas flushing arrangement. Pneumatically operated sealing jaws, compressed air supply at 4 to 5 bar to be arranged by you.</p> <p>Vacuum Creation and Sealing : Automatic</p> <p>Working : Automatic</p> <p>Seal : Automatic electronic variable to several levels sleeplessly.</p> <p>Command Board : Digital</p> <p>Air Re- entry : electro valve</p> <p>Vacuum In : Bags inside the chamber</p> <p>Chamber Size : 500x450x100mm</p> <p>Seal Length : 485mm</p> <p>No. of seal bar : 2</p> <p>No. of chamber : 1</p> <p>Pump capacity :15cu.m/hr;0.75hp;3ph</p> <p>Accessories for above Machine</p> <p>Tricolour printed PVC pouch</p> <p>Nitrogen gas cylinder</p>	01
6	Laboratory type Foil Sealing Machine	Laboratory type Foil Sealing Machine Size:200mm [8"] (L x W x H) Case Size: 14" x 10" x 23.5"	02
7	Horizontal Band Sealer	one Horizontal Band Sealer with digital display, suitable for all types of pouches	01

Sl No	Items Name	Specification	Qty
		include HDPE, LDPE, PP for 100 g, 250 g, 500g, 1000g.	
8	Heat sealing machine	<p>This machine suitable for shops to seal Rasgulla, Gulabjamun, noodle, fruit jelly, pudding, bean milk, hot & cold food, mild tea etc. It adopts IC computer controlling switch for which is easy to be used. The sealing is automatically finished after putting on the case or cup. Its casing is made of stainless steel, in line with the sanitary requirement.</p> <p>Specifications: 123mm Diameter Manual Cup Sealing Machine</p> <p>Product Type :</p> <ul style="list-style-type: none"> • Sealing Machine • Power : 400 W • Voltage : 220 V <p>Seal material : Polyethylene(PE), Polypropylene(PP), Polyethylene terephthalate(PET), Al. Foil • Size Diameter : 123 mm • Temperature : 0-200oC • Capacity : 350 cups/hr • Dimension (L x B x H) : 490 x 220 x 460 mm approx.</p> <p>Supply with PP Shrink Films roll of two set and 300 pieces 250 gm PP Containers and 300 pieces 500 gm PP Containers and 300 pieces 1000 gm PP Containers.</p>	01
9	Vertical Continuous Band Sealing Machine	<p>Vertical Continuous Band Sealing Machine for packing of flour of capacity 500g, 1kg, 2kg.</p> <p>Band Sealing Machine Specification</p> <p>Capacity 10-15 Meters/Min.</p> <p>Conveyor belt width 200mm Conveyor height Adjustable upto 500mm</p> <p>Conveyor load capacity 25 Power 110v/60hz</p>	01
10	Universal Tensile Testing Machine	Determine a material's effectiveness and behavior when a stretching force is applied to it with tensile tester.	01
11	Burst Tester For Film And Corrugated Box	The Presto corrugated box bursting strength tester can be used to accurately determine the bursting strength of paper, corrugated cardboard, carton box, card board, leather, cloth or synthetic leathers. Save your Corrugated Box from getting ruptured by testing it with bursting strength tester.	01
12	Drop Tester	Save your product from getting "dead at	01

SI No	Items Name	Specification	Qty
		arrival” with drop impact tester. With Minimal Equipment & Formal Training Time You Can Save Your Package From Getting Damaged.	
13	Vacuum Leak Tester	Avoid the fear of vacuum leaks present in products with the use of Presto vacuum leak tester. This lab testing instrument is best for checking the vacuum leak integrity.	01
14	Laboratory Heat Sealer	Perform sealing on flexible packaging products and other thermoplastic materials using pressure and heat by maintaining high temperatures with Presto heat seal tester.	01

Marks Distribution

Outcome	Outcome Code	Total Th Marks	Total Pr Marks
Describe the fundamental of packaging technology and packaging materials.	FPT/1107/OC1	20	70
Interpret different processes related to the manufacturing of packaging material, methods of packaging, packaging technique and equipment.	FPT/1107/OC2	40	180
Explain interaction between package-flavour, gas storage systems for food storage, scavengers and emitters for improving the food quality and use of green plastics for reducing the pollution.	FPT/1107/OC3	40	180
Identify suitable packaging materials by test-analysis and through legal specifications	FPT/1107/OC4	30	150
Demonstrate Labelling, storage, transport and distribution of Packaging materials	FPT/1107/OC5	20	70
Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	FPT/1107/OC6	0	150
Employability Skill-30 Hrs	DGT/VSQ/N0101	50	0