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Norwegian Embassy
Islamabad

FOOD PROCESSING & PACKAGING TECHNICIAN

CBT Curriculum

National Vocational Certificate Level 1

Version 1 - November, 2019

NAVTTC

Implemented by
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Published by
National Vocational and Technical Training Commission
Government of Pakistan

Headquarter
Plot 38, Kirthar Road, Sector H-9/4, Islamabad, Pakistan
www.navttc.org

Responsible
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Layout & design
SAP Communications

Photo Credits
TVET Sector Support Programme

This document has been produced with the technical assistance of the TVET Sector Support Programme, which is funded by the European Union, the Federal Republic of Germany and the Royal Norwegian Embassy and has been commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ). The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in close collaboration with the National Vocational and Technical Training Commission (NAVTTC) as well as provincial Technical Education and Vocational Training Authorities (TEVTAs), Punjab Vocational Training Council (PVTC), Qualification Awarding Bodies (QABs)s and private sector organizations.

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1. INTRODUCTION

This course is aimed at introducing and developing the basic skills and knowledge of Food processing Industry. The trainee is introduced in a step by step manner to the various elements of the discipline and their implications. Ranging from the knowledge and skills required to prepare work environment according to the food processing order, product raw materials and perform packaging. The trainees are encouraged to experiment with a focus on acquiring a wide range of new skills for meeting the new trends in food industry both in processing and packaging. Trainee is also exposed to the commercial market and taught how to deal with clients and their demands in food processing industry.

In order to improve the quality of training and to ensure relevance, National Vocational & Technical Training Commission (NAVTTC) through Qualification Development Committee (QDC) developed National Competency Standards for Food Processing & Packaging Technician. The learning outcomes provided in this curriculum forms the basis, which is in accordance with the approved National Competency Standards for Food Processing & Packaging Technician. The curriculum can be implemented in a variety of pathways and provides flexible learning opportunities in public and private sector as well as industry based institutes.

1. PURPOSE OF THE TRAINING PROGRAMME

In this training program trainee will learn and acquire specialized knowledge and practical skills required to function as a Food Processing & Packaging Technician in Food Processing and Packaging industry. The specific objectives of developing these qualifications are as under:

- Improve the overall quality of training delivery and setting national benchmarks for training of Food Processing & Packaging Technician in the country.
- Provide flexible pathways and progressions to learner enabling them to receive relevant, up-to-date and current skills in Food Industry.
- Provide basis for competency-based assessment which is recognized and accepted by employers in modern days.
- Establish a standardized and sustainable system of training in consultation with the industry for Food Processing & Packaging Technician in the country.

2. OVERALL OBJECTIVES OF TRAINING COURSE

The primary objective of this two years certificate course in Food Processing & Packaging Technician is to provide the trainees with a comprehensive introduction in food industry. At present there are no skill standards at national level in Food Processing Industry. These standards will develop trainee's abilities, interests and offers outstanding opportunities at different stages of Food Sector. It will encourage individual to learn knowledge and skills in related field of Food Processing. He/she should have the capability to get job in food industry after successful completion of two years (level 1-4) course. Trainee must take part in commercial activities after seeking training in this sector. It will help the trainees to start their own commercial activities as an independent skilled worker in Food Sector or an employee in a commercial setup. He/she will also made aware of the ever changing and evolving demands and challenges of market trends in Food Industry. This course will be opened to all Science matriculate students for enhancing their capabilities in this field.

3. COMPETENCIES TO BE GAINED AFTER COMPLETION OF COURSE

The study of Food Processing & Packaging Technician enables trainee to develop a range of competencies including, creative thinking, research skills, personal management, presentation skills, communication, negotiation skills and technical competence related to their job assignment. Such competencies acquired and enhanced during the course of study results in highly employable pass outs. In addition, the trainee will be able to acquire the following competencies after completing this course:

- Demonstrate and apply basic knowledge and concepts in food processing industry
- Develop creative thinking skills and perceptual awareness in food processing industry
- Develop skills necessary for understanding and applying skills during work
- Explore and discuss unique properties and potential of technical work
- Demonstrate techniques and processes for food processing and packaging
- Communicate and express ideas through a variety of skills and techniques in food industry
- Evaluate and select materials, techniques and processes to process food and packaging the products as per order.
- Demonstrate the safe and responsible use of tools and materials at workplace
- Ability to work in a commercial or apprenticeship setup

4. JOB OPPORTUNITIES AVAILABLE IMMEDIATELY AND IN THE FUTURE

The Pass outs of this course may find job / employment opportunities in the following areas:

- Work as Helper in Food Processing & Packaging Industry (Level-I)

5. TRAINEE ENTRY LEVEL:

- Middle or equivalent

6. MINIMUM QUALIFICATION OF TRAINER

- 2-5 years of professional experience in food industry after DAE (Food Technology)/ Bachelor's degree (Food Technology).

7. RECOMMENDED TRAINER: TRAINEE RATIO

- The recommended trainer and trainee ratio is1:25 per class

8. MEDIUM OF INSTRUCTION:

- Urdu, English or Local Language

9. DURATION OF COURSE (TOTAL TIME, THEORY & PRACTICAL)

Module #	Title	Theory (Total Hours)	Practical (Total Hours)	Total Hours	Credit Hours
102200843	Comply with Work Health and Safety Policies	10	20	30	3
041700838	Obey the Workplace Policies and Procedures	5	15	20	2
001100850	Follow Basic Communication Skills (General)	15	25	40	5
061100855	Operate Computer Functions(General)	15	25	40	5
072100979	Adopt Basic Good Manufacturing Practices (GMP) for Food Processing & Packaging	12	48	60	6
Total Hours		**57**	**133**	**190**	**21**

SUMMARY OF MODULES

The proposed curriculum is composed of 5 modules that will be covered in 190 hrs. It is proposed that the course may be delivered in 3 months period. The distribution of contact hours (practical & theory) is given below:

- **Theory** (20%) **: Practical** (80%)
- **Theory:** 57 **hours**
- **Practical:** 133 **hours**

10. SUMMARY – OVERVIEW OF THE CURRICULUM

Module Title	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 1 Comply with Work Health and Safety Policies	**LU1.**	10	20	30
Module 2 Obey the Workplace Policies and Procedures	**LU1.**	5	15	20
Module 3 Follow Basic Communication Skills (General)	**LU1.**	15	25	40
Module 4 Operate Computer Functions(General)	**LU1.**	15	25	40
Module 5 Adopt Basic Good Manufacturing Practices (GMP) for Food Processing & Packaging	**LU1.** Apply basic GMP requirements in regard to layout of premises, workspace **LU2.** Apply Basic GMP requirements in regard to personal hygiene **LU3.** Apply basic GMP requirements in regard to food processing, including rework **LU4.** Apply basic GMP requirements in regard to food packaging	12	48	60

	LU5. Apply basic GMP requirements in regard to documentation and records **LU6.** Apply basic GMP requirements to production quality control and in process controls **LU7.** Apply basic GMP requirements in regard to storage, warehousing and distribution **LU8.** Apply basic GMP requirements in regard to management of purchased materials **LU9.** Apply basic GMP requirements in regard to cleaning and sanitation **LU10.** Apply basic GMP requirements in regard to measures for prevention of cross contamination **LU11.** Apply basic GMP requirements in regard to Pest Management Apply basic GMP requirements in regard to food defense			

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Module-5

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Module.5: 072100979 Adopt Basic Good Manufacturing Practices (GMP) for Food Processing & Packaging

Objectives: After completing this module, the learner will be able to identify the competencies for GMP guidelines commonly used to implement, manage and improve quality standard programs in food processing. The trainees will understand GMP systems in different food operations, including procedures and documentation for product safety, hygienic product manufacture and handling, packaging and labelling within specifications, as well as proper documentation and record keeping.

Duration:	**Total hours**	**60**	**Practical**	**48**	**Theory**	**12**

Learning Unit	**Learning Outcomes**	**Learning Elements**	**Duration**	**Materials (Tools & Equipment) Required**	**Learning Place**
LU1. Apply basic GMP requirements in regard to layout of premises, workspace	**P1.** Permit adequate cleaning and/or disinfection **P2**. Protect against the accumulation of dirt, toxic materials, food debris and the formation of condensation **P3.** Aware of layout and construction of the food premises as per Food hygiene legislation **P4.** Provide sufficient space for food production and storage of equipment	Explain importance of layout in food industry (display lay-out in variant places) Describe methods of removing /protecting dirt, toxic material food debris and the formation of condensation (hand and mechanical cleaning) Describe the factors affecting on the selection of food industry site. (free from wooden area disposal, availability of water etc.) Define the separation of operation procedures (space for storage of raw material,	1 hours Theory 04 hours Practical Total:05 hours	Mopes, PPE's, buckets,	Class Room and workplace

	P5. Adequate mechanical ventilation to effectively remove fumes, smoke, steams, and vapours from food premises **P6.** Follow safety rules and regulations for the food processing industry	processed material etc.) Describe the Importance of mechanical ventilation (exhaust and ducting system) Explain the rule of provincial and federal food safety regulation department in food industry (PFA)			
LU2. Apply Basic GMP requirements in regard to personal hygiene	**P1.** Perform proper hand washing and disinfection procedures before entering production area. **P2.** Report to supervisor in the case of illness **P3**. Wear Personal Protective Equipment (PPE) as per SOPs regarding hygienic measures	Describe the hand washing procedure (rub palm, rub the back, rub both wrists etc.) Define viral and non-viral disease (fever, hepatitis) Enlist PPE's regarding hygienic measure (hygiene cap, beard mask, face mask, shoes cover etc.)	1 hours Theory 04 hours Practical Total:05 hours	Disinfectants, sanitizer	Class Room and workplace
LU3. Apply basic GMP requirements in regard to food processing, including rework	**P1.** Make sure that the actual food rework is clearly identifiable. **P2.** Perform rework handling as per industry standards. **P3.** Maintain traceability records of all food rework	Define rework handling procedure (batch documentation & product history) Describe the procedure of rework handling (identify the problem in product, sampling of product, recheck batch history, corrective action) Define traceability (batch reports, analysis report)	1 hours Theory 04 hours Practical Total:05 hours	Insect-o-cutters, Bait Station, Glue Boards, Straws, Cages	Class Room and workplace

LU4. Apply basic GMP requirements in regard to food packaging	**P1.** Prevent contamination in manufacturing, storage and transportation **P2.** Ensure food contact materials and products are safe for their intended uses **P3.** Maintain packing surfaces and equipment to minimize product damage and contamination	Define GMP in food packaging area (packaging environment & packaging parameters) Describe the sources of contamination and product damage (conveyors, dead joints etc.)	1 hours Theory 04 hours Practical Total:05 hours	Hose cleaning pipe, scrubbers, mopes, color coded brushes,	Class Room and workplace
LU5. Apply basic GMP requirements in regard to documentation and records	**P1.** Fill out specifications, records, batch production records for production under supervision **P2.** Interpret laboratory control records **P3.**Maintain records to support that any Good manufacturing practices (GMP) have been implemented **P4.** Locate documents of external origin, if needed **P5.** Safeguard documents and records appropriately	Define how to maintain documentation in food industry (batch reports, log sheets) Define the work bench instructions (lab analysis protocol) Describe the importance of proper documentation and record keeping	1 hours Theory 04 hours Practical Total:05 hours	tempered glass, Glass protective lights, file racks	Class Room and workplace
LU6. Apply basic GMP requirements to production quality control and in process controls	**P1.** Follow master production instructions (SOPs) **P2.** Perform basic in-process control measurements (e.g. pH, weighing) under supervision **P3.** Perform basic quality control	Define SOP's; Elements of process control (measurements, control strategy, control action) Enlist basic food quality control measures (pH, acidity, temperature, viscosity etc.) Explain the procedure of pH,	1 hours Theory 04 hours Practical Total:05 hours	trolleys, pH mater, weighing balance, titration apparatus, viscometer, thermometer, refractomet	Class Room and workplace

	measure under supervision	acidity and temperature checking		er	
LU7. Apply basic GMP requirements in regard to storage, warehousing and distribution	**P1.** Store materials and end product appropriately **P2.** Follow First Expire First Out (FEFO)/First in First Out (FIFO) **P3.** Ensure stacking method as per product description **P4.** Ensure Product storage as per required parameters (temperature, humidity etc.)	Define FEFO and FIFO and its importance Define the materials inventory and stock taking Describe the procedure of storage foods in warehouse and proper distribution (control storage parameters, avoid over stacking, label the pellets)	1 hours Theory 05 hours Practical Total:06 hours	Lifters, Fork Lifters	Classroom, workplace
LU8. Apply basic GMP requirements in regard to management of purchased materials	**P1.** Handle the raw materials as per product requirements **P2.** Meet not only manufacturing order specifications, but also regulatory requirements **P3.** Select the appropriate raw materials based on functionality **P4.** List of existing approved materials and their specifications **P5.** Meet existing company or customer standards (e.g. halal, organic, gluten-free	Describe the Importance of proper handling of raw materials (quality checks, specifications, regulatory standards.) Describe the process to make list of approved raw material (ingredient name, supplier name, quantity, MFG & EXP date) Define company and customer standards (ISO, BRC, and halal, taste and quality etc.)	1 hours Theory 04 hours Practical Total:05 hours	Computer, Buckets, Hand jacks, Beakers	Class Room and workplace
LU9. Apply basic GMP requirements in regard to cleaning and sanitation	**P1.** Ensure safe food supply **P2.** Follow sanitation procedures for all food contact equipment and food contact surfaces **P3.** Analysis the root cause of sanitation failures	Describe safe food supply (inspect and store raw material, appropriate preservation techniques) Explain the cleaning procedure of food contact surfaces (dry cleaning, washing, brushing etc.) Explain the statistical process of quality control (fish bone	1 hours Theory 04 hours Practical Total:05 hours	Pumps, Valves, CIP solutions, brushes	Class Room and workplace

	P4. Maintain record keeping associated with the sanitation procedure	diagram) Describe record keeping methods (quality checks, parameter log sheet)			
LU10. Apply basic GMP requirements in regard to measures for prevention of cross contamination	**P1.** Ensure segregation of area according to hygiene requirement (Zoning) **P2.** Control equipment to minimize odors and vapors (including steam and noxious fumes) in areas where they may contaminate food **P3.** Ensure adequate floor drainage systems in all areas	Describe the importance of zoning Enlist the methods to minimize bad order in process area (fume hoods, exhaust tunnel, Mechanical ventilation) Describe the importance of proper draining system (remove bad smells, avoid water blockage, prevent from slipping hazards)	1 hours Theory 04 hours Practical Total:05 hours	Shrink wrap, air tight containers, compressed air, steam, hot water	Class Room and workplace
LU11. Apply basic GMP requirements in regard to Pest Management	**P1.** Identify Target pest related to workplace area **P2.** Ensure preventive measures in regard to pest entry in food processing area **P3.** Install monitoring devices (Insect-o-cutors, Bait Station, Glue Boards, Straws, Cages) **P4.** Clean and maintain monitoring devices **P5.** Maintain record and trend analysis	Enlist targeted pest regarding food processing area (ant, house fly cockroach, rat) Explain preventive measure to control pest entry in food processing areas (air cartons, mouse traps, glue boards, insect-o-cutors etc.) Describe cleaning interval of pest control devices Define integrated pest control broad-based approach that integrates practices for economic control of pests (solve pest problem)	1 hours Theory 04 hours Practical Total:05 hours	Glue gums, mouse/rat traps, insectocutors, glueboards, air curtains	Class Room and workplace

LU12. Apply basic GMP requirements in regard to food defence	**P1.** Prevent intentional contamination of food products (Human intervention as the source of contamination) **P2.** Prevent accidental (unintentional) contamination of food products **P3.** Minimize risk and impact of an incident of intentional contamination	Define risk management in food defense; Explain the strategies to Protect Food Against Adulteration with requirements for covered facilities to prepare and implement food defense planes (self-procurement, approved suppliers, process flow monitoring) Describe strategies to prevent accidental contamination of food (label the ingredients, store the ingredients separator) Describe the preventive measures to minimize adulteration (allocate prohibited areas self-procurement, approved suppliers, process flow monitoring)	1 hours Theory 03 hours Practical Total:04 hours	Shrink wrap, shrink wrap machine, sanitizer	Class Room and workplace

SUPPORTIVE NOTES:

Assessment context, Critical aspects, Assessment conditions

Formative assessment: The specification of the expected performance demonstrated by the trainee at the conclusion of the learning experiences in a particular module or course. It is used to assess the necessary knowledge, skills and attitudes, reflecting the performance standard in the relevant industry or competency standards. Formative assessment may include observation, simulation, questioning, presentation/ demonstration and written assessment at the end of each module. The various methods or techniques used to gather evidence of sufficiency and quality in which to make a sound judgment on the competency of a learner

Summative assessment: Assessors need to plan in advance how they will conduct summative assessments covering all modules. There must be a maximum of 6-8 trainees per assessor and if there are two assessors than 12 students can be assessed within a day and 24 students in 2 days. The entire course can be tested in the summative assessment covering all 16 modules. Direct observation is an important approach in assessing the attitude of the students toward work, observance of safety rules and regulations, and how they interact and relate with other trainees and instructor. Training providers need to decide ways to combine modules into a cohesive two-day final assessment programme for each group of 6-8 trainees. Assessment methods may include observation, simulation, questioning, presentation/ demonstration and written assessment. The various methods or techniques used to gather evidence of sufficiency and quality in which to make a sound judgment on the competency student or learner. Training providers must agree the settings for practical assessments in advance.

LIST OF TOOL AND EQUIPMENT		
SR.NO	**Tools**	**Required items for 24 candidates**
1.	Chiller, compressors, RO (reverse osmoses), Filters.	1 Unit each
2.	Refrigerator, cooling agents,	1 Unit each
3.	Freezer, incubators	1 Unit each
4.	Stoves	6 No.
5.	**Food packaging system** with filling and sealing, can seamer, shrink wrapper, stripper, case packer, labeler, cap applicators, case sealer, lifters, card board packer, milters	1 Unit each
6.	Jack lift, fork lifter, hand jack's lifter, material moving lifters, hydraulic lifters, palletizers	1 Unit each
7.	Trolley, liquid jacked tanks	1 Unit each
8.	Wheeler	1 No.
9.	Poly/temperature sealer, shrink machines, cylinders	1 Unit each
10.	Cap sealer	1 No.
11.	Pressure canner	1 No.
12.	Pressure cooker	2 No.
13.	Cap seal	1 No.
14.	Oven	1 No.
15.	Silent cutter	1 No.
16.	Brix refractometers (0-90^{o} brix)	2 No.
17.	Electronic scales (0.1 gm. capacity)	1 No.
18.	Consist meter/viscometer	1 No.
19.	Vacuum pack machine	1 No.
20.	Laboratory scale cabinet drier or forced draft oven	1 No.

21.	Headspace gauge	2 No.
22.	Test equipment – pH meter, centrifuge, moisture meter, color chart/colorimeter, texture meter	2 Unit each
23.	Computer	1 No.
24.	**Firefighting equipment**, fire extinguisher types and uses, fire hydrants, smoke detector, SCABA (Self containing and breathing apparatus), fire Alarms, manual and automatic emergency haters, safety shower, safety harness,	2 unit each
25.	First aid kit	1 No.
26.	**PPE** – apron, face mask, gloves (chemical gloves, surgical, electrical & Steam gloves), gum shoes (rubber shoes) chemical suit, face shelled, safety helmet, air protectives, goggles	24 No.
27.	Computer system	1 No.
	TOOLS/SUPPLIES	
1.	Weighing scales and balances of various capacities and sensitivities	1 No.
2.	Measuring cups (solid)	6 Set
3.	Measuring cups (liquid)	6 Set
4.	Wrench, screw driver, belts, nuts and bolts, spanners (open, ring combinations) pliers, L kays, star keys, stretched pliers, gas pipe	
5.	Clocks/timer	6 No.
6.	Mixing bowls, stainless steel	6 No.
7.	Hard plastic chopping boards (white, blue, green)	6 unit each
8.	Thermometers of varying temperature range	10 No.
9.	Glass Jar (1.0 L)	24 No.
10.	Food processor set	2 No.
11.	Wire baskets	3 No.
12.	Casseroles stainless steel	3 No.
13.	Saucepan, stainless steel	6 No.

14.	Spoons, wooden	6 No.
15.	Spoon, basting	6 No.
16.	Paddles, wooden	6 No.
17.	Food tongs	6 No.
18.	Soaking container	6 No.
19.	Utility trays	6 No.
20.	Colanders, stainless steel	2 No.

Sr. No.	Consumable Items	Quantity for 24 candidates
1	NaoH (PELLETS)	3 Kg
2	HNO_3	3 ltr
3	H_2SO_4	2.5 ltr
4	Ethanol (Absolute)	5 Ltr
5	Phenolphthalein	1 Bottle (100 gm)
6	Burette Set	6 No.
7	Pipette 1ml	10 No.
8	Pipette 5ml	10 No.
9	Pipette 10 ml	10 No.
10	Pipette 10.94 ml	5 No.
11	Auto sucker	10 No.
12	Volumetric flask 100 ml	5 No.
13	Volumetric flask 250 ml	5 No.
14	Volumetric flask 500 ml	5 No.
15	Volumetric flask 1000 ml	5 No.
16	Measuring Cylinder 100 ml	5 No.
17	Measuring Cylinder 500 ml	5 No.
18	Measuring Cylinder 1000 ml	5 No.
19	Reagent Bottles	10 No.
20	Glass Beaker 50 ml	5 No.
21	Glass Beaker 100 ml	5 No.
22	Glass Beaker 250 ml	5 No.

23	Glass Beaker 500 ml	5 No.
24	Tool and Equipment	5 No.
25	Capillary tube	1 Box
26	Filter paper (90 mm)	2 Box
27	Iso amyl alcohol	1 ltr
28	Test tube 20 ml	20 No.
29	Thermometer (0-100 C)	10 No.
30	Violet Red Bile Agar	1 box
31	Potato Dextrose Agar	1 Box
32	Swab Sticks	1 Box
33	Inoculating loops	5 No.
34	Burner	5 No.
35	Potassium Metabisulphite	100 gm
36	Sodium Citrate	100 gm
37	Yeast (Sachet)	50 No.
38	Baking Soda	1 kg

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