



National Vocational Qualification
CURRICULUM OF FOOD TECHNOLOGY

Level 3

(Line Supervisor/ Lab Attendant)

National Vocational and Technical Training Commission
Islamabad

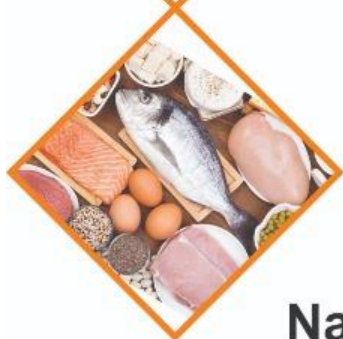


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1. INTRODUCTION

The agriculture sector is playing pivotal role to maintain the economy of the Pakistan where large number of individuals are directly or indirectly related to this sector to earn their livelihood. Pakistan has been bestowed with enormous climatic conditions conducive for producing multiple agricultural crops. However, much of the food produced is wasted due to negligence and lack of processing facilities. Alongside, there is always a huge need for food preservation and processing units capable of producing and ensuring availability of safe food for all necessary to maintain food security in the country. Hence, this course is specifically designed to develop basic to advanced skills and knowledge of the personnel related to Food Technology with special emphasis on requirements of the food industries with respect to safety and quality of the food products. The step by step training of the students in this course ensures polishing their skills to adapt and perform in the multidisciplinary environment of the food industries with variable food processing operations. The students are encouraged to implement their theoretical knowledge to wide range of food handling and processing environments such as raw material procurement, processing, storage, packaging and transportation while managing the quality and safety in the food systems. Furthermore, the students are introduced with new skills in a stepwise manner to increase their troubleshooting competencies in changing food operations. Notably, students are stimulated to polish their entrepreneurial skills and explore new horizons of the food processing industry. To improve the quality and relevancy of this training program, National Vocational & Technical Training Commission via Qualification Development Committee (QDC) developed National Competency Standards Level 5 for Food Technology. The learning outcomes through this curriculum provide enough grounds to enrich the food industry with demand-driven trained personnel in line with the latest industrial needs. Furthermore, this curriculum can be implemented in different sectorial pathways with flexibility in both public and private sector institutes.

2. PURPOSE OF THE TRAINING PROGRAMME

The purpose of this qualification is to give the trainee a thorough understanding of Food Technology in the industry with effective quality control and safety of the food products. Food Technology operations are diversified and continuously subject to various changes. Therefore, it is important to emphasize on a multidisciplinary approach to meet the requirements of the industry and cope the encountered challenges in the food sector. Upon successful completion of this course the trainees will be aware of:

- The core elements of food processing and preservation techniques
- The chemistry underlying the properties and reactions of various food components
- The principles behind analytical techniques associated with food
- The laboratory techniques common to basic and applied food chemistry
- The basic principles and practices of hygiene and sanitation in food processing operations
- Applying the principles of food science to assure the quality and safety of food products.
- Waste management in food industries
- Providing supervision and working effectively with others in a variety of situations and dealing with individual and/or group conflict.

3. Overall objectives of training course

The primary objective of this training program is to provide the trainees with up-to-date knowledge and skills required by the food sector in a comprehensive way to cope the challenges of the food industries. After qualifying the course at level 3, the students will be able to get job in the food industries and able to perform as entrepreneurs. The contents of the course are specifically designed in such a way that it covers all the major food sectors of Pakistan.

The overall objectives of developing this qualification are to:

- Improve the overall quality of training delivery and setting national benchmarks for training of Food Technology (Level 3 in the country)
- Provide flexible and progressive learning opportunity for trainees to receive relevant and up-to-date skills of food industry
- Provide basis for competency-based assessment which is recognized and accepted by employers in modern days
- Establish a standardized and sustainable training in consultation with the food industry.

4. Qualification Validation Committee

The following members participated in the qualifications validation meeting from February 07-11, 2022 at Pakistan Industrial Technical Assistance Center (PITAC), Lahore:

Sr.	Name	Designation
1.	Mr. Muhammad Aasim	Convener/Assistant Director, NAVTTC Coordinator
2.	Mr. Muhammad Nasir Khan	DACUM Facilitator, Ex-Deputy Director, SS&C Wing, NAVTTC
3.	Mr. Naeem-ur-Rehman Zafar	Deputy Manager Technical Application, AB Mauri Pakistan Pvt. Ltd. (Industry)
4.	Dr. Shinawar Waseem Ali	Ex-Quality Assurance Officer K&N Pakistan Associate Professor, Institute of Agricultural Sciences, University of the Punjab, Lahore
5.	Mr. Muhammad Ahmad	Manager Projects LabOnline Bizware (Private) Limited (Industry)
6.	Mr. Mubeen Arshad Awan	Quality Assurance Head, YUM Group (Industry) Former Director PFA
7.	Mr. Hafiz Rehan Nadeem	Secretary General (NAFS), National Alliance for Safe Food, Pakistan
8.	Dr. Muhammad Ajmal	Representative P-TEVTA HOD, Food Technology, Govt. College of Technology, Sahiwal
9.	Dr. Tabussam Tufail	Assistant Professor, University of Lahore
10.	Dr. Ihtisham-Ul-Haq	Assistant Professor, Kauser Abdulla Malik School of Life Science, Forman Christian College (A Chartered University), Lahore
11.	Mr. Muhammad Abdul Aziz	Ex-Manager, Munchies Food, Islamabad Ex-Manager, Dominos, Islamabad
12.	Dr. Sumaira Maqsood	Assistant Professor Entomology, Institute of Agricultural Sciences, University of the Punjab, Lahore
13.	Ms. Samina Kulsoom	Representative S-TEVTA GCT Girls, Karimabad, Karachi
14.	Mr. Engr. Kifayatullah Khan	Representative B-TEVTA HOD Food Technology, Govt. Polytechnic Institute, Khanozia
15.	Mr. Shaukat Ali Rana	Representative PBTE Deputy Controller Examination

5. Competencies to be gained after completion of course

After completing this course, the students will be capable of performing different food processing operations decently in the food industries. Furthermore, this skilled training program enables the students to develop multispectral competencies such as creative thinking, problem solving, research skills, personal and group management, presentation and communication skills, technical and professional negotiations related to food processing operations. The below listed competencies imprinted by this training program are quite prominent to the students' profile to enhance their employability in their career in food sector:

- Knowledge and concepts of processing operations in food industry
- Creative thinking and troubleshooting skills in food manufacturing
- Potential to translate theoretical knowledge into practice
- Identify and explore potential areas of opportunities in food sector
- Develop strategies to maintain quality and safety of food products
- Time management, working in teams and conflict handling among co-workers
- Safe and secure use of workplace tools, techniques and materials at worksites
- Digital documentation and effective communication skills
- Working in commercial setups and meeting the timelines

6. Job opportunities available immediately and in the future

The successful pass outs of this course may avail entrepreneurial opportunities and/or fetch job/employment in food sectors as

- Line Supervisor/ Lab Attendant (Level-III)

7. Trainee Entry Level:

- Matric science or equivalent with Level 2 qualified

8. Minimum Qualification of Trainer

- 2-5 years of professional experience in food industry after BS Food Science & Technology / DAE (Food Technology)

9. Recommended trainer: trainee ratio

- The recommended trainer and trainee ratio is 1:24 per class

10. Medium of Instruction:

- Urdu, English or Regional Language

11. Duration of Course (Total time, theory & practical)

Module #	Title	Theory Total (Hours)	Practical Total (Hours)	Total (Hours)	Credit hours
1.	Adopt Basic Good Manufacturing Practices (GMP) in Food Industry	12	48	60	06
2.	Apply Food Processing Techniques	14	56	70	07
3.	Perform Carbonated Beverage Processing	12	58	70	07
4.	Perform Meat Processing	14	56	70	07
5.	Perform Fruits and Vegetables Processing	10	60	70	07
6.	Perform Processing of Edible Oils and Fats	12	48	60	06
7.	Perform Milling of Grains	14	56	70	07
8.	Perform Butter Making Process	12	48	60	06
9.	Digital Skills	20	50	70	07
Total hours		120	480	600	60

SUMMARY OF COMPETENCY STANDARDS

The proposed curriculum is composed of 09 modules that will be covered in 600 hrs. It is proposed that the course may be delivered in six-month period. The distribution of contact hours (practical & theory) is given below:

- **Theory:** (20%) **Practical** (80%)
- **Theory:** 120 hours
- **Practical:** 480 hours

12. SUMMARY – OVERVIEW OF THE CURRICULUM

Module Title	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 01. Adopt Basic Good Manufacturing Practices (GMP) for Food Industry	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 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	12	48	60

	LU10. Apply basic GMP requirements in regard to measures for prevention of cross contamination LU11. Apply basic GMP requirements regarding Integrated Pest Management (IPM) LU12. Apply basic GMP requirements regarding food defense			
Module 02. Apply Food Processing Techniques	LU1. Prepare food for processing LU2. Apply size reduction techniques LU3. Apply extraction techniques LU4. Apply high temperature techniques LU5. Apply low temperature techniques LU6. Apply fermentation techniques LU7. Apply evaporation techniques LU8. Monitor adding of ingredients LU9. Push batches to preservation and for packaging process LU10. Produce beverages LU11. Handle food additives LU12. Perform basic calculation	14	56	70
Module 03. Perform Carbonated Beverage Processing	LU1. Apply standard formulation procedure LU2. Apply mixing process LU3. Ensure Pasteurization and homogenization of for carbonated drinks LU4. Ensure carbonation and cooling of carbonated drinks LU5. Filling of beverages	12	58	70
Module 04. Perform Meat Processing	LU1. Inspect the live animals LU2. Perform Halal Slaughtering LU3. Grading and chilling of carcass LU4. Cutting and/or mincing of meat LU5. Packaging and labeling of meat LU6. Freezing, and storage of meat	14	56	70
Module 05. Perform Fruits and Vegetables Processing	LU1. Receive fruits and vegetables according to quality parameters LU2. Perform Cleaning of Fruits and Vegetables	10	60	70

	LU3. Perform preparatory operations LU4. Prepare value-added products from fruits LU5. Prepare value-added products from vegetables LU6. Perform Drying Process LU7. Perform Freezing process			
Module 06. Perform Processing Of Edible Oils And Fats	LU1. Perform load and unload tankers LU2. Perform Fats and oil analysis LU3. Perform neutralization process LU4. Perform bleaching process LU5. Perform deodorizing process LU6. Perform hydrogenation process LU7. Perform interesterification process LU8. Perform fractionation process LU9. Perform processed liquid fill process	12	48	60
Module 07. Perform Milling of Grains	LU1. Perform milling of wheat LU2. Perform milling of rice LU3. Perform milling of corn	14	56	70
Module 08. Perform Butter Making Process	LU1. Receive milk for process LU2. Prepare cream LU3. Inoculate culture LU4. Perform butter churning LU5. Add butter additives LU6. Perform testing of prepared butter LU7. Perform butter pressing/moulding LU8. Perform Packaging and labelling LU9. Ensure optimum storage conditions	12	48	60

Module 01: Adopt Basic Good Manufacturing Practices (GMP) in Food Industry

Objective: 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
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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	<ul style="list-style-type: none"> Permit adequate cleaning and/or disinfection Protect against the accumulation of dirt, toxic materials, food debris and the formation of condensation Aware of layout and construction of the food premises as per Food hygiene legislation Provide sufficient space for food production and storage of equipment Adequate mechanical ventilation to effectively remove fumes, smoke, steams, and vapours from food premises Follow safety rules and regulations for the food processing industry 	<ul style="list-style-type: none"> Describe importance of layout in food industry (display lay-out in variant places) Explain 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, processed material etc.) Describe the Importance of mechanical ventilation (exhaust and ducting system) 	1 hours Theory 6 hours Practical Total: 7 hours	PPE's (Face Mask, Gloves, Caps, Aprons, Shoe Cover, Hand Sanitizer, Soap, Goggles) Insectocutor, Bait Station, Glue Boards, Cages tempered glass, Glass protective lights	Class Room and workplace

		<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Perform proper hand washing and disinfection procedures before entering production area. Report to supervisor in the case of illness Wear Personal Protective Equipment (PPE) as per SOPs regarding hygienic measures 	<ul style="list-style-type: none"> Describe Personal hygiene in food processing and their importance of entrance protocol as per area requirement. Elaborate GMP standards for ensuring food safety through personal hygiene 	1 hours Theory 6 hours Practical Total: 7 hours	Disinfectant, sanitizer,	Class Room and workplace
LU3. Apply basic GMP requirements in regard to food processing, including rework	<ul style="list-style-type: none"> Make sure that the actual food rework is clearly identifiable. Perform rework handling as per industry standards. Maintain traceability records of all food rework 	<ul style="list-style-type: none"> Describe rework handling procedure (batch documentation & product history) Describe rework handling of food processing industry standards and traceability 	1 hours Theory 6 hours Practical Total:7 hours		Class Room and workplace
LU4. Apply basic GMP requirements in regard to food packaging	<ul style="list-style-type: none"> Prevent contamination in manufacturing, storage and transportation Ensure food contact materials and products are safe for their intended uses Maintain packing surfaces and equipment to minimize product damage and contamination 	<ul style="list-style-type: none"> Define GMP in food packaging area (packaging environment & packaging parameters) Describe how to avoid contamination during packaging of food 	1 hours Theory 3 hours Practical Total:4 hours	Hose cleaning pipe, scrubbers, mopes, color coded brushes, Cleaning agents	Class Room and workplace
LU5. Apply basic GMP requirements in regard to	<ul style="list-style-type: none"> Fill out specifications, records, batch production records for production under supervision 	<ul style="list-style-type: none"> Define how to maintain documentation in food industry 	1 hours Theory	Thermometer	

documentation and records	<ul style="list-style-type: none"> Interpret laboratory control records Maintain records to support that any Good manufacturing practices (GMP) have been implemented Locate documents of external origin, if needed Safeguard documents and records appropriately 	<ul style="list-style-type: none"> Define recommended paper work to be completed (log sheets, log book, batch reports/check lists), 	3 hours Practical Total: 4 hours		
LU6. Apply basic GMP requirements to production quality control and in process controls	<ul style="list-style-type: none"> Follow master production instructions (SOPs) Perform basic in-process control measurements (e.g. pH, weighing) under supervision Perform basic quality control measure under supervision 	<ul style="list-style-type: none"> Explain elements of process control (measurements, control strategy, control action) Define pH 	1 hours Theory 6 hour Practical Total:7 hours	Weighing scale, pH meter	Class Room and workplace
LU7. Apply basic GMP requirements in regard to storage, warehousing and distribution	<ul style="list-style-type: none"> Store materials and end product appropriately Follow First Expire First Out (FEFO)/First in First Out (FIFO) Ensure stacking method as per product description Ensure Product storage as per required parameters (temperature, humidity etc.) 	<ul style="list-style-type: none"> Define FEFO and FIFO and its importance Define the materials inventory and stock taking Recommended procedure of storage foods in warehouse and proper distribution 	1 hours Theory 3 hour Practical Total:4 hours	trolleys, pallets, racks, temperature gauge, humidity gauge, tags	Class Room and workplace
LU8. Apply basic GMP requirements in regard to management of purchased materials	<ul style="list-style-type: none"> Handle the raw materials as per product requirements Meet not only manufacturing order specifications, but also regulatory requirements 	<ul style="list-style-type: none"> Describe Importance of handling raw materials Define recommended specifications and regulatory requirements in food industry 	1 hours Theory 3 hour Practical	trolleys, sieves, sorter	Class Room and workplace

	<ul style="list-style-type: none"> • Select the appropriate raw materials based on functionality • List of existing approved materials and their specifications • Meet existing company or customer standards (e.g. halal, organic, gluten-free) 		Total:4 hours		
LU9. Apply basic GMP requirements in regard to cleaning and sanitation	<ul style="list-style-type: none"> • Ensure safe food supply • Follow sanitation procedures for all food contact equipment and food contact surfaces • Analysis the root cause of sanitation failures • Maintain record keeping associated with the sanitation procedure 	<ul style="list-style-type: none"> • Describe the importance of safe food supply • Appropriate measures for safe supply of food 	1 hours Theory 3 hour Practical Total:4 hours	trolleys,	Class Room and workplace
LU10. Apply basic GMP requirements in regard to measures for prevention of cross contamination	<ul style="list-style-type: none"> • Ensure segregation of area according to hygiene requirement (Zoning) • Control equipment to minimize odors and vapors (including steam and noxious fumes) in areas where they may contaminate food • Ensure adequate floor drainage systems in all areas 	<ul style="list-style-type: none"> • Importance of segregation of area into different zoning • Describe the routes of contamination • Differentiate between chance contamination and cross contamination 	1 hours Theory 3 hour Practical Total:4 hours	trolleys, exhaust fan, racks	Class Room and workplace
LU11. Apply basic GMP requirements in regard to Pest Management	<ul style="list-style-type: none"> • Identify Target pest related to workplace area • Ensure preventive measures in regard to pest entry in food processing area 	<ul style="list-style-type: none"> • Write down strategies of pest control • Define integrated pest control broad-based approach that integrates practices for economic 	1 hours Theory 3 hour Practical	Insectocutor, Bait Station, Glue Boards, Straws, Cages, air curtain, spray tanks	Class Room and workplace

	<ul style="list-style-type: none"> • Install monitoring devices (Insectocutor, Bait Station, Glue Boards, Straws, Cages) • Clean and maintain monitoring devices • Maintain record and trend analysis 	control of pests (solve pest problem)	Total:4 hours		
LU12. Apply basic GMP requirements in regard to food defense	<ul style="list-style-type: none"> • Prevent intentional contamination of food products (Human intervention as the source of contamination) • Prevent accidental (unintentional) contamination of food products • Minimize risk and impact of an incident of intentional contamination 	<ul style="list-style-type: none"> • Define strategies to Protect Food Against Adulteration • Define risk management in food defense 	1 hours Theory 3 hour Practical Total:4 hours	Camera, metal detector, colored uniform shirts,	Class Room and workplace

Module 02: Apply Food Processing Techniques

Objective: After completing this module, the learner will be able to apply skills and specific knowledge to perform food processing techniques in accordance with the industry approved guidelines, procedure as well as the manufacturing order. Trainee will be expected to apply food processing techniques according to the work place requirements. The underpinning knowledge regarding food processing techniques will be sufficient to provide the basis for the job at workplace.

Duration:	Total hours	70	Practical	56	Theory	14
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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials (Tools & Equipment) Required	Learning Place
LU1. Prepare food for processing	<ul style="list-style-type: none"> Perform sorting, grading and peeling methods for fruits and vegetables Perform dressing of Meat, Poultry and Marine food Perform shelling of eggs and dry fruits Ensure batch loading as per recipe 	<ul style="list-style-type: none"> Define sorting and grading Define different types of meats. Enlist preparatory operations for food processing Define shelling in dry fruits 	2 hours Theory 6 hours Practical Total hours: 8	Chopper Cutting Boards Peeling Knives Abrasive Peeler Pumps Sorter Egg sheller	Class Room and workplace
LU2. Apply size reduction techniques	<ul style="list-style-type: none"> Perform cutting of fruits and vegetables by using different methods Perform cutting, mincing, filleting of Meat and Fish Perform grinding and milling 	<ul style="list-style-type: none"> Define size reduction in fruits and vegetables Demonstrate filleting in meat & fish Describe milling and grinding process 	1 hours Theory 3 hours Practical Total hours: 4	Cutting Boards Cutting Knives Shredder Mincer Filleting Knife Grinder	
LU3. Apply extraction techniques	<ul style="list-style-type: none"> Perform extraction techniques in fruits and vegetables Perform extraction techniques in Fat and Oil 	<ul style="list-style-type: none"> Define extraction Demonstrate methods of extraction. Differentiate between fats & oils 	1 hours Theory 5 hours Practical	Cooker Rose head machine Juicer / Extractor Pulper Soxhlet Apparatus Oil Extractor	

			Total hours: 6		
LU4. Apply high temperature techniques	<ul style="list-style-type: none"> Perform pasteurization of different food products Perform sterilization of different food products Perform (UHT) Ultra High Temperature treatment for liquid foods Perform blanching of Fruits and vegetables Use dry heat method for different foods 	<ul style="list-style-type: none"> Define blanching Describe Pasteurization Demonstrate Sterilization. Explain UHT parameters Explain dry heat methods 	1 hours Theory 5 hours Practical Total hours: 6	Steamer Pasteurizer Blancher Retort Cooking pan Double jacketed kettle Vacuum evaporator	Class Room and workplace
LU5. Apply low temperature techniques	<ul style="list-style-type: none"> Use refrigeration/cold storage methods for different foods Perform freezing techniques for foods Apply different chilling techniques for foods 	<ul style="list-style-type: none"> Define hardening process in frozen products. Differentiate between refrigeration and chilling. Demonstrate freezing techniques 	1 hours Theory 5 hours Practical Total hours: 6	Freezer Refrigerator Chiller	Class Room and workplace
LU6. Apply fermentation techniques	<ul style="list-style-type: none"> Perform lactic acid fermentation for foods Perform Acetic Acid fermentation for foods Perform Alcoholic fermentation for foods 	<ul style="list-style-type: none"> Explain types of fermentation. Differentiate between lactic acid and acetic acid fermentation Demonstrate different fermentation techniques 	1 hours Theory 5 hours Practical Total hours: 6	Fermenter Evaporators Proofer Slicers Fillers Ovens	
LU7. Apply evaporation techniques	<ul style="list-style-type: none"> Use different evaporation techniques Use spray drying method for liquid foods Perform drum drying for foods 	<ul style="list-style-type: none"> Describe working principle of evaporators Demonstrate methods of drying Demonstrate drum drying 	1 hours Theory 5 hours Practical	Heat exchangers Extractors Centrifuge Evaporator Drum Dryer Spray Dryer	

			Total hours: 6		
LU8. Monitor adding of ingredients	<ul style="list-style-type: none"> Check flavor, aroma and appearance of ingredients Ensure addition of ingredients as per specification Maintain record of ingredients 	<ul style="list-style-type: none"> Explain basic principles of sensory evaluation. Differentiate between preservative and non-preservative additives. 	1 hours Theory 3 hours Practical Total hours: 4	Weighing scale Mixers PPEs Stationary items	
LU9. Push batches to preservation and for packaging process	<ul style="list-style-type: none"> Perform incubation / Maturation for different food Perform storage of finished products at low temperature Perform Hardening of frozen products 	<ul style="list-style-type: none"> Explain need of incubation and maturation in food industry. Demonstrate different methods of food preservation and packaging 	1 hours Theory 5 hours Practical Total hours: 6	Blenders Packaging Machines Printers Metal Detectors Incubator	
LU10. Produce beverages	<ul style="list-style-type: none"> Prepare carbonated drink as per recipe Prepare non-carbonated drink as per recipe 	<ul style="list-style-type: none"> Define and classify beverages. Differentiate between carbonate and non-carbonated beverages 	1 hours Theory 5 hours Practical Total hours: 6	Chillers Agitators Separators Homogenizers Freezer	
LU11. Handle food additives	<ul style="list-style-type: none"> Use different preservative chemicals for food preservation Perform enrichment and fortification Use functional additives to improve physical and chemicals properties 	<ul style="list-style-type: none"> Demonstrate continuous and batch type processing Explain the effects of food processing on Carbohydrates, Proteins, Fats, Minerals and Vitamins 	2 hours Theory 6 hours Practical Total hours: 8	Weighing Scale Fortificant Dossier Mixer	

LU12. Perform basic calculation	<ul style="list-style-type: none"> • Perform calculations for dry and wet ingredients • Calculate process losses 	<ul style="list-style-type: none"> • Describe method of calculation for dry and wet ingredients • Describe process losses 	1 hours Theory 3 hours Practical Total hours: 4	Temperature Transmitter Level Transmitters Sensors Filters Scribers Refiners Sieves Coating Pans Fryers Bag Sealers	
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Module 03: Perform Carbonated Beverage Processing

Objective: After completing this module, the learner will be able to perform carbonated beverage processing in accordance with the industry approved guidelines, procedure as well as the manufacturing order. Trainee will be expected to perform carbonated beverage processing techniques according to the work place requirements. The underpinning knowledge regarding carbonated beverage processing will be sufficient to provide the basis for the job at workplace.

Duration:	Total hours	70	Practical	58	Theory	12
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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials (Tools & Equipment) Required	Learning Place
LU1. Apply standard formulation procedure	<ul style="list-style-type: none"> Ensure availability of all ingredients as per formulation Ensure formulation contains permitted ingredients Tag each food ingredients appropriately Check the working of weighing balance and its calibration. 	<ul style="list-style-type: none"> Define and classify beverages. Enlist permitted and non-permitted ingredients of beverages Enlist beverage processing equipment Demonstrate calibration process 	2 hours Theory 9 hour Practical Total:11 hours	Ingredients, weighing scale	Class Room and laboratory
LU2. Apply mixing process	<ul style="list-style-type: none"> Check the working of mixing tank / agitator Check availability of all utilities Check the cleaning of all equipment used Check strainers and line filters are in sound condition 	<ul style="list-style-type: none"> Demonstrate mixing methods in beverages Demonstrate pasteurization Define function of strainer Demonstrate steps to clean beverage equipment 	3 hours Theory 15 hour Practical Total hours: 18	Mixing tank, Pasteurizer Filler, strainer	Class Room and laboratory
LU3. Ensure Pasteurization and homogenization of carbonated drinks	<ul style="list-style-type: none"> Check availability of steam for pasteurization Ensure pasteurizer temperature gauge is in working condition and calibrated. Check the leakage of pasteurizer 	<ul style="list-style-type: none"> Explain parameters of pasteurizer for beverages Demonstrate homogenization 	3 hours Theory 12 hour Practical Total:15 hours	Pasteurizer, homogenizer, boiler, Carbo cooler	Class Room and laboratory

	<ul style="list-style-type: none"> • Ensure homogenizer is in working condition • Check the sample before and after homogenization 				
LU4. Ensure carbonation and cooling of carbonated drinks	<ul style="list-style-type: none"> • Check quality of CO2 gas as per specifications • Check the working of carbo cooler condenser and temperature gauges • Check any leakage from carbo cooler and all pipelines at inlet and outlet • Check CO2 gas volume in the final product after certain intervals as per sampling plan • Check sealing of container 	<ul style="list-style-type: none"> • Enlist the impurities in CO2 gas • Describe the function of CO2 gas • Demonstrate the operation of carbo cooler 	2 hours Theory 12 hour Practical Total:14 Hours	Pasteurizer Carbonation cylinder machine / Carbonation tester Filler, sealer, container	Class Room and laboratory
LU5. Filling of beverages	<ul style="list-style-type: none"> • Ensure quality of packaging material • Check all filters and strainers are in place before starting beverage filling. • Ensure product meet the quality parameters as per standard specifications • Perform filling and sealing • Check the labelling and date coding 	<ul style="list-style-type: none"> • Explain packaging quality parameters for beverages • Demonstrate function of space head in beverages • Differentiate between cold and hot filling • Demonstrate procedure for hot and cold filling 	2 hours Theory 10 hour Practical Total:12 hours	Filler, capper, filters, strainers, sealer, date coding machine	Class Room and laboratory

Module 04: Perform Meat Processing

Objective: After completing this module, the learner will be able to perform meat processing in accordance with the industry approved guidelines, procedure as well as the manufacturing order. Trainee will be expected to perform meat processing techniques according to the work place requirements. The underpinning knowledge regarding meat processing will be sufficient to provide the basis for the job at workplace.

Duration:	Total hours	70	Practical	56	Theory	14
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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials (Tools Equipment) & Required	Learning Place
LU1. Inspect the live animals	<ul style="list-style-type: none"> Check the animal / bird health Calculate the mortality rate in case of poultry Calculate the average weight and size of the animal/bird 	<ul style="list-style-type: none"> Demonstrate pre-mortem inspection of live animals Describe types of meat Explain composition and nutritional value of meat 	2 hours Theory 9 hour Practical Total: 11 hours	Animals/birds (Poultry, Goat, Cattle etc.) Weighing scale, calculator	Class Room and laboratory
LU2. Perform Halal Slaughtering	<ul style="list-style-type: none"> Apply basic Shariah principles for slaughtering Perform Halal Slaughtering (Zabiha) Ensure complete blood removal of slaughtered animals / birds. 	<ul style="list-style-type: none"> Define Halal slaughtering process Describe the requirements of Halal slaughtering Demonstrate Halal Slaughtering and skinning 	3 hours Theory 12 hour Practical Total:15 hours	Animals/birds (Poultry, Goat, Cattle etc.), Knives, cutters, water, bleeding cones/tank	Class Room and laboratory
LU3. Grading and chilling of carcass	<ul style="list-style-type: none"> Grade the carcasses as per weight, age and size specifications Monitor chilling process as per specifications 	<ul style="list-style-type: none"> Define marbling Describe grading of meat Define meat spoilage Demonstrate chilling process 	3 hours Theory 12 hour Practical	Weighing scale, chillers, freezer, knives, trollys, crates, cold store, Temperature Gauge	Class Room and laboratory

	<ul style="list-style-type: none"> Record the temperature of chilled carcass Separate the out-of-specifications product Rectify the process as per procedures 		Total:15 hours		
LU4. Cutting and/or mincing of meat	<ul style="list-style-type: none"> Perform cutting/mincing as per product specifications Identify the non-conforming product Dispose waste generated by the process as required 	<ul style="list-style-type: none"> Demonstrate meat cuts and cutting equipment Explain processing of different meat cuts Define waste disposal 	2 hours Theory 9 hour Practical Total:11 hours	Weighing scale, mincer, chopper, chillers, freezer, knives, trolleys, crates, cold store, cutting board	Class Room and laboratory
LU5. Packaging and labeling of meat	<ul style="list-style-type: none"> Inspect the packaging material to meet the specifications Monitor the packaging of products as per label specifications Check the temperature of finally packed products 	<ul style="list-style-type: none"> Explain packaging materials nature and specifications Demonstrate labeling requirements for meat and meat products 	2 hours Theory 8 hour Practical Total:10 hours	Packaging machine, thermometer, wrappers, chiller, cold store, date coding machine	Class Room and laboratory
LU6. Freezing and storage of meat	<ul style="list-style-type: none"> Check the blast freezer is working as per specifications Monitor the freezing procedure is being followed as per specifications Check the storage conditions at specified temperatures Store the final products in freeze storage (-18 oC) 	<ul style="list-style-type: none"> Describe blast freezing Describe the defects in frozen meat Describe frozen storage working protocols Demonstrate thawing procedures 	2 hours Theory 6 hour Practical Total: 8 hours	Thermometer, blast room, freezers, wrappers, chiller, cold store, racks, crates	Class Room and laboratory

Module 05: Perform Fruits and Vegetables Processing

Objective: After completing this module, the learner will be able to perform fruits and vegetables processing in accordance with the industry approved guidelines, procedure as well as the manufacturing order. Trainee will be expected to perform fruits and vegetables processing techniques according to the work place requirements. The underpinning knowledge regarding fruits and vegetables processing will be sufficient to provide the basis for the job at workplace.

Duration:	Total hours	70	Practical	60	Theory	10
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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials (Tools & Equipment) Required	Learning Place
LU1. Receive fruits and vegetables according to quality parameters	<ul style="list-style-type: none"> Inspect fruits and vegetables as per food safety requirements (Pest contamination, cuts, appearance etc.) Perform sorting and grading to meet specifications. 	<ul style="list-style-type: none"> Describe quality parameters of fruits & vegetables Define fruit processing Define respiration of fruits and vegetables Demonstrate sorting and grading of fruits and vegetables 	2 hours Theory 08 hour Practical Total:10 hours	Receiving container Sorter Fruits and Vegetables, Weighing Scale	Class Room and laboratory
LU2. Perform Cleaning of Fruits and Vegetables	<ul style="list-style-type: none"> Perform washing and cleaning. Operate conveyers used to transfer materials to required locations. Maintain work area and equipment to meet housekeeping standards 	<ul style="list-style-type: none"> Describe chemicals used for washing of fruits and vegetables Describe methods used to clean materials. (This includes both wet and dry-cleaning methods) Explain consequences of inadequate cleaning of raw material. 	2 hours Theory 08 hour Practical Total:10 hours	Water, cleaning agent, washing tank	Class Room and laboratory
LU3. Perform preparatory operations	<ul style="list-style-type: none"> Perform blanching as per set specifications. Operate peeler. Operate destoner. 	<ul style="list-style-type: none"> Define blanching Explain function of peeler and destoner 	2 hours Theory 08 hour	Blancher, Peeler, destoner,	Class Room and laboratory

	<ul style="list-style-type: none"> Perform Cutting, Slicing, Dicing, Shredding, Pulping, Crushing etc. Perform Mixing according to product requirements 	<ul style="list-style-type: none"> Explain different types of mixing Demonstrate shredding, dicing and cutting 	Practical Total:10 hours	Shredder, pulper, Cutting boards, choppers, knives, peelers, slicers Mixer	
LU4. Prepare value-added products from fruits	<ul style="list-style-type: none"> Prepare batch according to set specifications by mixing fruits and additives. Perform syrumping of fruits. Check quality parameters (Brix, viscosity, acidity, sensory evaluation) 	<ul style="list-style-type: none"> Differentiate between syrumping and brining Explain quality parameters standards like brix, viscosity, acidity Demonstrate working refractometer Describe quality characteristics of the fermented and pickled product 	1 hours Theory 09 hour Practical Total:10 hours	Fruits, Water, Mixing tank, Sugar, Refractometer, pH meter, Viscometer	Class Room and laboratory
LU5. Prepare value-added products from vegetables	<ul style="list-style-type: none"> Prepare batch according to set specifications by mixing vegetables and additives. Perform brining for vegetables Check quality parameters (Brix, viscosity, acidity, sensory evaluation) 	<ul style="list-style-type: none"> Describe concentration of brine & syrup solutions Enlist sensory evaluation parameters of fruits and vegetables Demonstrate working of salometer 	1 hours Theory 10 hour Practical Total:11 hours	Vegetables, Water, Mixing tank, salt, salometer Refractometer, pH meter, Viscometer	Class Room and laboratory
LU6. Perform Drying Process	<ul style="list-style-type: none"> Check control points to confirm performance is maintained as per specification Operate dryer for fruit products Perform routine analysis to check the quality of the final product 	<ul style="list-style-type: none"> Define dehydration Explain microbiological considerations in drying Demonstrate different methods of drying 	1 hours Theory 09 hour Practical Total:10 hours	Fruits and vegetables, Dryer/Dehydrator Trays,	Class Room and laboratory

LU7. Perform Freezing process	<ul style="list-style-type: none"> • Check control points to confirm performance is maintained as per specification • Monitor equipment to confirm operating condition • Identify non-conforming product, process and equipment performance 	<ul style="list-style-type: none"> • Define freezing process • Define the chilling injury and freezing injury • Demonstrate the methods of freezing • Demonstrate the thawing process 	1 hours Theory 08 hour Practical Total: 09 hours	Fruits and vegetables, Blast freezer Baskets, trays, bags	Class Room and laboratory
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Module 06: Perform Processing of Edible Oils and Fats

Objective: After completing this module, the learner will be capable to perform the processing of edible oils and fats through the neutralization process, bleaching process, deodorizing, hydrogenation, interesterification, and packaging of the finished product. The trainees will be skilled to enhance various edible oils and fats products production skills.

Duration:	Total hours	60	Practical	48	Theory	12
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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials (Tools & Equipment) Required	Learning Place
LU1. Perform load and unload tankers	<ul style="list-style-type: none"> Prepare the tanker for loading/unloading process as per Standard Operating procedures (SOPs) Perform tanker loading/unloading process Identify non-conforming product, process and equipment Shut down tanker loading/unloading process Collect, treat, dispose off or recycle waste according to Standard Operating Procedures (SOPs) Record workplace information in the appropriate format 	<ul style="list-style-type: none"> Describe the method of loading / unloading a tanker Demonstrate loading and unloading operation Explain the safety risks associated with loading and unloading tankers 	1 hours Theory 3 hours Practical Total: 4 hours	PPEs,	Class Room and workplace
LU2. Perform Fats and oil analysis	<ul style="list-style-type: none"> Perform representative sampling for raw and processed oil for analysis Prepare all required reagents and solutions for analysis Perform all Physico-chemical analysis of oils and fats 	<ul style="list-style-type: none"> Describe the test for fat and oil Explain the roles of fats and oils Define fatty acid analysis 	1 hours Theory 6 hours Practical	Lovibond tintometer, Pycnometer, Titration Apparatus, Refractometer,	Class Room and workplace

	<ul style="list-style-type: none"> Maintain stock and record of all required chemicals and reagents 		Total: 7 hours	Hot air oven, Water Bath, Weighing Balance, Pensky-Martens closed cup apparatus, Thermometer	
LU3. Perform neutralization process	<ul style="list-style-type: none"> Prepare neutralization process for operation Ensure the availability of materials to meet production requirements Check equipment to confirm readiness for use Set the neutralization process to achieve production requirements Perform neutralization process Monitor control points to confirm that performance is maintained within specification Check neutralized product meets FFA and soap target specifications Maintain stock-flow to and from neutralization process within production requirements Identify out-of-specification product, process and equipment performance Shut down the neutralization process according to company procedures 	<ul style="list-style-type: none"> Define neutralization reaction and give two examples Define neutralization titration 	2 hours Theory 6 hours Practical Total: 8 hours	Lovibond tintometer, Pycnometer,	Class Room and workplace

	<ul style="list-style-type: none"> Collect, treat, dispose off or recycle waste according to company procedures Record workplace information in the appropriate format 				
LU4. Perform bleaching process	<ul style="list-style-type: none"> Prepare bleaching process for operation Set the bleaching process to meet production specifications Perform bleaching process Monitor control points to confirm that performance is maintained within specification Ensure bleached product meets color specifications Maintain stock-flow to and from bleaching within production requirements Identify out-of-specification product, process and equipment performance Shut down bleaching process Collect, treat, dispose off or recycle waste according to company procedures Record workplace information in the appropriate format 	<ul style="list-style-type: none"> Define Solomatic bleaching Name the chemical which is used as bleaching agent Describe why is H₂O₂ a universal bleaching agent Explain safety risks associated with leaching process 	2 hours Theory 6 hours Practical Total: 8 hours	Lovibond tintometer, Pycnometer,	Class Room and workplace
LU5. Perform deodorizing process	<ul style="list-style-type: none"> Prepare deodorizing process for operation Set the deodorizing process to meet production requirements Perform deodorizing process Start the deodorizing process according to company specifications 	<ul style="list-style-type: none"> Define deodorization process Describe method of palm oil deodorizing Explain cooking oil process Enlist vegetable oil refining procedure steps 	2 hours Theory 6 hours Practical Total: 8 hours	Lovibond tintometer, Pycnometer,	Class Room and workplace

	<ul style="list-style-type: none"> • Monitor control points to confirm that performance is maintained within specification • Ensure deodorized product meets odor and flavor specifications • Check equipment to confirm operating condition • Identify out-of-specification product, process and equipment performance • Shut down the deodorizing process according to company procedures • Collect, treat, dispose off or recycle waste according to company procedures • Record workplace information in the appropriate format 				
LU6. Perform hydrogenation process	<ul style="list-style-type: none"> • Prepare hydrogenation process for operation • Set the hydrogenation process to meet production requirements • Perform hydrogenation process • Monitor control points to confirm that performance is maintained within specification • Ensure Hydrogenated product meets melting point and fat profile specifications • Identify out-of-specification product, process and equipment performance • Shut down hydrogenation process 	<ul style="list-style-type: none"> • Define hydrogenation • Describe use of hydrogenation • Explain hydrogenation reaction • Elaborate hydrogenation process in edible oils 	1 hours Theory 6 hours Practical Total: 7 hours	Lovibond tintometer, Pycnometer,	Class Room and workplace

	<ul style="list-style-type: none"> Collect, treat, dispose off or recycle waste according to company procedures Record workplace information in the appropriate format 				
LU7. Perform interesterification process	<ul style="list-style-type: none"> Prepare interesterification process for operation Set the interesterification process to meet production requirements Perform interesterification process Ensure the interesterification process is started up according to company specifications Monitor control points to confirm that performance is maintained within specification Ensure product modification meets melting point and odor specifications Check equipment to confirm operating condition Stock flow to and from interesterification process is maintained within production requirements Identify and report out-of-specification product, process and equipment performance Shut down Interesterification process according to company procedures Collect, treat, dispose off or recycle waste according to company procedures 	<ul style="list-style-type: none"> Define Interesterified Enlist benefits of hydrogenation Define Interesterified canola 	1 hours Theory 6 hours Practical Total: 7 hours	Lovibond tintometer, Pycnometer,	Class Room and workplace

	<ul style="list-style-type: none"> Record workplace information in the appropriate format 				
LU8. Perform fractionation process	<ul style="list-style-type: none"> Prepare fractionation process for operation Ensure the availability of materials to meet production requirements Confirm readiness of services for the operation Check equipment to confirm readiness for use Set the fractionation process to meet production requirements Perform fractionation process Monitor control points to confirm that performance is maintained within specification Ensure fractionated product meets melting point specifications Maintain stock-flow to and from fractionation process within production requirements Identify and report out-of-specification product, process and equipment performance Shut down the fractionation process according to company procedures Collect, treat, dispose off or recycle waste according to company procedures Record workplace information in the appropriate format 	<ul style="list-style-type: none"> Enlist steps of cell fractionation Describe use of fractionation Define fractionation oil 	1 hours Theory 6 hours Practical Total: 7 hours	Lovibond tintometer, Pycnometer,	Class Room and workplace

LU9. Perform processed liquid fill process	<ul style="list-style-type: none"> • Prepare processed liquid fill process for operation • Set processed liquid fill process is set to meet production requirements • Perform a processed liquid fill process according to company specifications • Monitor control points to confirm that performance is maintained within specification • Ensure processed liquid fill meets specifications • Identify and report out-of-specification product, process and equipment performance • Shut down processed liquid fill process according to company procedures • Collect, treat, dispose off or recycle waste according to company procedures • Ensure complete cleaning of filling line • Ensure routine maintenance of filling line • Record workplace information in the appropriate format 	<ul style="list-style-type: none"> • Describe liquid filling process • Describe liquid filling machine • Differentiate between hot fill and cold fill • Define aseptic food processing 	1 hours Theory 3 hours Practical Total: 4 hours	Lovibond tintometer, Pycnometer,	Class Room and workplace
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Module 07: Perform Milling of Grains

Objective: After completing this module, the learner will be capable to demonstrate the understanding of the basic principles of grain milling. Trainee will be able to perform the main practical and activities associated with milling process.

Duration:	Total hours	70	Practical	56	Theory	14
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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials (Tools & Equipment) Required	Learning Place
LU1. Perform milling of wheat	<ul style="list-style-type: none"> Perform cleaning Ensure tempering and conditioning of wheat grains Perform grinding of wheat grains as per specifications and requirements Perform sifting of milled wheat products Perform packaging and storage of wheat products 	<ul style="list-style-type: none"> Describe milling process Demonstrate wheat flour milling process Demonstrate packaging process 	5 hour Theory 18 hour Practical Total: 23 hours	Milling machine, Sifter, sorter, Packing machine, metal detector Magnifying glass Tempering Bin, Hot air oven	Class Room and workplace
LU2. Perform milling of rice	<ul style="list-style-type: none"> Perform cleaning of paddy Monitor par boiling of paddy Operate husker Operate whitener Operate polisher Perform sorting to remove broken rice kernels Perform packaging and storage of rice products 	<ul style="list-style-type: none"> Describe milling process Demonstrate rice milling process Demonstrate the working of husker, whitener and polisher Demonstrate packaging process 	4 hour Theory 18 hour Practical Total: 22 hours	Milling machine, Sifter, Rice sorter, Packing machine, De-husker, Whitener, Polisher metal detector, Magnifying glass	Class Room and workplace

LU3. Perform milling of corn	<ul style="list-style-type: none"> • Perform cleaning • Ensure tempering and conditioning of corn grains • Perform grinding of corn grains as per specifications and requirements • Perform sifting of milled corn products • Perform separation of starch from corn • Perform separation of gluten from corn • Perform oil processing from corn • Perform packaging and storage of wheat products 	<ul style="list-style-type: none"> • Describe milling process • Demonstrate corn flour milling process • Demonstrate packaging process 	5 hour Theory 20 hour Practical Total: 25 hours	Milling machine, Sifter, sorter, Packing machine, metal detector, Magnifying glass	Class Room and workplace
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Module 08: Perform Butter Making Process

Objective: After completing this module, the learner will be capable to run the butter making process. The trainees will be skilled to enhance skills for butter production.

Duration:	Total hours	60	Practical	48	Theory	12
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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials (Tools & Equipment) Required	Learning Place
LU1. Receive milk for process	<ul style="list-style-type: none"> Conduct sensory evaluation Analyze quality of milk 	<ul style="list-style-type: none"> Demonstrate milk collection procedure Demonstrate common tests while receiving milk Enlist characteristics of raw milk 	2 hours Theory 6 hours Practical Total: 8 hours	Butyrometer, Gerber Machine, Pasteurizer	Class Room and workplace
LU2. Prepare cream	<ul style="list-style-type: none"> Perform separation of fat from milk Maintain temperature of separated cream Pasteurize cream 	<ul style="list-style-type: none"> Demonstrate cream preparation procedure Describe characteristics of cream 	2 hours Theory 6 hours Practical Total: 8 hours	Churning machine, Butter cream separator, Beater,	Class Room and workplace
LU3. Inoculate culture	<ul style="list-style-type: none"> Monitor culture temperature Apply appropriate dosage according to batch size Maintain batch temperature Check pH of cream 	<ul style="list-style-type: none"> Define inoculation Demonstrate culture inoculation Describe importance of inoculation 	1 hours Theory 6 hours Practical Total: 7 hours	Churning machine, Pasteurizer, pH meter	Class Room and workplace

LU4. Perform butter churning	<ul style="list-style-type: none"> • Operate butter churner • Maintain specification by monitoring control points • Collect and store the whey for further processing 	<ul style="list-style-type: none"> • Define butter churn • Demonstrate butter churning procedure • Explain the effects of over churning of butter 	2 hours Theory 6 hours Practical Total: 8 hours	Churning machine,	Class Room and workplace
LU5. Add butter additives	<ul style="list-style-type: none"> • Apply salt, colors and flavors according to set specification • Mix additives as per SOP 	<ul style="list-style-type: none"> • Enlist milk additives • Enlist roles of additives • Demonstrate the mixing process 	1 hours Theory 6 hours Practical Total: 7 hours	Mixer	Class Room and workplace
LU6. Perform testing of prepared butter	<ul style="list-style-type: none"> • Determine moisture percentage • Determine fat percentage • Determine salt contents • 	<ul style="list-style-type: none"> • Describe butter testing method • Demonstrate fat measurement • Describe butter composition 	1 hours Theory 6 hours Practical Total: 7 hours	Butyrometer, Gerber machine, Petri plates, Desiccator, Weighing balance,	Class Room and workplace
LU7. Perform butter pressing/moulding	<ul style="list-style-type: none"> • Operate pressing machine • Prepare moulds/blocks of butter • 	<ul style="list-style-type: none"> • Demonstrate butter pressing procedure • Demonstrate butter moulding 	1 hours Theory 6 hours Practical Total: 7 hours	Butter press machine	Class Room and workplace
LU8. Perform Packaging and labelling	<ul style="list-style-type: none"> • Operate packaging machine • Ensure labeling • 	<ul style="list-style-type: none"> • Differentiate between packaging and Labelling 	1 hours Theory 3 hours	Packaging machine, labeling machine	Class Room and workplace

		<ul style="list-style-type: none"> Describe selection criteria for product packaging and labeling Demonstrate the working of packaging and labelling machine 	Practical Total: 4 hours		
LU9. Ensure optimum storage conditions	<ul style="list-style-type: none"> Monitor storage temperature Control cross contamination 	<ul style="list-style-type: none"> Describe optimum storage conditions for butter Define cross contamination 	1 hours Theory 3 hours Practical Total: 4 hours	Refrigerator, Temperature gauge	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 (Level wise): 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 9 modules (Level-3 = 9). 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.	Food processing system with retort, pump, boiler, cooker, steamer, dehydrator, concentrator, separator, heat exchanger and all types, mixers, valves all type, actuators, thermocouples, transducers, flow meters, motors (induction & servo), conductivity meters, level switches, sensors type, angle encoders, VFD (variable flow drives), photocells, nozzles, gauges, Solenoid valves and operation, conveyors, weighing scales	1 Unit each
2.	PPE – apron, face mask, gloves (chemical gloves, surgical, electrical & Steam gloves), gum shoes (rubber shoes) chemical suit, face shelled, safety helmet, air protectives, goggles, Caps, Hand Sanitizer, Soap, colored uniform shirts,	24 No.
3.	Jack lift, fork lifter, hand jack's lifter, material moving lifters, hydraulic lifters, palletizers	1 Unit each
4.	Insectocutor, Bait Station, Glue Boards, Straws, Cages, air curtain, spray tanks	2 No.
5.	Beater	2 No.
6.	Blancher	2 No.
7.	Bleeding Cones / Tank	2 No.
8.	Brix Refractometers (0-90° brix)	2 No.
9.	Butter Press Machine	2 No.
10.	Monitoring Camera	4 No.
11.	Carbonation Cylinder / Machine	2 No.
12.	Carbonation Tester	2 No.
13.	Centrifuge	1 No.
14.	Chiller, compressors, RO (reverse osmoses), Filters.	1 Unit each
15.	Clinometers	2 No.
16.	Color Chart / Colorimeter	2 No.
17.	Computer System	2 No.
18.	Cooking pan	4 No.

19.	Cooling Agents	4 No.
20.	Crates	6 No.
21.	Cutting Boards	6 No.
22.	Cutting Knives	6 No.
23.	Cylinders	2 No.
24.	Desiccator	2 No.
25.	Double jacketed kettle	4 No.
26.	Dryer/Dehydrator	2 No.
27.	Egg sheller	2 No.
28.	Exhaust Fan	2 No.
29.	Filleting Knife	6 No.
30.	Fortificant Dossier	2 No.
31.	Freezer	1 No.
32.	Grinder	2 No.
33.	Headspace Gauge	2 No.
34.	Hot Air Oven	1 No.
35.	Humidity Gauge	2 No.
36.	Incubators	1 Unit each
37.	Juicer / Extractor	2 No.
38.	Laboratory scale cabinet drier or forced draft oven	1 No.
39.	liquid jacked tanks	2 No.
40.	Magnifying glass	4 No.
41.	Metal detector	2 No.

42.	Mincer	2 No.
43.	Moisture meter	2 No.
44.	Oil Extractor	2 No.
45.	Pallets	4 No.
46.	Pasteurizer	1 No.
47.	Pensky-Martens closed cup apparatus,	1 No.
48.	Petri plates	24 No.
49.	pH meter	2 Unit each
50.	Poly/temperature sealer	1 Unit each
51.	Pressure canner	1 No.
52.	Pulper	2 No.
53.	Racks	4 No.
54.	Receiving Container	2 No.
55.	Refrigerator	1 Unit each
56.	Rose Head Machine	2 No.
57.	Shredder	4 No.
58.	Sieves	4 No.
59.	Silent Cutter	1 No.
60.	Smoking Trays	6 No.
61.	Sorter	2 No.
62.	Soxhlet Apparatus	2 No.
63.	Steam-jacketed kettle	1 No.
64.	Stoves	6 No.

65.	Stuffer/linker	1 No.
66.	Tags	12 No.
67.	Temperature Gauge	2 No.
68.	Tempering Bin	2 No.
69.	Texture meter	2 No.
70.	Titration Apparatus	2 No.
71.	Trays	12 No.
72.	Trolley	1 Unit each
73.	Vacuum evaporator	2 No.
74.	Vacuum pack machine	2 No.
75.	Viscometer / Consist meter	2 No.
76.	Washing Tank	4 No.
77.	Water Bath	2 No.
Tools / Supplies		
1.	Weighing scales and balances of various capacities and sensitivities	1 No.
2.	Paring knives	6 No.
3.	Peelers	6 No.
4.	Measuring spoons	6 Set
5.	Measuring cups (solid)	6 Set
6.	Measuring cups (liquid)	6 Set
7.	Wrench, screw driver, belts, nuts and bolts, spanners (open, ring combinations) pallairs, L keys, star keys, stretched p allairs, gas pipe	

8.	Clocks/timer	6 No.
9.	Mixing bowls, stainless steel	6 No.
10.	Hard plastic chopping boards (white, blue, green)	6 unit each
11.	Thermometers of varying temperature range	10 No.
12.	Jar liter	24 No.
13.	Food processor set	2 No.
14.	Wire baskets	3 No.
15.	Casseroles stainless steel	3 No.
16.	Saucepan, stainless steel	6 No.
17.	Spoons, wooden	6 No.
18.	Spoon, basting	6 No.
19.	Paddles, wooden	6 No.
20.	Food tongs	6 No.
21.	Steamer	1 No.
22.	Soaking container	6 No.
23.	Fermented containers	2 No.
24.	Utility trays	6 No.
25.	Colanders, stainless steel	2 No.
Packaging machinery		
1.	Food packaging system with filling and sealing, can seamer, shrink wrapper, stripper, case packer, labeler, cap applicators, case sealer, lifters, card board packer, milers , Cap sealer, labeling machine, shrink machines	1 Unit each
2.	Automatic can opener	1 No.

3.	Can seam saw	1 No.
4.	Can seam counter sink	1 No.
5.	Can seamer	1 No.
6.	Vacuum can sealer	1 No.
7.	Capping machine	1 No.
8.	Crown corking machine	1 No.
9.	Form fill seal machine (a) 3 side sealing (b) Pillow type	1 No.
10.	Cup filling & sealing machine	1 No.
11.	Horizontal packing machine	1 No.
12.	Twist wrap machine	1 No.
13.	Fold wrap machine	1 No.

Sr. No.	Consumable Items	Quantity for 24 candidates
1.	NaOH (PELLETS)	3 Kg
2.	HNO ₃	3 ltr
3.	H ₂ SO 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.	Pycnometer	5 No.
25.	Capillary tube	1 Box
26.	Filter paper (90 mm)	2 Box
27.	Butyrometer 8 %	5 No.
28.	Butyrometer 40 %	5 No.
29.	Butyrometer 80 %	5 No.
30.	Lactometer	10 No.
31.	Rubber stoppers	20 No.
32.	China Dish	10 No.
33.	Iso amyl alcohol	1 ltr
34.	Test tube 20 ml	20 No.
35.	Thermometer (0-100 C)	10 No.
36.	Plate Count Agar	1 box
37.	Violet Red Bile Agar	1 box
38.	Potato Dextrose Agar	1 Box
39.	Swab Sticks	1 Box
40.	S-S Agar	1 Box
41.	Inoculating loops	5 No.
42.	Spirit lamp	5 No.
43.	Hexane	2.5 ltr
44.	CMC	1 kg
45.	Citric Acid	1 kg
46.	Pectin Powder	1 kg
47.	Sodium benzoate	100 gm
48.	KMS	100 gm
49.	Sodium Citrate	100 gm
50.	Baking Powder	1 kg
51.	Yeast (Sachet)	50 No.
52.	Baking Soda	1 kg

COLORS		
53.	Caramel Liquid	100 ml
54.	Apple Green	100 gm
55.	Sunset Yellow	100 gm
56.	Apple Red	100 gm
57.	Cloudifying Agent	250 ml
58.	Lime YELLOW	100 gm
FLAVORS		
59.	Apple	250 ml
60.	Strawberry	250 ml
61.	Mango Chaunsa	250 ml
62.	Chocolate	250 ml
63.	Vanilla	250 ml
64.	Orange	250 ml
65.	Pineapple	250 ml
SPICES		
66.	Salt	1 kg
67.	Red Chili (Powder)	1 kg
68.	Black pepper (Powder)	500 gm
69.	Mix masala	500 gm
70.	Chicken Tikka Masala	5 Box
71.	Chicken Tandoori Masala	5 Box
72.	Chaat Masala	5 Box
73.	Chicken Cubes	2 Box
Grocery/fruits/vegetables		
74.	Chicken, Beef, Mutton, Fish	10 kg each
75.	Fine Flour	20 kg
76.	Sugar	50 kg
77.	Cooking Oil	10 ltr
78.	Ghee	5 kg
79.	Peas	10 kg
80.	Lemon	5 kg
81.	Tomatoes	10 kg
82.	Potatoes	10 kg
83.	Green Chili	2 kg
84.	Capsicum	2 kg
85.	Carrot	10 kg

86.	Apple	10 kg
87.	Mango	10 kg
88.	Orange	10 Dozen
89.	Strawberry	10 kg
90.	Pineapple	10 kg
91.	Cheddar Cheese	10 kg
92.	Mozzarella Cheese	10 kg
93.	Skimmed Milk Powder	1 Kg
94.	Condensed Milk	5 Jar
95.	Fresh Milk	20 ltr
96.	Empty Metal Can (500 gm)	25 No.
97.	Empty Plastic Bottles (750 ml)	50 No
98.	Empty Glass Jars (500 gm)	25 No.
99.	Plastic Wrapping Sheet	1 Roll
100.	Aluminum Foil	2 Roll