Model Curriculum

QP Name: Food Lab Instrumentation Specialist

QP Code: FIC / Q7610

QP Version: 1.0

NSQF Level: 5

Model Curriculum Version: 1.0

Food Industry Capacity and Skill Initiative (FICSI)
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Training Parameters

Sector	Food Processing
Sub-Sector	Generic
Occupation	Quality Analysis / Assurance
Country	India
NSQF Level	5
Aligned to NCO/ISCO/ISIC Code	NCO-2015/2113.0500
Minimum Educational Qualification and Experience	1.BSc. (Chemistry, Physics, or related Life Science) or Diploma in a Science related program or equivalent experience or training OR 2. Completed 1st year of 3year/4years UG 1yr of relevant experience OR 3. 12th pass with 2years of any combination of NTC/NAC/CITS or equivalent. OR 4. 12th Grade pass with 1yera of NTC/NAC 1yr of relevant experience OR 5. Completed 3 years of diploma after 10th with 1yr of relevant experience OR 6. Previous relevant Qualification of NSQF Level 4.5 with 1.5 years of Experience OR 7. Previous relevant Qualification of NSQF Level 4 with 3 years of relevant experience
Pre-Requisite License or Training	NA
Minimum Job Entry Age	20 years
Last Reviewed On	23-06-2023
Next Review Date	22-06-2026
NSQC Approval Date	23-06-2023
QP Version	1.0

Model Curriculum Creation Date	24-05-2023
Model Curriculum Valid Up to Date	23-05-2026
Model Curriculum Version	1.0
Minimum Duration of the Course	540 hours
Maximum Duration of the Course	540 hours

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the participants will be able to:

- Understand planning, organizing and setting up of Food Analysis Laboratory
- Carry out Physical, Chemical, and Instrumental Analysis
- Carry out repair, maintenance and decommissioning of equipment
- Implement Food Safety Requirements
- Employability Skills

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS:

NOS and Module Details	Theory	Practical	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
	Duration	Duration			
FIC/N7629: Planning, Organizing and Setting up of Food Analysis Laboratory **NOS Version 1.0** **NSQF Level 5**	**30**	**60**	**30**	**0**	**120**
Module 1: Requirement analysis for setting up a Laboratory	10	20	0	0	30
Module 2: Measures to ensure Laboratory Safety	10	20	0	0	30
Module 3: Maintenance and Calibration of equipment	10	20	30	0	60
FIC/N7630: Carry out Physical, Chemical, and Instrumental Analysis **NOS Version 1.0** **NSQF Level 5**	**70**	**110**	**30**	**0**	**210**
Module 4: Perform sampling and sample preparation	20	30	0	0	50

Module 5: Perform analysis through classical analytical techniques	20	30	10	0	60
Module 6: Carry out quantitative and qualitative analysis	20	30	20	0	70
Module 7: Carry out Reporting and Documentation	10	20	0	0	30
FIC/N7631: Carry out maintenance and decommissioning of equipment **NOS Version No. 1.0** **NSQF Level 5**	**40**	**80**	**30**	**0**	**150**
Module 8: Implement preventive planned maintenance	15	30	0	0	45
Module 9: Overhaul instrumentation of equipment	15	25	30	0	70
Module 10: Decommissioning of equipment and documentation per compliance standards	10	25	0	0	35
FIC/N9904: Ensure food safety at the workplace **NOS Version No. 1.0** **NSQF Level 5**	**10**	**20**	**0**	**0**	**30**
Module 11: Ensure food safety at the workplace	10	20	0	0	30
DGT/VSQ/N0101 – Employability Skills (30 Hours) **NOS Version No. 1.0** **NSQF Level 2**	**12**	**18**	**0**	**0**	**30**
Module 12: ES Skills	12	18	0	0	**30**
Total Duration	**162**	**288**	**90**	**0**	**540**

Module Details

Module 1: Requirement analysis for setting up a Laboratory

Mapped to FIC/N7629 v1.0

Terminal Outcomes:

- Organize resources for setting up the laboratory
- Describe the various mechanisms to undertake analysis

Duration: *10:00*	**Duration**: *20:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss about the food processing industry and food Lab testing sector and its growth trends • Discuss the career opportunities available to Lab instrumentation specialist in the food processing industry • Explain the terminologies used in the food quantitative and qualitative analysis • List the sequence of operations to be performed in the job • List the various types of activities undertaken for sample collection, analysis and calibration of equipment • List the both the generic and specialised activities to ensure laboratory setup • Explain the significance of dust-free facility, both from environmental sources or from other samples • Explain the significance of ventilation to avoid re-circulation of laboratory air and associated risk of contamination of test materials and hazard to laboratory staff • Discuss why work surfaces and floor shall be made of impervious, smooth, easy to clean materials, work surfaces are levelled and not inclined in any way • State the significance of using 300-lux light intensity at working surfaces other than those required for specified tests	• Demonstrate how to for segregate trace analysis from highly concentrated formulations and from pure substances used in preparing analytical standards • Show how to separate media and media/ glassware sterilization areas from testing areas • Demonstrate the technique for all the discards and proper disposal procedure/system for all microbiological samples • Show how to manage proper gas/LPG supply system through pipelines to burners and a proper safety system for the same • Demonstrate how to maintain negative air pressure in a lab compared to outside

• List activities that need to be prohibited in the laboratory to manage security, safety or sensitivity to contamination and fire safety • State the importance of maintaining negative air pressure in a lab	
Classroom Aids:	
Training kit (Trainer guide, Presentations), Whiteboard, Marker, Projector, Laptop, Presentation, Participant Handbook, etc.	
Tools, Equipment, and Other Requirements	
fixed benches with provision of water, power, sinks, cupboards, fume cupboards, reagent shelves, glassware cleaning and storage, safety manuals, washing/ cleaning manual for equipment and glassware, protective clothing, etc.	

Module 2: Measures to ensure Laboratory Safety

Mapped to FIC/N7629 v1.0

Terminal Outcomes:

- Describe the measures to ensure laboratory safety
- Understand the process of handling and storing the toxic chemicals

Duration: *10:00*	**Duration**: *20:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• State the labelling for storing samples and chemicals • Discuss conditions for storing areas of highly toxic chemicals • State how to administer the supply of piped gas through clearly identifiable metal piping to instrument rooms and other equipment • Explain compressed gas cylinders are attached to a secure structure by a non-combustible material, such as a metal chain • List labelling standards of chemical and waste containers in their respective sections/laboratories • State significance of color coded and labelled waste bins for each laboratory • Define the role of commercial firm, licensed by respective State Pollution Control Board, to remove and transport biological wastes to a designated disposal site for incineration • Explain autoclaving process (steam sterilized) of the microorganisms, to inactivate the microorganisms for safety reasons • Define the building laws and codes for administering number of emergency exits • Define an Emergency Evacuation Plan and route for all buildings floors, areas, and post instructions in every laboratory section and corridor	• Demonstrate how to manage empty and full cylinders storage in separate cages outside the laboratory • Show how to use a number and type of safety equipment in well-marked, highly visible and easily accessible locations in or near all the laboratory rooms in the facility and must be maintained in working conditions • Demonstrate procedure for proper disposal of chemical waste basis category of chemical used • Illustrate process of validating Laboratory Information Card at the entrance door of each laboratory and ensure Emergency exits shall be marked accordingly
Classroom Aids:	
Training kit (Trainer guide, Presentations), Whiteboard, Marker, Projector, Laptop, Presentation, Participant Handbook	
Tools, Equipment, and Other Requirements	

Emergency showers, eyewashes, first-aid kits and spill kits, electrical apparatus, telephones, thermostats, electrical control panels, or power sockets, gas cylinders, building laws and codes guidelines, etc.

Module 3: Maintenance and Calibration of equipment

Mapped to FIC/N7629 v1.0

Terminal Outcomes:

- Explain the process of maintenance and calibrating equipment
- Discuss process of sampling, maintenance and calibration of equipment

Duration: *10:00*	**Duration**: *20:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• State ways to organize random, systematic or sequential sampling plans to obtain quantitative or qualitative information, or to determine conformance or non-conformance with a specification • List the technique to select an appropriate sample or samples, from a larger amount of material for chemical analysis • Explain the significance of using defined and accurate terms which are understandable to others • Discuss state of maintenance and calibration of equipment • State the selection, purchase, reception and storage of reagents for determining the quality of reagents • Discuss how to administer grade of any critical reagent used (including water) with guidance on any particular precautions which should be observed in its preparation, storage and use • List the labelling standards for reagents and reference materials to identify substance, strength, solvent (where not water), any special precautions or hazards, restrictions of use, and date of preparation and/or expiry • Explain ways to identify relevant sources of uncertainty to administer complete	• Show how to devise and plan all analytical work adequately with the strategy for achieving the desired aims, considering scope of amendment. • Demonstrate how to select an appropriate sample or samples • Walk through how to assess factors that make any analytical measurement result liable to deviate from true value as they influence the result • Demonstrate how standard methods are developed and validated collaboratively by a group of experts and that development should include consideration of all of the necessary aspects of validation and related uncertainty • Walk through tests and calibrations using organisational procedures and within agreed timescales • Show how to insert any relevant system trip defeats, including fire extinguishant, emergency shutdown, in accordance with organisational procedures • Illustrate ways to isolate electrical, hydraulic, pneumatic, mechanical instruments as recommended and per standards • Demonstrate ways to maintain safe access and working arrangements for testing and

sequence of events necessary to achieve the purpose of the analysis • List regulations, directives and guidelines to work safely at all times, complying with health and safety, environmental and other relevant food and drink aspects • State manufacturers' drawings and testing/calibration documentation • Discuss procedures for use of tools and equipment to carry out the required tests and calibration • State the electrostatic (ESD) precautions when handling sensitive components and circuit boards • Explain how to record results of tests and calibrations in accordance with organisational procedures • Discuss process of reviewing results and carry out further tests, if necessary, dispose of waste items and any spoilt products in a safe and environmentally acceptable manner, and leave the work area in a safe and clean condition in accordance with organisational procedures • State precautionary instructions to be adhered inside the laboratory	calibration area to carry out required activities as per organisational procedures • Walk through how to maintain log book (digitally and manually) for each instrument /equipment and troubleshoot/adjust minor malfunctions in the instruments
Classroom Aids:	
Training kit (Trainer guide, Presentations), Whiteboard, Marker, Projector, Laptop, Presentation, Participant Handbook	
Tools, Equipment, and Other Requirements	
Hotplates, stirrers, nonvolumetric glassware and glassware, laboratory heating or ventilation systems; Volumetric equipment (e.g. flasks, pipettes, pycnometer, burettes etc.) and measuring instruments (e.g. hydrometers, U-tube viscometers, thermometers, timers, spectrometers, chromatographs, electrochemical meters, balances etc.); physical measurement standards (weights, reference thermometers); computers and data processors, etc.	

Module 4: Perform sampling and sample preparation

Mapped to FIC/N7630 v1.0

Terminal Outcomes:

- Illustrate the standards for sampling process
- Explain how to handle and segregate samples for analysis

Duration: *20:00*	**Duration**: *30:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the national or sectoral standards for sampling • State acceptable quality level (AQL) or the limiting quality (LQ) for acceptance/rejection of non-conformities • Discuss the significance of reducing the particle size by grinding or milling • Explain different mechanisms like coning and quartering, riffling, or by means of a rotating sample divider or a centrifugal divider to subdivide sample • List the precautionary measures to take care of samples by avoiding cross contamination, by ensuring equipment does not contaminate the sample and composition of sample is not altered during grinding • Explain how to analyze problem necessitating sample extraction and design the sampling strategy considering the nature of problem • List properties of analyte such as volatility, sensitivity to light, thermal lability, and chemical reactivity for designing sampling strategy and choosing equipment, packaging and storage conditions	• Demonstrate sampling stages with an understanding of overall context of analysis • Show how to analyze problem necessitating sample extraction and design the sampling strategy considering the nature of problem • Illustrate the use and value of rest of original material once a sample has been removed for analysis • Show how to maintain record of procedures followed in order that sampling process may be repeated exactly irrespective of strategy used for sampling • Demonstrate how to identify poorly considered sampling, especially if destructive
Classroom Aids:	
Training kit (Trainer guide, Presentations), Whiteboard, Marker, Projector, Laptop, Presentation, Participant Handbook	
Tools, Equipment, and Other Requirements	
Food samples, equipment for analysing, Sampling records and manuals, etc.	

Module 5: Perform analysis through classical analytical techniques

Mapped to FIC/N7630 v 1.0

Terminal Outcomes:

- Discuss methods employed for conducting analysis through classical analytical techniques
- Demonstrate the tasks to be performed for conducting the analysis

Duration: *20:00*	**Duration:** *30:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• State how to identify whether analyte is either organic or inorganic prior to qualitative analysis of any given compound • List ways to draw inference about the identity of analyte by observing the chemical reactions and their products • Discuss how to administer result of assay between added chemical reagents and functional groups of organic molecules • Discuss the significance of adding gradually or stepwise reagent (the titrant) to the analyte from a burette and examine the process • Explain equivalence point of titration, typically observed as a colour change • Discuss way to calculate amount or concentration of the analyte by accessing end point with concentration of titrant	• Demonstrate how to perform classical qualitative analysis by adding one or a series of chemical reagents to the analyte • Show how to identify molecule by following measurements such as, boiling points, melting points, and densities, etc. in addition to chemical reaction between chemical reagents and functional groups • Walk through how to examine during gravimetric analysis an excess of added reagent reacts with analyte to form a precipitate • Demonstrate way to handle precipitate by filtering, drying, and weighing as its mass is used to calculate concentration or amount of assayed substance in analyte
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Organic or inorganic analyte, chemical reagents, tools and equipment, thermometer, manuals, SOPs, etc.	

Module 6: Carry out quantitative and qualitative analysis
Mapped to FIC/N7630 v1.0

Terminal Outcomes:

- Discuss the process of Gas Chromatography (GC)/ Mass spectrometry (MS) analysis
- Demonstrate the tasks to be performed for carrying out the quantitative and qualitative analysis

Duration: *20:00*	**Duration:** *30:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the process of Gas Chromatography (GC)/ Mass spectrometry (MS) analysis • State ways to monitor how analysis is repeated under tightly controlled conditions • State the steps to observe that signal generates the characteristic GC peaks in a chromatogram and peaks are proportional in area to the concentration of gases of interest • Discuss ways to instil a medium into which the target analytes can be preferentially partitioned followed by the separation of the analyte-containing phase from the remainder of the sample • List the importance of administering sample is heated, have its pH adjusted, or be otherwise treated to make analytes more accessible to partitioning medium • Explain the Liquid extraction, Ultrasonic simulation, Steam distillation, Liquid-liquid extraction, on- and offline solid-phase extraction and gel permeation chromatography (GPC) in partitioning of target analytes in liquid samples or liquid extracts of solid samples • Discuss filter turbid or otherwise opaque liquids to remove particulates prior to extraction • Explain the significance of automated sampling system instead of manual injectors to get highly reproducible injection volume, low carryover and increased sample throughput • State how to maintain limit of detection	• Demonstrate how to instill sample manually into carrier gas with a syringe, via a sample loop and analytical valve which are in-line with carrier stream • Show how to mount columns in an oven with precise temperature and carrier gas flow control • Walk through process to regulate separated gasses leave (or elute from) the column(s), and pass through a detector which, in turn, responds with an output signal • Show how to install guard columns at the head of analytical column to prevent contamination of stationary phase by sample matrix • Demonstrate ways to assemble HPLC pumps to deliver pulse-free flow with high precision over a wide flow rate range with low dead volume • Demonstrate how to administer other important detection parameters like dynamic range, calibration linearity, chromatographic selectivity and qualitative information are appropriate, as per defined standards • Walk through the installation of a lamp in Atomic Absorption (AA) unit for analyte • Demonstrate the process to regulate by nebulizing liquid sample and spray into an atomizer, or atom source • Show the process of atomizing samples, breaking it down into individual elements and energy absorption is measured

(LOD) and limit of quantification (LOQ) as two to three and 10 to 20 times the noise level. LOD for food additives can be as low as 100 parts per trillion • Explain ways to automate derivatization and integrate online within the analysis to improve sensitivity and/or selectivity of an optical detector (UV, visible or fluorescence) when analytes lack chromophores or an adequate optical response • Discuss way to introduce sample as an aerosol into flame, which is aligned so that light beam passes through the flame, where the light is absorbed, measured, and reported by the instrument • Explain Graphite Furnace Atomic Absorption (GFAA) to remove liquid solvent and to atomize the remaining sample • State charged ions are passed into a mass spectrometer, where ions are split according to their mass before reaching the detector, which in turn identifies and quantifies the elements present in a sample based on their mass • Explain why there is significant improvement in sensitivity by following ICP-MS approach	• Illustrate to review in flame AA, the atomizer or atom source, is in the form of an air/acetylene or nitrous oxide/acetylene flame
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Syringe, oven, heaters, filters, extractor, guard column, HPLC pumps, an optical detector (UV, visible or fluorescence), graphite tube, etc.	

Module 7: Carry out Reporting and Documentation
Mapped to FIC/N7630 v1.0

Terminal Outcomes:

- Discuss the process of reporting and documentation
- Demonstrate the tasks for reporting and documentation

Duration: *10:00*	**Duration:** *20:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• State the significance of reviewing and updating the test methods and procedures as per the schedule • List logbooks, worksheet, calibration records, parameters of column, reagent, volumetric solution and working standards for updation • Discuss the importance of accounting defects/problem/incidents/quality issues/test results as applicable as per SOP • State the significance of preparing analytical and quality control reports for detailed findings and recommendations as per SOPs • Discuss the need to prepare reports of validations, deviations and incidents to production and quality assurance team in compliance with GLP and GMP • List ways to maintain all original and controlled document files and quality records in a timely and accurate manner and made available for inspection and auditory purposes	• Demonstrate how to review and update the test methods and procedures • Show how to prepare analytical and quality control reports for detailed findings and recommendations as per SOPs • Walk through to prepare reports of validations, deviations and incidents to production and quality assurance team in compliance with GLP and GMP • Illustrate ways to document testing results and analysis accurately
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
logbooks, worksheet, calibration records, parameters of column, reagent, volumetric solution and working standards, analytical and quality control report, etc.	

Module 8: Implement preventive planned maintenance

Mapped to FIC/N7631 v1.0

Terminal Outcomes:

- Discuss the process of planned maintenance
- Demonstrate the process of planned maintenance

Duration: 15:00	**Duration:** 30:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss health and safety, environmental and other relevant food and drink regulations, directives and guidelines • Explain the use of company and/or manufacturers' drawings and maintenance documentation • State maintenance activities and schedule so as to minimise any disruption to normal working • List the organisational procedures to insert or override any relevant system trip defeats (including fire extinguishant, emergency shutdown) and instruments (including process, electrical, hydraulic, pneumatic, mechanical) in accordance with organisational procedures • Discuss safe access and working arrangements for the maintenance area • State ways to re-connect and return the system to service on completion of the maintenance activities • Discuss instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule • Explain how to complete maintenance records and documentation in accordance with organisational requirements	• Demonstrate how to review and update the test methods and procedures • Walk through the maintenance activities in accordance with organisational procedures within the limits of your personal authority • Show how to carry out functional tests and adjust equipment to specification • Demonstrate process to dispose of waste materials in accordance with safe working practices and approved procedures
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
SOPs, Company and Manufacturers' drawings, format of maintenance schedules, manuals, etc.	

Module 9: Overhaul instrumentation of equipment

Mapped to FIC/N7631 v1.0

Terminal Outcomes:

- Discuss the overhauling instrumentation of equipment
- Demonstrate the tasks for overhauling instrumentation of equipment

Duration: 15:00	**Duration:** 25:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain use of the correct equipment repair/overhauling documentation (including manuals, drawings, maintenance records) • Discuss repair/overhauling schedules to carry out the required work • State safe access and working arrangements for the repair/overhauling area • Discuss decontamination procedures for instruments that have been used with hazardous (including toxic, corrosive, inflammable, explosive, radioactive) substances • List electrostatic discharge (ESD) protection procedures • State the significance to establish and mark/label components to aid re-assembly • Discuss maintenance of equipment free from damage and foreign objects • Explain how to carry out repair/overhaul to the agreed level, using correct tools and techniques as per standards • Explain the importance of reporting any instances where repair/overhauling activities cannot be fully met, or where there are identified defects outside planned repair/overhauling schedule	• Show how to carry out repair/overhaul to the agreed level, using correct tools and techniques as per standards • Demonstrate ways to store removed components in accordance with organisational procedures • Illustrate the process of disposal of unwanted components, waste materials and substances, in accordance with safe working practices approved procedures
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
manuals, drawings, maintenance records, electrostatic discharge (ESD) protection procedure guidelines, labelling standards, tools and equipment, waste disposal procedures, etc.	

Module 10: Decommissioning of equipment and documentation per compliance standards

Mapped to FIC/N7631 v1.0

Terminal Outcomes:

- Discuss the decommissioning of equipment and documentation per compliance standards
- Demonstrate the process of decommissioning of equipment and documentation

Duration: 10:00	**Duration: 25:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain how to conduct equipment survey or inspection before planning for decommissioning • Discuss ways to identify and select equipment / facility to be decommissioned for recycling, reuse or resale • List record manufacturer, serial number, equipment specs, part number, suite and rack location/area and photos, etc. before initiating the process • Explain process of decommissioning of approved equipment ensuring site security and notify manager(s) in case of any mismatch with inventory list • Illustrate ways to upkeep procedures, records and workplace documentation needed for audit • Discuss document evidence collection methods and sources along with checklists developed as per specifications • State and categorized non- conformities observed from prior audit trails and plan actionable steps • Discuss how to maintain records of effectiveness of corrective actions	• Demonstrate how to direct wiped, decommissioned and disconnected equipment towards the circular repository • Show how to prepare transfer notes and reports for audit compliance • Demonstrate how to maintain records of effectiveness of corrective actions
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
manuals, drawings, maintenance records, survey samples, transfer notes and reports, etc.	

Module 11: Ensure Food Safety at the workplace

Mapped to FIC/N9904 v 1.0

Terminal Outcomes:

- Explain the various food safety standards to be followed during the production process
- Prepare sample reports regarding food safety regulations, inspections, faults observation, etc.

Duration: *10:00*	**Duration**: *20:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the types of biological, chemical and physical hazards present in the food processing industry • Discuss various types of food contaminations, their causes, and ways to prevent them • Discuss the importance of following the standard procedures for ensuring food safety) • State the importance of ensuring that the materials (such as raw materials, processed materials, finished goods, etc.) are adequately isolated to prevent them from contamination • Outline the standard regulations to be followed for ensuring food safety as listed in 'The Food Safety and Standards Act, 2006 that need to be followed during production • Discuss the role of HACCP, VACCP and TACCP as well as procedures to implement these in the food industry • Discuss about product information and consumer awareness, product recall and withdrawal, and traceability • Explain the procedure to conduct workplace food safety audits • Discuss various types of allergens and their management at the workplace • Discuss the corrective measures to be applied to ensure food safety	• Apply appropriate practices to identify various biological, chemical, and physical hazards at various stages (procurement of raw material; production, manufacturing, distribution, delivery of finished product, etc.) of food processing • Employ appropriate practices to implement food safety procedures and regulatory policies at the workplace • Employ appropriate practices to establish and follow Good Manufacturing Practices (GMPs) related to ergonomics, cleaning and sanitation, equipment and containers, pest control, facilities, food storage, transportation, distribution etc. • Demonstrate the procedure followed for allergen management and handling and storage of raw materials • Apply appropriate practices to establish and follow monitoring systems, like Hazard Analysis Critical Control Point (HACCP) • Apply relevant practices to take appropriate action in instances such as VACCP (Vulnerability Assessment Critical Control Points) and TACCP (Threat Assessment Critical Control Points)

• List various issues that can arise during food production and other processes • Discuss the procedure of performing root cause analysis and taking corrective and preventive actions against workplace problems • State the significance of training the team members regarding various food safety procedures such as GMP, HACCP, etc. • List the information to be recorded in the work process	• Apply appropriate practices to plan and execute an audit on food safety address the non-conformance with root cause analysis (RCA), and take corrective action preventive action (CAPA) • Role play a situation on how to address issues pertaining to food safety and quality reported by the team members • Prepare sample reports for food safety regulations followed, inspections done, faults observed, etc. • Dramatize a situation on how to organize training and workshops on food safety aspects such as Good Manufacturing Practices (GMP), HACCP, VACCP, TACCP, etc.
Classroom Aids:	
Training kit (Trainer guide, Presentations), White board, Marker, Projector, Laptop, Presentation, Participant Handbook and Related Standard Operating Procedures	
Tools, Equipment and Other Requirements	
Sample pictures of various biological, chemical, and physical hazards, Sample pictures of Contaminants, samples of potential allergens, process flow chart and HACCP plan.	

Module 12: Employability Skills

Mapped to DGT/VSQ/N0101 v1.0

Terminal Outcomes:

- Discuss Employability skills, Constitutional values, digital, financial, and legal literacy
- Explain about diversity and Inclusion, communication skills, and customer service
- State the relevance of entrepreneurship skills and how to be ready for jobs and apprenticeship

Duration: *12:00*	**Duration***: 18:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the importance of Employability Skills in meeting the job requirements • Explain constitutional values, civic rights, duties, citizenship, responsibility towards society etc. that are required to be followed to become a responsible citizen • Show how to practice different environmentally sustainable practices • Discuss 21st century skills. • Display positive attitude, self - motivation, problem solving, time management skills and continuous learning mindset in different situations • Use appropriate basic English sentences/phrases while speaking • Discuss the significance of reporting sexual harassment issues in time • Discuss the significance of using financial products and services safely and securely • Explain the importance of managing expenses, income, and savings • Explain the significance of approaching the concerned authorities in time for any exploitation as per legal rights and laws • Discuss the significance of using internet for browsing, accessing social media platforms, safely and securely • Discuss the need for identifying opportunities for potential	• Demonstrate how to communicate in a well -mannered way with others • Demonstrate working with others in a team • Show how to conduct oneself appropriately with all genders and PwD • Show how to operate digital devices and use the associated applications and features, safely and securely • Create a biodata

business, sources for arranging money and potential legal and financial challenges • Differentiate between types of customers • Explain the significance of identifying customer needs and addressing them • Discuss the significance of maintaining hygiene and dressing appropriately • Use various sources to search and apply for jobs • Discuss the significance of dressing up neatly and maintaining hygiene for an interview • Discuss how to search and register for apprenticeship opportunities	
Classroom Aids:	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Computer (PC) with latest configurations – and Internet connection with standard operating system and standard word processor and worksheet software (Licensed) (all software should either be latest version or one/two version below) , UPS, Scanner cum Printer, Computer Tables, Computer Chairs, LCD Projector, White Board 1200mm x 900mm	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Graduate	Science	2	M.Sc. (Analytical Chemistry) with 2 years of related work experience	2	Training individuals on Food analysis with quantitative and qualitative analysis	

Trainer Certification	
Domain Certification	**Platform Certification**
"Food Lab Instrumentation Specialist", "FIC/Q7610, V1.0", Minimum accepted score is 80%	Recommended that the Trainer is certified for the Job Role: "Trainer" (VET & SKILLS), mapped to the Qualification Pack: "MEP/Q2601", V.2. Minimum accepted SCORE IS 80 % as per SSC guidelines.

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Graduate	Science	2	M.Sc. (Analytical Chemistry) with 2 years of related work experience	2	Training individuals on Food analysis with quantitative and qualitative analysis	

Assessor Certification	
Domain Certification	**Platform Certification**
"Food Lab Instrumentation Specialist", "FIC/Q7610, V1.0", Minimum accepted score is 80%	Recommended that the Assessor is certified for the Job Role: "Assessor" (VET & SKILLS), mapped to the Qualification Pack: "MEP/Q2701", V-2. Minimum accepted SCORE IS 80 % as per SSC guidelines.

Assessment Strategy

This section includes the processes involved in identifying, gathering and interpreting information to evaluate the learner on the required competencies of the program.

Assessment will be based on the concept of Independent Assessors empanelled with Assessment Agencies, identified, selected, trained and certified on Assessment techniques. These assessors would be aligned to assess as per the laid down criteria.

Assessment Agency would conduct assessment only at the training centres of Training Partner or designated testing centers authorized by FICSI.

Ideally, the assessment will be a continuous process comprising of three distinct steps:

A. Mid- term assessment

B. Term / Final Assessment

Each National Occupational Standard (NOS) in the respective QPs will be assigned weightage. Therein each Performance Criteria in the NOS will be assigned marks for theory and / or practical based on relative importance and criticality of function.

This will facilitate preparation of question bank / paper sets for each of the QPs. Each of these papers sets / question bank so created by the Assessment Agency will be validated by the industry subject matter experts through FICSI, especially with regard to the practical test and the defined tolerances, finish, accuracy etc.

The following tools are proposed to be used for final assessment:

i. Written Test: This will comprise of (i) True / False Statements (ii) Multiple Choice Questions (iii) Matching Type Questions. Online system for this will be preferred.

ii. Practical Test: This will comprise a test job to be prepared as per project briefing following appropriate working steps, using necessary tools, equipment and instruments. Through observation it will be possible to ascertain candidate's aptitude, attention to details, quality consciousness etc. The end product will be measured against the pre-decided MCQ filled by the Assessor to gauge the level of his skill achievements.

iii. Structured Interview: This tool will be used to assess the conceptual understanding and the behavioural aspects as regards the job role and the specific task at hand.

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT (M)	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do **upon the completion of the training**.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do **upon the completion of a module.** A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
QP	Qualification Pack
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards
TVET	Technical and Vocational Education and Training
SOP	Technical and Vocational Education and Training
OH&S	Occupational Health and Safety
PPE	Personal Protective Equipment
HACCP	Hazard Analysis and Critical Control Points
VACCP	Vulnerability Assessment Critical Control Points
TACCP	Threat Assessment Critical Control Points
FSSAI	Food Safety and Standards Authority of India
FIFO	First In First Out
FEFO	First Expire First Out
GMP	Good Manufacturing Practices
GHP	Good Hygiene Practices
CPR	Cardiopulmonary Resuscitation