

# Model Curriculum

**QP Name: Corn Processing Technician**

**QP Code: FIC/Q1009**

**QP Version: 1.0**

**NSQF Level: 4**

**Model Curriculum Version: 1.0**

Food Industry Capacity and Skill Initiative (FICSI)  
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## Training Parameters

<b>Sector</b>	Food Processing
<b>Sub-Sector</b>	Food Grain Milling
<b>Occupation</b>	Processing- Food grain Milling
<b>Country</b>	India
<b>NSQF Level</b>	4
<b>Aligned to NCO/ISCO/ISIC Code</b>	NCO-2015/ 8131.3800
<b>Minimum Educational Qualification and Experience</b>	1. Class 12th 2. Class 10th and 2 years of relevant experience 3. Class 8th with 3 years of relevant experience
<b>Pre-Requisite License or Training</b>	Not Applicable
<b>Minimum Job Entry Age</b>	18 years
<b>Last Reviewed On</b>	24/02/2022
<b>Next Review Date</b>	23/02/2025
<b>NSQC Approval Date</b>	24/02/2022
<b>QP Version</b>	1.0
<b>Model Curriculum Creation Date</b>	15/12/2021
<b>Model Curriculum Valid Up to Date</b>	24/02/2025
<b>Model Curriculum Version</b>	1.0
<b>Minimum Duration of the Course</b>	340 Hours
<b>Maximum Duration of the Course</b>	520 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:

- Prepare for production
- Facilitate corn production through wet and dry milling methods
- Apply necessary health and safety practices to ensure workplace health and safety
- Work effectively with others
- Use resources at the workplace optimally

### Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory	Practical	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
	Duration	Duration			
<b>Bridge Module</b>	<b>36</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>48</b>
Module 1: Introduction to Food Processing Sector and the Job of 'Corn Processing Technician'	8	0	0	0	8
Module 2: Employability and Entrepreneurship skills	28	12	0	0	40
<b>FIC/N9026: Prepare for production NOS Version No. 1 NSQF Level 3</b>	<b>12</b>	<b>32</b>	<b>0</b>	<b>0</b>	<b>44</b>
Module 3: Prepare for production	12	32	0	0	44
<b>FIC/N1031: Carry out corn production NOS Version No. 1.0 NSQF Level 4</b>	<b>56</b>	<b>116</b>	<b>0</b>	<b>0</b>	<b>172</b>
Module 4: Facilitate cleaning ingredients for production	12	28	0	0	40
Module 5: Perform wet milling of corn	15	30	0	0	45
Module 6: Perform dry milling of corn	15	30	0	0	45
Module 7: Undertake packaging and post-production activities	14	28	0	0	42

<b>FIC/N9901: Implement health and safety practices at the workplace</b> <b>NOS Version No. 1.0</b> <b>NSQF Level 3</b>	<b>8</b>	<b>16</b>	<b>0</b>	<b>0</b>	<b>24</b>
Module 8: Ensure food safety and personal hygiene	4	8	0	0	12
Module 9: Managing accidents and emergencies	4	8	0	0	12
<b>FIC/N9902 – work effectively in an organization</b> <b>NOS Version No. 1.0</b> <b>NSQF Level 3</b>	<b>8</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>16</b>
Module 10: Work effectively in an organization	8	8	0	0	16
<b>SGJ/N1702 – Optimize Resource Utilization at the Workplace</b> NOS <b>Version No. 1.0</b> <b>NSQF Level 3</b>	<b>12</b>	<b>24</b>	<b>0</b>	<b>0</b>	<b>36</b>
Module 11: Material Conservation	4	8	0	0	12
Module 12: Energy / electricity conservation	4	8	0	0	12
Module 13: Waste Management / Recycling	4	8	0	0	12
<b>Total Duration</b>	<b>132</b>	<b>208</b>	<b>0</b>	<b>0</b>	<b>340</b>

Elective NOS and Module Details	Theory	Practical	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
	Duration	Duration			
<b>FIC/N1032: Produce Corn Oil</b> <b>NOS Version 1.0</b> <b>NSQF Level 4</b>	<b>10</b>	<b>40</b>	<b>0</b>	<b>0</b>	<b>50</b>
Module 14: Produce corn oil	10	40	0	0	50
<b>Total Duration</b>	<b>10</b>	<b>40</b>	<b>0</b>	<b>0</b>	<b>50</b>

Elective NOS and Module Details	Theory	Practical	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
	Duration	Duration			
<b>FIC/N1033: Produce Corn Syrup</b> <b>NOS Version 1.0</b> <b>NSQF Level 4</b>	<b>10</b>	<b>30</b>	<b>0</b>	<b>0</b>	<b>40</b>
Module 15: Produce corn syrup	10	30	0	0	40
<b>Total Duration</b>	<b>10</b>	<b>30</b>	<b>0</b>	<b>0</b>	<b>40</b>

Elective NOS and Module Details	Theory	Practical	On-the-Job Training		Total Duration
	Duration	Duration			

			Duration (Mandatory)	On-the-Job Training Duration (Recommended)	
<b>FIC/N1034: Produce Corn Starch NOS Version 1.0 NSQF Level 4</b>	<b>10</b>	<b>40</b>	<b>0</b>	<b>0</b>	<b>50</b>
Module 16: Produce corn starch	10	40	0	0	50
<b>Total Duration</b>	<b>10</b>	<b>40</b>	<b>0</b>	<b>0</b>	<b>50</b>

Elective NOS and Module Details	Theory	Practical	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
	Duration	Duration			
<b>FIC/N1035: Produce Corn Flakes NOS Version 1.0 NSQF Level 4</b>	<b>10</b>	<b>30</b>	<b>0</b>	<b>0</b>	<b>40</b>
Module 17: Produce corn flakes	10	30	0	0	40
<b>Total Duration</b>	<b>10</b>	<b>30</b>	<b>0</b>	<b>0</b>	<b>40</b>

## Module Details

### Module 1: Introduction to Food Processing Sector and the Job of 'Corn Processing Technician'

#### Terminal Outcomes:

- Describe the food processing industry and its sub-sectors in brief
- Discuss the roles and responsibilities of a Corn processing technician

<b>Duration:</b> 08:00	<b>Duration:</b> 00:00
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Discuss about the food processing industry and multi-sectoral sub-sector in brief</li> <li>• Discuss the career opportunities available to a corn processing technician in the food processing industry</li> <li>• Explain the terminologies used</li> <li>• List the sequence of operations to be performed in the job</li> <li>• State the food safety hygiene standards to follow in a work environment</li> </ul>	
<b>Classroom Aids:</b>	
Whiteboard, Marker, Duster, Projector, Laptop, PowerPoint Presentation	
<b>Tools, Equipment, and Other Requirements</b>	
Nil	

## Module 2: Employability and Entrepreneurship skills

### Terminal Outcomes:

- Describe the traits of individual at workplace
- Demonstrate apply employability and entrepreneurship skills at workplace

Duration: 28:00	Duration: 12:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> <li>• Discuss own strengths and weaknesses and analyse the gaps to ensure continuous improvement.</li> <li>• Discuss the measures to be undertaken to utilise time effectively thereby achieving maximum productivity.</li> <li>• List the characteristics of innovative individuals</li> <li>• List the levels of Maslow Hierarchy of needs</li> <li>• List the traits of effective team</li> <li>• Discuss tips for stress management</li> <li>• Discuss the importance of good work ethics</li> <li>• Discuss how to manage an enterprise</li> <li>• Describe how to plan effective strategies for solving problems and improving work culture within the team.</li> <li>• List the various types of digital marketing techniques.</li> <li>• Discuss the types and importance of e-commerce in promoting businesses.</li> <li>• List the various types of online banking services being used widely.</li> <li>• Discuss the procedure to apply for bank finances</li> <li>• List the elements of a proposal to attract future business opportunities and prospective clients.</li> <li>• Explain how to conduct entrepreneurial programs to identify business opportunities, generate employment and increase clientele.</li> <li>• Understand the make in India campaign</li> <li>• Discuss the importance of Swachh Bharat Abhiyan</li> <li>• Understand the importance of entrepreneurship</li> </ul>	<ul style="list-style-type: none"> <li>• Show how to analyse a situation to identify gaps for improving the work process.</li> <li>• Demonstrate the procedure to plan the time taken to perform various tasks effectively.</li> <li>• Describe how market research is carried out</li> <li>• Role play the characteristics of an effective entrepreneur and leader</li> <li>• Demonstrate on how to identify new business opportunities</li> <li>• Prepare a sample plan to solve problems and improve productivity at the workplace.</li> <li>• Demonstrate the procedure to operate a computer for digital marketing, e-commerce, branding, etc.</li> <li>• Show how to use services such as NEFT, IMPS, UPI, RTGS for online banking.</li> </ul>



<ul style="list-style-type: none"> <li>• Describe the traits of successful entrepreneur</li> <li>• List the types of enterprises</li> <li>• Understand the importance of effective speaking and listening</li> <li>• Discuss the importance of problem solving</li> <li>• Discuss how to deal with failures</li> <li>• Describe the core keys of marketing</li> <li>• Discuss ways to manage risks at workplace</li> </ul>	
<b>Classroom Aids:</b>	
White board/Chart papers, marker.	
<b>Tools, Equipment and Other Requirements</b>	
NIL	

## Module 3: Prepare for production

*Mapped to FIC/N9026 v1.0*

### Terminal Outcomes:

- Discuss the standard practices to be followed for production
- Demonstrate the tasks to be performed for planning the production

<b>Duration:</b> 12:00	<b>Duration:</b> 32:00
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Elucidate production planning process.</li> <li>• List the manpower and material requirements as per work requirement.</li> <li>• Discuss the importance of various process charts, product flow charts, resource management process, etc.</li> <li>• List the priority of tasks as per work schedule.</li> <li>• Recall the steps to plan capacity utilization of machinery with respect to the processing time, production order and batch size for each product.</li> <li>• List down the basic concept of food safety and hygiene.</li> <li>• List the tools, equipment and production materials required.</li> <li>• Recall various steps required to organize production materials appropriately.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate the procedure for obtaining work requirements from supervisors.</li> <li>• Prepare samples to plan and prioritize work schedules</li> <li>• Demonstrate how to estimate the resources as per the requirement (raw materials, packaging materials, machineries, and manpower)</li> <li>• Employ appropriate practices to plan capacity utilization of machineries</li> <li>• Carry out cleaning and maintaining the work area following organizational procedures.</li> <li>• Perform cleaning of machines and tools and sanitize them following the organization's specifications and standards.</li> <li>• Demonstrate how to dispose of the waste material at the designated place, safely.</li> <li>• Inspect the tools, equipment and machinery to ascertain suitability for use.</li> <li>• Report information such as faulty tools and equipment to the concerned authority.</li> <li>• Demonstrate how to organize production materials appropriately.</li> <li>• Demonstrate how to allot responsibilities to the helpers.</li> </ul>
<b>Classroom Aids:</b>	
Training kit (Trainer guide, Presentations), Whiteboard, Marker, Projector, Laptop, Presentation, Participant Handbook, etc.	
<b>Tools, Equipment, and Other Requirements</b>	
broom, brush, duster, vacuum cleaner, scraper, polisher, personnel protective equipment (PPE), hair net, gloves, mask, safety shoes, head cover, various cleaning agents, sample procedures, policies, equipment, chemicals, etc.	

## Module 4: Facilitate cleaning of ingredients for production

*Mapped to FIC/N1031 v 1.0*

### Terminal Outcomes:

- Discuss the process of cleaning ingredients for production
- Demonstrate the process of cleaning ingredients by using different machines

<b>Duration:</b> 12:00	<b>Duration:</b> 28:00
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Explain organizational policies and procedures to be followed in the job</li> <li>• Share documentation and reporting procedure followed in the organization</li> <li>• Elucidate the process of removing impurities like stones, metal, sticks, straw, corn cob and dust particles</li> <li>• State the relevance and process of centrifugal sedimentation</li> </ul>	<ul style="list-style-type: none"> <li>• Exemplify the functioning of the machines used for corn milling such as de-stoner, bucket elevator, steep tank, screw conveyor</li> <li>• Demonstrate the procedure of checking moisture level of corn</li> <li>• Demonstrate the process of removing impurities and conditioning the corn grains</li> <li>• Guide how to remove the smaller dust particles after eliminating the lighter impurities through centrifugal sedimentation</li> </ul>
<b>Classroom Aids:</b>	
Training kit (Trainer guide, Presentations), Whiteboard, Marker, Projector, Laptop, Presentation, Participant Handbook, etc.	
<b>Tools, Equipment, and Other Requirements</b>	
Destoner screens, bucket elevators, screw conveyors, dumping pit / hopper, water bath, etc.	

## Module 5: Perform wet milling of corn

### Mapped to FIC/N1031 v 1.0

#### Terminal Outcomes:

- Describe the process of wet milling of corn
- Demonstrate the activities performed for wet milling of corn

<b>Duration:</b> 15:00	<b>Duration:</b> 30:00
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• State the role of washing screens in separating fiber from starch gluten</li> <li>• Detail the importance of steeping process to reduce the germ density and softens the kernel to make milling easy</li> <li>• Explain the process of removal of gluten from corn starch</li> <li>• Detail how extraction of modified starch is done from unmodified starch</li> <li>• Illustrate steps involved in getting the fine flour using roller mills, sifter, and grinder mills</li> <li>• List organizational procedures for setting the temperature for specified time to soak corn effectively</li> <li>• State the use of stationary teeth and attrition mill's rotatory plate</li> <li>• Share the importance of examining speed and pressure of washing screens to separate fiber from starch-gluten suspension</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate the conditioning process with the intent to separate kernel and various component from corn</li> <li>• Show how to conduct steeping process and preparation of steeping liquid in wet milling</li> <li>• Illustrate how to use stationary teeth and attrition mill's rotatory plate</li> <li>• Show how to examine washing screens</li> <li>• Administer formulation of unmodified starch by de-humidifying starch slurry through vacuum filters/centrifuge, flash dryers</li> <li>• Illustrate the process of transferring to co-products processing area for production of modified starch</li> </ul>
<b>Classroom Aids:</b>	
Training kit (Trainer guide, Presentations), Whiteboard, Marker, Projector, Laptop, Presentation, Participant Handbook, etc.	
<b>Tools, Equipment, and Other Requirements</b>	
Conveyor, steeping tank, elevator, stationary teeth, attrition mill, hydrocyclone separator machine, grinding mill, washing screens, centrifuge/disc separators, vacuum filters/centrifuge, flash dryers, etc.	

## Module 6: Perform dry milling of corn

*Mapped to FIC/N1031 v 1.0*

### Terminal Outcomes:

- Describe the process of dry milling of corn
- Demonstrate the non-degerming, tempering and degerming method of dry milling of corn

<b>Duration:</b> 15:00	<b>Duration:</b> 30:00
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• List the organizational specifications for ensuring quality of product</li> <li>• State the function of roller mill and importance of adjusting the clearance</li> <li>• State the need of tempering and degerming method of dry milling</li> <li>• Explain the need of appropriate cooler machine to cool the corn</li> <li>• State the relevance of removing corn germ from endosperm using gravity tables in dry milling</li> </ul>	<ul style="list-style-type: none"> <li>• Show the steps of using stone grinder for grinding corn</li> <li>• Demonstrate the use of sifter to remove germ and hull</li> <li>• Exhibit degerminator machine functionality to remove germ and bran</li> <li>• Illustrate the functioning of cooler machine to ensure corn is cooled as per organizational standards</li> <li>• Administer the speed of sifter and reduction rollers to extract corn products – grits, flour, etc.</li> <li>• Demonstrate the procedure to inspect the quality of finished products</li> <li>• Prepare a sample report to deliver test product for quality analysis</li> </ul>
<b>Classroom Aids:</b>	
Training kit (Trainer guide, Presentations), Whiteboard, Marker, Projector, Laptop, Presentation, Participant Handbook, etc.	
<b>Tools, Equipment, and Other Requirements</b>	
Stone grinder, sifter, degerminator machine, cooler machine, roller mills, sieves, etc.	

## Module 7: Undertake packaging and postproduction activities

*Mapped to FIC/N1031 v 1.0*

### Terminal Outcomes:

- Describe the process of packaging of milled corn
- Demonstrate the packaging method of milled corn

<b>Duration:</b> 14:00	<b>Duration:</b> 28:00
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• List the organizational specifications for ensuring quality of product</li> <li>• State the food laws and regulations to follow for appropriate labelling</li> <li>• List industry approved cleaning procedures to clean work area, machineries, equipment, and tools</li> <li>• Explain how to attend to minor repairs/faults (if any) of all components and machines</li> <li>• List the organizational procedure for disposal of waste</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate the steps to transfer products to packing machine</li> <li>• Show how to operate packaging/bagging machinery by setting controls such as, batch code, date coding and filling quantity, printing mark, sealer temp and pressure etc.</li> <li>• Illustrate how to inspect the weight of the packed/bagged product to ensure its conformance to standards</li> </ul>
<b>Classroom Aids:</b>	
Training kit (Trainer guide, Presentations), Whiteboard, Marker, Projector, Laptop, Presentation, Participant Handbook, etc.	
<b>Tools, Equipment, and Other Requirements</b>	
Stone grinder, sifter, degerminator machine, cooler machine, roller mills, sieves, etc.	

## Module 8: Ensuring food safety and personal hygiene

### Mapped to FIC/N9901 v 1.0

#### Terminal Outcomes:

- Explain the ways to ensure food safety and personal hygiene at the workplace
- Demonstrate the steps to be followed for implementing good hygiene and manufacturing practices

Duration: 04:00	Duration: 08:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> <li>• Define hazards and risks.</li> <li>• Recall the various types of health and safety equipment available in an organisation and the methods for obtaining them.</li> <li>• Discuss the organisational health and safety policies and procedures.</li> <li>• Discuss the relevant health and safety standards to be followed in the job as listed in 'The Food Safety and Standards Act, 2006'.</li> <li>• Explain the importance of wearing appropriate personal protective equipment (such as eye protection, hard hats, gloves apron, rubber boots, etc.) and ensuring personal hygiene at the workplace.</li> <li>• Elucidate the ways to prevent product contamination and cross contamination at the workplace.</li> <li>• Discuss the ways to handle items that can lead to allergic reactions in a retail environment.</li> <li>• State the importance of preventive health check-ups for ensuring personal hygiene.</li> <li>• State the importance of storing food at specified temperature.</li> <li>• Discuss the importance of sanitising self and the work area safely and appropriately.</li> <li>• Recall the ways to store the sanitising materials appropriately.</li> </ul>	<ul style="list-style-type: none"> <li>• Employ appropriate techniques to prevent product contamination and cross contamination.</li> <li>• Demonstrate the steps to be performed for implementing good manufacturing practices (GMP) in a retail environment.</li> <li>• Show how to treat injuries such as cuts, boils, skin infections and grazes appropriately.</li> <li>• Apply suitable methods for disinfecting the work area and equipment thoroughly.</li> <li>• Demonstrate how to wash hands and use alcohol-based sanitisers appropriately.</li> <li>• Show how to wear personal protective equipment such as gloves, hairnets, masks, ear plugs, goggles, shoes etc. properly ensuring adequate protection.</li> <li>• Prepare a sample report consisting of information such as illness to self and others as per organisational practice.</li> <li>• Roleplay a situation on how to communicate with the supervisor for reporting illness of self and others.</li> </ul>
<b>Classroom Aids:</b>	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
<b>Tools, Equipment and Other Requirements</b>	
Gloves, hair net, shoe cover, soap dispenser, hand sanitizer, ear plugs, masks, aprons/lab coats eye protection, hard hats, gloves, rubber boots, etc.	

## Module 9: Managing accidents and emergencies

### Mapped to FIC/N9901 v1.0

#### Terminal Outcomes:

- List the various types of accidents and emergencies that can arise at the workplace and the ways to address them
- Demonstrate the steps to be followed to implement emergency and evacuation procedures effectively

Duration: 04:00	Duration: 08:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> <li>• List the various types of health and safety hazards present in the environment.</li> <li>• Discuss the possible causes of risk, hazard or accident at the workplace.</li> <li>• Elucidate the standard practices and precautions used to control and prevent risks, hazards and accidents at the workplace.</li> <li>• Discuss the dangers associated with the use of electrical and other equipment.</li> <li>• State the importance of using protective equipment and clothing for specific tasks and work conditions.</li> <li>• Discuss the role of organisational protocols in preventing accidents and hazards.</li> <li>• Recall the preventive and remedial actions to be taken in the case of exposure to toxic materials at the workplace.</li> <li>• Discuss the various causes of fire and ways to prevent them.</li> <li>• Elaborate the steps to use different types of fire extinguishers.</li> <li>• Explain the procedure to provide artificial respiration and cardio-pulmonary resuscitation (CPR) to the affected.</li> <li>• Summarise the rescue techniques to be followed at times of fire hazard.</li> <li>• Discuss the significance of various types of hazard and safety signs.</li> <li>• Discuss the workplace emergency and evacuation procedures.</li> <li>• Elaborate the type of first-aid treatment to be offered at times of shock, electrical shock, bleeding, breaks to bones, minor burns, resuscitation, poisoning, eye injuries, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Apply appropriate techniques to deal with hazards safely and appropriately.</li> <li>• Demonstrate the use of various types of fire extinguishers effectively.</li> <li>• Demonstrate appropriate ways to respond to an accident situation or medical emergency promptly and appropriately.</li> <li>• Demonstrate the steps to be followed for providing artificial respiration and cardio-pulmonary resuscitation (CPR) in various instances (e.g. cardiac arrest).</li> <li>• Perform the steps to be followed during emergency and evacuation procedure.</li> <li>• Demonstrate the procedure of freeing a person from electrocution.</li> <li>• Show how to administer appropriate first aid to victims in case of cuts, bleeding, burns, choking, electric shock, poisoning etc.</li> </ul>



- Discuss about the potential injuries and ill health conditions that are caused due to incorrect manual handling practices.
- List the precautions to be taken while lifting and carrying materials in a food retail environment.

#### **Classroom Aids:**

Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook

#### **Tools, Equipment and Other Requirements**

Helmet, gloves, rubber mat, ladder, neon tester, leather or asbestos gloves, flame proof aprons, flame proof overalls buttoned to neck, cuff less (without folds) trousers, reinforced footwear, helmets/hard hats, cap and shoulder covers, ear defenders/plugs, safety boots, knee pads, particle masks, glasses/goggles/visors, hand and face shields, machine guards, residual current Devices, shields, dust sheets, respirator.

## Module 10: Working Effectively in an Organization

### Mapped to FIC/N9902 v 1.0

#### Terminal Outcomes:

- State the importance of proper communication and teamwork at the workplace
- Roleplay a situation to communicate with others effectively

Duration: 08:00	Duration: 08:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> <li>• Discuss the applicable organisational quality procedures and processes for working effectively in a team</li> <li>• Elucidate the legislations, standards, policies, and procedures followed in the organization relevant to employment, behaviour, harassment, discrimination, and performance conditions</li> <li>• State the importance of well-defined reporting structure in an organisation. List the various types of inter-dependent functions applicable in the job</li> <li>• Discuss the different types of harassment and discrimination based on gender, disability, caste, religion, and culture</li> <li>• List the key factors that aid in prioritising tasks</li> <li>• Discuss the components of effective communication and its importance at the workplace</li> <li>• State the impact of poor communication on the employee, the employer, and the customer</li> <li>• State the importance of teamwork in organizational and individual success.</li> <li>• Discuss the importance of ethics and discipline for professional success</li> <li>• Explain the ways to address grievances appropriately and effectively</li> <li>• Discuss the importance of managing interpersonal conflicts effectively and ways to do so</li> <li>• List the different types of disabilities and the challenges faced by persons with disability (PwD)</li> <li>• Discuss the applicable laws, acts and provisions defined for PwD by the statutory bodies</li> </ul>	<ul style="list-style-type: none"> <li>• Roleplay a situation on how to obtain information, seek clarifications, reciprocate understanding and provide information accurately and clearly</li> <li>• Roleplay a situation on how to use inclusive language (verbal, non-verbal and written) that is gender, disability and culturally sensitive while interacting with others</li> <li>• Show how to consult and assist others to maximize effectiveness and efficiency at work</li> <li>• Dramatize a situation to show how to escalate problems and grievances beyond own scope to the concerned authority</li> <li>• Roleplay a situation on how to take appropriate action to resolve conflicts at the workplace</li> <li>• Roleplay a situation on how to report incidents of harassment and discrimination to appropriate authority</li> </ul>

<ul style="list-style-type: none"> <li>• State the importance of gender sensitivity and equality</li> <li>• Discuss the applicable legislations, grievance redressal mechanisms, and penalties against harassment at the workplace</li> <li>• State the importance of transacting with others without personal bias</li> </ul>	
<b>Classroom Aids:</b>	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
<b>Tools, Equipment and Other Requirements</b>	
Nil	

## Module 11: Material Conservation

### Mapped to SGJ/N1702 v 1.0

#### Terminal Outcomes:

- Discuss optimal usage of material including water in various tasks/activities/processes

<b>Duration:</b> 04:00	<b>Duration:</b> 08:00
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• List the types of hazards, risks and threats associated with handling different materials</li> <li>• Discuss the role of workstation layout, electrical and thermal equipment used in the material conservation</li> <li>• Discuss organisational procedures for minimising waste</li> <li>• Elucidate practices of efficient and inefficient management and utilization of material and water at the workplace</li> <li>• Discuss the ways to manage material and water usage at work effectively</li> </ul>	<ul style="list-style-type: none"> <li>• Show how to check for spills and leakages in various materials applicable in the job</li> <li>• Demonstrate how to plug the spills and leakages appropriately</li> <li>• Roleplay a situation on how to escalate any issues related to repair of spills and leakages to the concerned authority effectively</li> <li>• Demonstrate the standard practices to be followed for cleaning tools, machines and equipment effectively</li> </ul>
<b>Classroom Aids:</b>	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
<b>Tools, Equipment and Other Requirements</b>	
Materials and tools and equipment used at work	

## Module 12: Energy/Electricity Conservation

### Mapped to SGJ/N1702 v 1.0

#### Terminal Outcomes:

- Discuss optimal usage of energy/electricity

<b>Duration:</b> 04:00	<b>Duration:</b> 08:00
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Define electricity</li> <li>• Discuss the basics of electricity</li> <li>• List the energy efficient devices that are used in the job</li> <li>• Discuss the ways to identify electrical problems that can arise during work</li> <li>• Discuss the standard practices to be followed for conserving electricity in the job</li> <li>• State the impact of improperly connected electrical equipment and appliances on the tasks being performed</li> </ul>	<ul style="list-style-type: none"> <li>• Apply suitable techniques to check the equipment/machinery for desired level of functioning</li> <li>• Employ appropriate methods to rectify faulty equipment/machinery safely</li> <li>• Roleplay a situation on how to report equipment faults and maintenance lapses to the concerned personnel effectively</li> </ul>
<b>Classroom Aids:</b>	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
<b>Tools, Equipment and Other Requirements</b>	
Energy saving devices	

## Module 13: Waste Management/Recycling

### Mapped to SGJ/N1702 v 1.0

#### Terminal Outcomes:

- Discuss the importance of minimal waste generation
- Demonstrate how to dispose waste as per industry approved standards

<b>Duration:</b> 04:00	<b>Duration:</b> 08:00
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• List the various types of recyclable, non-recyclable, and hazardous waste</li> <li>• State the significance of different coloured dustbins</li> <li>• List the different types of waste to be segregated</li> <li>• State the importance of waste management</li> <li>• Discuss the standard methods for waste disposal</li> <li>• List the sources of pollution.</li> <li>• Discuss the ways to minimise various types of pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate the standard practices to be followed for segregating waste into respective categories</li> <li>• Show how to dispose non-recyclable waste appropriately and safely</li> <li>• Demonstrate the standard practice for depositing recyclable and reusable materials at designated place</li> <li>• Show how to dispose hazardous waste safely and appropriately</li> </ul>
<b>Classroom Aids:</b>	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
<b>Tools, Equipment and Other Requirements</b>	
Non-recyclable, recyclable waste bins	

## Module 14: Produce corn oil

### Mapped to FIC/N1032 v 1.0

#### Terminal Outcomes:

- Discuss the process involved in extraction, refining and packaging of corn oil
- Demonstrate how to extract, refine, and pack the corn oil
- Exhibit the postproduction cleaning and regular maintenance

<b>Duration: 10:00</b>	<b>Duration: 20:00</b>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Discuss the operating procedure for producing corn oil</li> <li>• List the ingredients used in producing corn oil</li> <li>• State the significance of solvents used, like, ethanol, methylene, chloride, etc.</li> <li>• Explain the significance of solvent extraction process using hexane</li> <li>• Define the process of passing solvent, retrieval of oil and carrying out boiling of oil by steam</li> <li>• Discuss the relevance of heating parameters of oil</li> <li>• State food safety and hygiene as per organisational policies</li> <li>• Explain the centrifuge process to remove soap forms, gums, and the dregs from certain substances</li> <li>• State bleaching of heated oil and deodorized process</li> <li>• Discuss major food uses of corn oil in cooking, salad oil, margarines, and spreads</li> <li>• Define SOP to wash bottle/plastic containers to fill measured quantity of finished products</li> <li>• State periodic maintenance of all machines and equipment following the SOP or following suppliers' instruction/manual</li> </ul>	<ul style="list-style-type: none"> <li>• Show the functionality of mechanized grooved rollers or hammer mills for crushing of material</li> <li>• Demonstrate how to operate packaging machine and labelling machine</li> <li>• Exhibit procedure to set date coding machine for batch number, date of manufacture, date of expiry, etc</li> <li>• Illustrate the process of hexane extraction or mechanical prepressing followed by hexane extraction</li> <li>• Show the transfer process of finished product to clean containers</li> <li>• Demonstrate post-production cleaning and regular maintenance procedures of the equipment</li> </ul>
<b>Classroom Aids:</b>	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
<b>Tools, Equipment and Other Requirements</b>	
mechanized grooved rollers or hammer mills, slotted barrel, hexane or other solvents, stripping column, alkaline substance (sodium hydroxide or sodium carbonate), clean containers - plastic bottles for domestic oils, glass bottles cans, plastic containers, cleaning agent and sanitizers, suppliers' instruction/manual	

## Module 15: Produce corn syrup

### Mapped to FIC/N1033 v 1.0

#### Terminal Outcomes:

- Discuss the process involved in converting corn starch into corn syrup and from corn syrup into high fructose corn syrup
- Demonstrate the activities involved in conversion
- Exhibit the postproduction cleaning and regular maintenance

Duration: 10:00	Duration: 30:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> <li>• Discuss the operating procedure for converting corn starch into syrup and syrup to high fructose corn syrup</li> <li>• List the ingredients used in producing corn syrup</li> <li>• State the significance of acid hydrolysis process</li> <li>• List the various stage undertaken in hydrolysis process to convert corn starch into corn syrup</li> <li>• Specify the dextrose sugars in syrup are converted into sweeter fructose sugars by action of an enzyme under controlled parameters</li> <li>• List series of fractionation columns to separate and hold the fructose content</li> <li>• Signify blending of fructose syrup to be used in soft drinks, ice cream, and frozen desserts</li> <li>• Explain the relevance of evaporation of water to produce powdered high fructose corn syrups</li> <li>• Discuss the use of corn syrup in foods to soften texture, add volume, prevent crystallization of sugar, and enhance flavor</li> <li>• List the importance of viscosity and sweetness of the syrup depends on the extent to which the hydrolysis reaction has been carried out</li> <li>• State food safety and hygiene as per organisational policies</li> </ul>	<ul style="list-style-type: none"> <li>• Show the acid hydrolysis process</li> <li>• Demonstrate the functioning of drum or spray dryer</li> <li>• Illustrate the enzymatic processing that produces a sweeter compound containing higher levels of fructose</li> <li>• Show the transfer process of finished product to clean containers</li> <li>• Demonstrate the use of enzyme to convert into sweeter fructose sugar</li> <li>• Illustrate evaporation process to produce powdered high fructose corn syrups</li> <li>• Demonstrate post-production cleaning and regular maintenance procedures of the equipment</li> </ul>
<b>Classroom Aids:</b>	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
<b>Tools, Equipment and Other Requirements</b>	
Mechanized grooved rollers or hammer mills, slotted barrel, hexane or other solvents, stripping column, alkaline substance (sodium hydroxide or sodium carbonate), clean containers - plastic bottles for domestic oils, glass bottles cans, plastic containers, cleaning agent and sanitizers, suppliers' instruction/manual	



## Module 16: Produce corn starch

### Mapped to FIC/N1034 v 1.0

#### Terminal Outcomes:

- Discuss the process involved in producing corn starch by following organization standards
- Demonstrate the various activities involved in producing corn starch
- Exhibit the postproduction cleaning and regular maintenance

Duration: 10:00	Duration: 20:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> <li>• Discuss the operating procedure for cleaning, steeping, degermination, refining, dehydration and drying of corn to produce corn starch</li> <li>• List the ingredients, machines, and tools used in producing corn starch</li> <li>• Discuss the conditions required for optimal water absorption of the corn kernel, controlled fermentation by lactic acid bacteria and loosening of the protein matrix</li> <li>• State the advantages of Sulphur dioxide focusing on fermentation</li> <li>• Define the process of grounding in attrition mills</li> <li>• State hydro cyclones process in a two-step separation in between lightweight germs and ground slurry</li> <li>• Draw the importance on following counter flow principle for complete washing out of the starch and separation of the fibres</li> <li>• Simplify how to separate dissolved proteins, called gluten, from crude starch milk by means of two successive nozzles type continuous centrifugal separator – a gluten thickener</li> <li>• Define powder recycling and its significance</li> <li>• Discuss the role of hydro-cyclone plants for starch refining</li> <li>• Explain the process of refining, dehydration and drying of starch</li> <li>• Administer screening and bagging of dried starch</li> <li>• List the organizational policies on food safety and hygiene</li> <li>• State food safety and hygiene as per organisational policies</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate how the steeping process is performed</li> <li>• Exhibit how to inspect the supplied corn to check whether it meets organization specification</li> <li>• Show the process of refining of starch using hydrocyclones</li> <li>• Make observations on growth of lactic acid bacteria which suppresses unwanted microorganisms</li> <li>• Demonstrate post-production cleaning and regular maintenance procedures of the equipment</li> <li>• Demonstrate the functioning of gluten separator and vacuum belt filter or decanter</li> <li>• Walk through the use of powder recycling</li> <li>• Show the complete process of refining, dehydration and drying of starch</li> </ul>

- State the relevance of periodic maintenance of all machines and equipment following the SOP or following suppliers' instruction/manual

#### **Classroom Aids:**

Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook

#### **Tools, Equipment and Other Requirements**

Mechanized grooved rollers or hammer mills, slotted barrel, hexane or other solvents, stripping column, alkaline substance (sodium hydroxide or sodium carbonate), clean containers - plastic bottles for domestic oils, glass bottles cans, plastic containers, cleaning agent and sanitizers, suppliers' instruction/manual

## Module 17: Produce corn flakes

### Mapped to FIC/N1035 v 1.0

#### Terminal Outcomes:

- Discuss the process involved in producing corn flakes
- Demonstrate the process of preparing grain, making flakes and packaging corn flakes
- Exhibit the postproduction cleaning and regular maintenance

Duration: 10:00	Duration: 30:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> <li>• Discuss the operating procedure for hydrothermal, pre-drying, flaking, roasting and cooling</li> <li>• List the ingredients, machines, and tools used in producing corn flakes</li> <li>• List different variety of flavours</li> <li>• Discuss the use of antioxidants like BHA and BHT in breakfast cereals</li> <li>• State the relevance of vitamins and minerals added to breakfast cereals to replace those lost during cooking</li> <li>• Explain the advantage of eliminating bacteria and eventually development of toxins that can appear in prolonged storage conditions</li> <li>• Define the complete process of preparing flaked cereals and adding coatings</li> <li>• Specify type of coating added depending on the recipe and manufacturers choice</li> <li>• List the organizational policies on food safety and hygiene</li> <li>• State food safety and hygiene as per organisational policies</li> <li>• State the relevance of periodic maintenance of all machines and equipment following the SOP or following suppliers' instruction/manual</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate how to manage high hydraulic compacting pressure and a precise roller setting create cornflakes with a consistently high quality</li> <li>• Show the roasting procedure through the formation of blisters</li> <li>• Exhibit cooking-laminating process to transform starch of the grains into less complex substances and the starch grains lose their crystalline</li> <li>• Demonstrate the process of making flaked cereals and adding coatings</li> <li>• Prepare an attractive and moisture proof sample package for packing corn flakes to ensure proper preservation</li> <li>• Demonstrate post-production cleaning and regular maintenance procedures of the equipment</li> </ul>
<b>Classroom Aids:</b>	
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook	
<b>Tools, Equipment and Other Requirements</b>	
Raw material: maize, salt, yeast, sweeteners, flavoring agents, coloring agents, vitamins, minerals, and preservatives; Sweeteners: malt (obtained from barley), white sugar, brown sugar, and corn syrup or natural sweeteners; Flavors: chocolate, cinnamon and other spices, and fruit flavors; Improvements: nuts, dried fruit, and marshmallows	

antioxidants BHA and BHT, rotary steam cooker, conveyor belt, metal rollers, ovens, polythene containers or other suitable packaging materials, cleaning agent and sanitizers, suppliers' instruction/manual

## Annexure

### Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
B.Sc or graduate/B.Tech/BE	Food technology or food engineering	3	Food processing	1	Food processing	
M.Sc/M.Tech/ME	Food technology or food engineering	2	Food processing	1	Food processing	
Diploma /certificate course	(Food Technology / Food Engineering /packaging/Home science, Milling technology or allied sector	4	Food processing	1	Food processing	

Trainer Certification	
Domain Certification	Platform Certification
"Corn Processing Technician", "FIC/Q1009, V1.0", Minimum accepted score is 80%	"Trainer", "MEP/Q2601, V1.0" with a scoring of minimum 80%

## Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
		Years	Specialization	Years	Specialization	
M.Sc/M.Tech/ME	Food technology or food engineering	2	Food processing	1	Food processing	
B.Sc or graduate/B.Tech/BE	Food technology/ Home Science	3	Food processing	2	Food processing	
Diploma	Hotel management/ Food Science/ Home Science	4	Food processing	2	Food processing	

Assessor Certification	
Domain Certification	Platform Certification
"Corn processing technician", "FIC/Q1009, V1.0", Minimum accepted score is 80%	"Assessor", "MEP/Q2701, V1.0" with a scoring of minimum 80%

## 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
<b>Declarative Knowledge</b>	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.
<b>Key Learning Outcome</b>	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).
<b>OJT (M)</b>	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
<b>OJT (R)</b>	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
<b>Procedural Knowledge</b>	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.
<b>Training Outcome</b>	Training outcome is a statement of what a learner will know, understand and be able to do <b>upon the completion of the training</b> .
<b>Terminal Outcome</b>	Terminal outcome is a statement of what a learner will know, understand and be able to do <b>upon the completion of a module</b> . 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