Model Curriculum

QP Name: Fundamentals of Food Product Development

QP Code: FIC/N9309

Version: 1.0

NSQF Level: 5.0

Model Curriculum Version: 1.0

Food Industry Capacity & Skill Initiative || Shriram Bharatiya Kala kendra, 3rd floor, 1, Copernicus Marg, Mandi House, New Delhi
Delhi 110001 || email: admin@ficsi.in

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Training Parameters

Sector	Food Processing
Sub-Sector	Generic
Occupation	Research and Development
Country	India
NSQF Level	5.0
Aligned to NCO/ISCO/ISIC Code	NCO-2015/2.2131.1400
Minimum Educational Qualification and Experience	Completed UG in Food Science/Food Technology/Chemistry/ Biotechnology/Biochemistry with 1.5 years of Experience in the Food Processing Industry OR Completed UG Diploma in Food Science/Food Technology/Chemistry/ Biotechnology/Biochemistry with 3 years of experience in the Food Processing Industry OR Previous relevant Qualification of NSQF Level 4 with 3 years of experience in the Food Processing Industry OR Previous relevant Qualification of NSQF Level 4.5 with 1.5 years of experience in the Food Processing Industry
Pre-Requisite License or Training	NA
Minimum Job Entry Age	NA
Last Reviewed On	07-10-2025
Next Review Date	7-10-2028
NSQC Approval Date	07-10-2025
QP Version	1.0
Model Curriculum Creation Date	05-09-2025
Model Curriculum Valid Up to Date	7-10-2028
Model Curriculum Version	1.0
Minimum Duration of the Course	90 Hours
Maximum Duration of the Course	90 Hours

Program Overview

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

Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills to:

- Explain the responsibilities of a New Product Development Executive in food processing, including their role in conceptualizing, developing, and launching innovative food products.
- Discuss how New Product Development Executive conducts market research and develops new recipe formulations in compliance with food safety regulations.
- Describe the process of coordinating with cross-functional teams to bring new food products from concept to market.
- Elucidate the methods used by a New Product Development Executive to improve existing food products.

Compulsory Modules

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

NOS and Module Details	Theory Duration (Hours)	Practical Duration (Hours)	On-the-Job Training Duration (Mandatory) (Hours)	On-the-Job Training Duration (Recommended) (Hours)	Total Duration (Hours)
FIC/N9309: Fundamentals of Food Product Development **NOS Version No.: 1.0** **NSQF Level: 4.5**	**30:00**	**60:00**	**00:00**	**00:00**	**90:00**
Module 1: Introduction to the Food Processing Sector and the Fundamentals of Food Product Development	05:00	00:00	00:00	00:00	05:00
Module 2: Carry Out Market Research and New Food Product Development	05:00	15:00	00:00	00:00	20:00
Module 3: Carry Out Food Product Testing and Quality Assurance	10:00	20:00	00:00	00:00	30:00
Module 4: Carry out Process Development and Optimization	05:00	10:00	00:00	00:00	15:00
Module 5: Carry Out Production and Launch of Food Products	05:00	15:00	00:00	00:00	20:00
Total Duration	**30:00**	**60:00**	**00:00**	**00:00**	**90:00**

Module Details

Module 1: Introduction to the Food Processing Sector and the Fundamentals of Food Product Development

Mapped to FIC/N9309, v1.0

Terminal Outcomes:

- Explain the importance of Food Processing Industry.
- Discuss the Fundamentals of Food Product Development in Food Processing.

Duration (in hours): 05:00	**Duration (in hours): 00:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Define food processing. • Describe the various sub-sectors of food processing industry. • Explain the need for the Fundamentals of Food Product Development. • Describe the Fundamentals of Food Product Development - Food Processing. • Explain the chemical composition of food and how different food ingredients interact. • Discuss the effect of microorganisms on food safety, quality, and shelf life. • Describe the principles and techniques of food processing.	
Classroom Aids	
Training Kit - Facilitator's Guide, Participant's Handbook, Presentations and Software, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Nil	

Module 2: Carry Out Market Research and New Food Product Development

Mapped to FIC/N9309, v1.0

Terminal Outcomes:

- Describe the steps involved in conducting market research and conceptualizing new food products.

Duration (in hours): 05:00	Duration (in hours): 15:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the techniques for conducting and analyzing market research. • Discuss the basic marketing concepts for food products. • Explain the chemical composition of food and how different ingredients interact to impact safety, quality, and shelf life. • Discuss the principles and techniques of food processing and preservation methods, including the equipment used for production. • Describe the nutritional aspects, dietary considerations, and formulation adjustments necessary to achieve desired product profiles. • Elucidate the importance of documenting recipe formulations, bills of materials, and developing protocols and quality control plans.	• Demonstrate how to conduct market research to identify trends, consumer preferences, and product innovations suitable for scale-up. • Show how to develop new food product concepts and formulations based on market research and consumer insights. • Demonstrate how to calculate and analyze the nutritional content and caloric value of food products to ensure regulatory compliance. • Show how to evaluate the feasibility of product concepts in terms of cost, resources, market potential, and scalability for mass production. • Demonstrate how to identify and source raw materials and ingredients needed for new product development and large-scale production. • Show how to create and test new formulations, ensuring they meet quality and safety standards. • Demonstrate how to develop product specifications and define process parameters for production scale-up. • Show how to document formulations, bill of materials, and production processes for consistent product quality in large-scale manufacturing.
Classroom Aids	
Training Kit - Facilitator's Guide, Participant's Handbook, Presentations and Software, Whiteboard, Marker, Projector, Laptop, Video Films	

Tools, Equipment and Other Requirements
Analytical Balance, pH Meter, Refractometer, Microscope, Mixers/Blenders, Ovens, Dehydrators, Food Processor, Fermentation Units, Stoves/Burners, Pots, Pans, Spatulas, Whisks, Measuring Cups, Knives, Peelers, Cutting Boards, Tasting Spoons/Cups, Thermometer, Timers, Scales, Sample Containers, Water Activity Meter, Measuring Cups and Spoons, Colorimeter, High-Performance Liquid Chromatography (HPLC), Gas Chromatography (GC), Texture Analyzer, Sealing Machine, Vacuum Packaging Machine, Refrigerator, Freezer, Lab Coats, Gloves, Hairnets, Masks, Aprons, Safety Goggles, Fire Extinguisher, First Aid Kit

Module 3: Carry Out Food Product Testing and Quality Assurance

Mapped FIC/N9309, v1.0

Terminal Outcomes:

- Describe how to carry out food product testing and quality assurance.

Duration (in hours): 10:00	**Duration (in hours)**: 20:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the principles of new product development and packaging design for food products. • Discuss the techniques for assessing the sensory characteristics of food products, such as taste, smell, and texture. • Describe the methods for developing and refining food product prototypes. • Explain the principles and techniques for food quality assessment and analysis of test results. • Discuss the quality management systems, such as Hazard Analysis Critical Control Point (HACCP) and ISO 22000. • Explain the FSSAI food safety regulations and standards. • Describe the techniques for conducting chemical, microbiological, and physical tests on food products. • Discuss the process of conducting line trials to check the product performance. • Explain the appropriate packaging for different food products to maintain their quality. • Discuss the food labeling requirements, including nutritional facts, ingredient lists, and allergen declarations. • Describe the importance of ensuring products meet applicable regulatory and certification requirements. • Discuss the importance of effective cross-functional collaboration with R&D, marketing, production, etc., for new food product development.	• Demonstrate how to develop product prototypes for testing and evaluation. • Show how to collect feedback on new products by organizing sensory panels and consumer tests. • Demonstrate how to conduct shelf-life studies to determine a product's stability and quality over time. • Show how to conduct line trials to assess product performance. • Demonstrate how to ensure new products comply with applicable food hygiene and safety standards. • Show how to identify and address issues that arise during the development process. • Demonstrate how to communicate information about the quality of food packaging materials to the production team. • Show how to identify and implement solutions to improve product quality and development processes. • Demonstrate how to maintain records of product development activities, including research findings, formulations, and testing results.

• Describe the appropriate strategies for identifying and resolving issues that arise during the product development process.	
Classroom Aids	
Training Kit - Facilitator's Guide, Participant's Handbook, Presentations and Software, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Analytical Balance, pH Meter, Refractometer, Microscope, Mixers/Blenders, Ovens, Dehydrators, Food Processor, Fermentation Units, Stoves/Burners, Pots, Pans, Spatulas, Whisks, Measuring Cups, Knives, Peelers, Cutting Boards, Tasting Spoons/Cups, Thermometer, Timers, Scales, Sample Containers, Water Activity Meter, Measuring Cups and Spoons, Colorimeter, High-Performance Liquid Chromatography (HPLC), Gas Chromatography (GC), Texture Analyzer, Sealing Machine, Vacuum Packaging Machine, Refrigerator, Freezer, Lab Coats, Gloves, Hairnets, Masks, Aprons, Safety Goggles, Fire Extinguisher, First Aid Kit	

Module 4: Carry out Process Development and Optimization

Mapped to FIC/N9309, v1.0

Terminal Outcomes:

- Describe the steps involved in development and optimization of processes.

Duration (in hours): 05:00	Duration (in hours): 10:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the structured innovation processes, methodologies, and the integration of emerging technologies in food processing. • Describe the process of developing and managing project timelines, budgets, and resources for new product development. • Explain the business aspects of product development, including cost management, profitability, and alignment with strategic goals. • Elucidate the basics of advanced food analysis and testing tools, such as Mass Spectrometry (MS), High-Performance Liquid Chromatography (HPLC), Nuclear Magnetic Resonance (NMR) Spectroscopy, Gas Chromatography-Mass Spectrometry (GC-MS), Rheometry (Rheological Analysis), Liquid Chromatography-Mass Spectrometry (LC-MS), and Fourier Transform Infrared (FTIR) Spectroscopy.	• Demonstrate how to develop product prototypes for testing and evaluation. • Show how to collect feedback on new products by organizing sensory panels and consumer tests. • Demonstrate how to conduct shelf-life studies to determine a product's stability and quality over time. • Show how to conduct line trials to check product performance. • Demonstrate how to ensure new products comply with applicable food hygiene and safety standards. • Show how to identify and address issues that arise during the development process. • Demonstrate how to communicate the quality of food packaging materials to the production team. • Show how to identify and implement solutions to improve product quality and development processes. • Demonstrate how to maintain records of product development activities, including research findings, formulations, and testing results.
Classroom Aids	
Training Kit - Facilitator's Guide, Participant's Handbook, Presentations and Software, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Analytical Balance, pH Meter, Refractometer, Microscope, Mixers/Blenders, Ovens, Dehydrators, Food Processor, Fermentation Units, Stoves/Burners, Pots, Pans, Spatulas, Whisks, Measuring Cups, Knives, Peelers, Cutting Boards, Tasting Spoons/Cups, Thermometer, Timers, Scales, Sample Containers, Water Activity Meter, Measuring Cups and Spoons, Colorimeter, High-Performance Liquid Chromatography (HPLC), Gas Chromatography (GC), Texture Analyzer, Sealing Machine, Vacuum Packaging Machine, Refrigerator, Freezer, Lab Coats, Gloves, Hairnets, Masks, Aprons, Safety Goggles, Fire Extinguisher, First Aid Kit	

Module 5: Carry Out Production and Launch of Food Products

Mapped FIC/N9309, v1.0

Terminal Outcomes:

- Explain how to carry out the production and launch of food products.

Duration (in hours): 05:00	**Duration (in hours): 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the process of developing and managing project timelines, budgets, and resources. • Explain the importance of market awareness, including consumer behavior and trends, competitors' products, and market positioning. • Describe the process of documenting research findings, development processes, and product specifications. • Discuss the business aspects of product development, including cost management, profitability, and alignment with strategic goals. • Elucidate supply chain management, logistics, and sourcing strategies for ensuring consistent material availability. • Describe the basics of food engineering and formulation tools and techniques, such as food texture analysers, rapid prototyping, and 3D food printing.	• Demonstrate how to create and manage project timelines and budgets for new product development projects. • Show how to coordinate the full-scale production of food products. • Demonstrate how to manage product launch timelines, marketing strategies, and distribution plans. • Show how to coordinate with marketing, production, quality assurance departments, and suppliers for the successful launch of new products. • Demonstrate how to support the sales team with technical knowledge and product information for product promotion. • Show how to prepare and present reports and presentations on new product development progress to senior management. • Demonstrate how to identify opportunities for innovation in product development, including new ingredients and processes. • Show how to integrate industry trends, new technologies, stakeholder and consumer feedback to refine and improve food products.
Classroom Aids	
Training Kit - Facilitator's Guide, Participant's Handbook, Presentations and Software, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Analytical Balance, pH Meter, Refractometer, Microscope, Mixers/Blenders, Ovens, Dehydrators, Food Processor, Fermentation Units, Stoves/Burners, Pots, Pans, Spatulas, Whisks, Measuring Cups,	

Knives, Peelers, Cutting Boards, Tasting Spoons/Cups, Thermometer, Timers, Scales, Sample Containers, Water Activity Meter, Measuring Cups and Spoons, Colorimeter, High-Performance Liquid Chromatography (HPLC), Gas Chromatography (GC), Texture Analyzer, Sealing Machine, Vacuum Packaging Machine, Refrigerator, Freezer, Lab Coats, Gloves, Hairnets, Masks, Aprons, Safety Goggles, Fire Extinguisher, First Aid Kit

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialisation**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
B.Sc.	Food Science/Food Technology/Chemistry/Biotechnology/Biochemistry	4	Research and Development	1	Training of Fundamentals of Food Product Development	
M.Sc.	Food Science/Food Technology/Chemistry/Biotechnology/Biochemistry	2	Research and Development	1	Training of Fundamentals of Food Product Development	

Trainer Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: "Fundamentals of Food Product Development" mapped to NOS: "FIC/N9309, v1.0". Minimum accepted score is 80%.	Recommended that the Trainer is certified for the Job Role: "Trainer (VET and Skills)", mapped to the Qualification Pack: "MEP/Q2601, v2.0". The minimum accepted score as per MEPSC guidelines is 80%.

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training/Assessment Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
B.Sc.	Food Science/Food Technology/Chemistry/Biotechnology/Biochemistry	4	Research and Development	1	Assessment of Fundamentals of Food Product Development	
M.Sc.	Food Science/Food Technology/Chemistry/Biotechnology/Biochemistry	2	Research and Development	1	Assessment of Fundamentals of Food Product Development	

Assessor Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: "Fundamentals of Food Product Development" mapped to NOS: "FIC/N9309, v1.0". Minimum accepted score is 80%.	Certified for the Job Role: "Assessor (VET and Skills)", mapped to the Qualification Pack: "MEP/Q2701, v2.0", with a minimum score of 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. There in 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 banks 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.

On the Job:

1. Each module (which covers the job profile of New Product Development Executive - Food Processing) will be assessed separately.

2. The candidate must score 70% in each module to successfully complete the OJT.

3. Tools of Assessment that will be used for assessing whether the candidate is having desired skills and etiquette of dealing with customers, understanding needs & requirements, assessing the customer and perform Soft Skills effectively:

- Videos of Trainees during OJT
- Answer Sheets of Question Banks
- Assessing the Logbook entries of Trainees at Employer location
- Employer Performance Feedback.

4. Assessment of each Module will ensure that the candidate is able to:

- Carry out production of fortified food
- Work effectively and efficiently as per schedules and timelines.
- Escalate the problem to appropriate authority.
- Implement safety practices.
- Optimize the use of resources to ensure less wastage and maximum conservation.

References

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 it 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
NCVET	National Council for Vocational Education and Training
FICSI	Food Industry Capacity & Skill Initiative
QP	Qualification Pack
MC	Model Curriculum
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards
NCO	National Classification of Occupations
ES	Employability Skills
HACCP	Hazard Analysis and Critical Control Points
FSSAI	Food Safety and Standards Authority of India
ISO	International Organization for Standardization
HPLC	High-Performance Liquid Chromatography
GC	Gas Chromatography