



**PERIYAR UNIVERSITY**  
Periyar Palkalai Nagar, Salem-636011



**SCHOOL OF PROFESSIONAL STUDIES**  
**Department of Food Science and Nutrition**



**B.Voc. FOOD SCIENCE AND NUTRITION**  
[Alignment with NSDC/NSQF/DGET]

**REGULATIONS AND CURRICULAR FRAMEWORK**

*(Effective from the academic year 2015-2016 and thereafter)*

## B.Voc. FOOD SCIENCE AND NUTRITION

### REGULATIONS

#### Preamble

The Department of Food Science and Nutrition aims in developing human resources, to expand and transfer knowledge for continuous improvement of the safety, quality and value of food products. Food Science and Nutrition is an interdisciplinary programme.

#### *Programme Objectives of B.Voc. Food Science and Nutrition* is

- Engineered to theoretical and practical aspects of the entire food chain from farm to fork.
- Gain insight into the national nutritional problems and their management through food formulations.
- Develop skills for various job roles related to Food Science and Technology division and entrepreneurship.

#### Candidate's eligibility for admission

Any candidate passed +2 examinations in any subject approved by TNBSC/CBSE/ICSE or any Diploma/UG degree, approved by the Association of Indian Universities are eligible to seek admission.

#### Duration of the course - Three years

S.No.	Exit Programme Level	Duration
1.	Certificate in Food Science and Handling	6 months
2.	Diploma in Food Science and Processing	12 months
3.	Advanced Diploma in Food Processing and Quality Control	24 months
4.	B.Voc. in Food Science and Nutrition	36 months

#### Part A

Credits for General Education Component	- 68
Credits for Skill Component	- 112
<b>Total credits</b>	<b>- 180</b>

#### Part -B

Modular Training Delivery Plan (Extra)- 06* 1- 06	
<b>Total credits</b>	<b>- 06</b>

#### Teaching methodologies

The **classroom teaching** would be through conventional lectures, video presentations and use of OHP and Power point presentations. The lecture would be such that the students should participate actively in the discussion, student's seminar and multi sensory approach in learning. The scientific discussions would be arranged to improve their communicative skills.

In the laboratory, instructions would be given for the **experiments** followed by **demonstration** and finally the students have to do the experiments individually. Periodic tests would be conducted and for the students of slow learners would be given special attention.

The student will be required to undergo an **internship** for a total duration of two weeks in their chosen area of interest in each semester as mentioned in the structure of the programme which will facilitate skills and professional career in the same field.

Students should undergo one **Modular Training Delivery Plan** in each semester in accordance with the curriculum as extra credit courses.

## Examinations

Examinations are conducted in semester pattern. The examination for the Semester I, III & V will be held in November/December and that for the Semester II, IV and VI will be in the month of April/May.

Candidates failing in any subject (both General Education and Skill Component) will be permitted to appear for such failed subjects in the same syllabus structure at subsequent examinations for within next 5 years. Failing which, the candidate has to complete the course in the present existing syllabus structure.

## Scheme for Evaluation

Evaluation will be done on a continuous basis and will be evaluated four times during the course work. The first evaluation will be in the 8<sup>th</sup> week, the second in the 12<sup>th</sup> week, third in the 18<sup>th</sup> week and the end – semester examination in the 20<sup>th</sup> week. The General Education Component is assessed by the University and Skill Education Component by the University and SSCs.

## Grading System

Evaluation of performance of students is based on ten point scale grading system as given below.

Ten Point Scale			
Grade of Marks	Grade points	Letter Grade	Description
90-100	9.0-10.0	O	Outstanding
80-89	8.0-8.9	D+	Excellent
75-79	7.5-7.9	D	Distinction
70-74	7.0-7.4	A+	Very Good
60-69	6.0-6.9	A	Good
50-59	5.0-5.9	B	Average
00-49	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

## Equivalence of the Programme

Candidates completed B.Voc. Food Science and Nutrition is equivalent to B.Sc. Nutrition and Dietetics, BSc. Food Science & Nutrition, BSc. Food science & Technology and B.Sc. Food Technology all its related disciplines awarded by any UGC recognized Universities and Institutions.



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**CURRICULAR FRAMEWORK OF B.Voc. PROGRAMME**



SEM	PART	COURSE CODE	COURSE	HRS		CREDIT	MARKS		
				L/T	P		IA	EA	TOTAL
Semester I									
I	I	15BFSNL01	Part I - Tamil-I	3	-	3	25	75	100
	II	15BFSNE01	Functional English Practical-I	2	2	3	40	60	100
	III	15BFSNC01	Core - Science & Handling of Raw Material	3	-	3	25	75	100
	III	15BFSNA01	Allied Practical I – Inflow Inventory Management	1	2	2	20	30	50
	IV	15BFSNV01	Val.Edu – Yoga and Fitness	2	-	1	20	30	50
	V	15BFSNSC01	Purchase Assistant Level – 4	15		18	Assessment by University and SSC		100
						30	30		500
Semester II									
II	I	15BFSNL02	Part I -Tamil -II	3	-	3	25	75	100
	II	15BFSNE02	Part II – Functional English Practical -II	2	2	3	25	75	100
	III	15BFSNC02	Core II - Food Processing I (Technology of Cereals, Pulses, Oilseeds and Spices)	3	-	3	25	75	100
	III	15BFSNA02	Allied Practical II – Food Science and Chemistry	1	2	2	40	60	100
	IV	15BFSNV02	Val.Edu – II - Environmental Studies	2	-	1	25	75	100
	V	15BFSNSC02	Plant Baker Level - 5	15		18	Assessment by University and SSC		100
						30	30		600
Semester III									
III	III	15BFSNC03	Core III – Food Processing II (Technology of	3	-	3	25	75	100



			Fruits and Vegetables, Sugar and Salt)						
	III	15BFSNC04	Core IV – Food Processing III (Technology of Milk, Egg and Fleshy Foods)	3	-	3	25	75	100
	III	15BFSNA03	Allied III – Food Product Development and Marketing Practical - I	1	2	2	40	60	100
	III	15BFSNC05	Core V - Practical – Food Processing and Preservation - I	1	2	2	40	60	100
	III	15BFSNEL01	Elective I – Nutritional Chemistry	2	1	2	25	75	100
	V	15BFSNSC03	Quality Assurance Manager Level - 6	15		18	Assessment by University and SSC		-
					30	30			500
<b>Semester IV</b>									
IV	III	15BFSNC06	Core VI – Food Quality Control	3	-	3	25	75	100
	III	15BFSNC07	Core VII – Instrumentation and Process Control	3	-	3	25	75	100
	III	15BFSNA04	Allied Practical IV – Food Product Development and Marketing - II	1	2	2	40	60	100
	III	15BFSNC08	Core VIII - Practical II – Food Processing and Preservation II	1	2	2	40	60	100
	III	15BFSNEL02	Elective II – Food for Life	2	1	2	25	75	100
	V	15BFSNSC03	Quality Assurance Manager Level - 6	15		18	Assessment by University and SSC		100
					30	30			600
<b>Semester V</b>									
V	III	15BFSNC09	Core IX – Food Microbiology	3	-	3	25	75	100

	III	15BFSNC10	Core X – Food Packaging Technology	3	-	3	25	75	100
	III	15BFSNC11	Core XI - Food Microbiology Practical	1	2	2	40	60	100
	III	15BFSNC12	Core XII - Food Quality Analysis Practical	1	2	2	40	60	100
	III	15BFSNEL03	Elective III – Food for Diseases	2	1	2	25	75	100
	V	15BFSNSC04	Food Production Manager Level – 7	15		18	Assessment by University and SSC		-
					30	30			500
<b>Semester VI</b>									
VI	III	15BFSNC13	Core XIII–Food Industrial by-products and Waste Management	3	-	3	25	75	100
	III	15BFSNC14	Core XIV – Food Trade and Business Management	3	-	3	25	75	100
	III	15BFSNC15	Core XV – Practical IV – Nutrition Assessment and Diet Planning	1	2	2	40	60	100
	III	15BFSNC16	Core XVI –IT application in Food Industry Practical	1	2	2	40	60	100
	III	15BFSNEL04	Elective IV – Nutrition and Physical Fitness	1	2	2	25	75	100
	V	15BFSNSC04	Food Production Manager Level – 7	15		18	Assessment by University and SSC		100
					30	30			600
<b>TOTAL</b>				<b>180 Hrs</b>		<b>180 Credits</b>	<b>3300 Marks</b>		

Note :- L- Lecture, T-Tutorial, P- Practical, C- Credit, IA – Internal Assessment, EA – External Assessment

Part I - Tamil

Part II - Functional English Practical

Part III - Core / Allied/Elective

Part IV - Foundation (Value Education)

Part V - NSDC (National Skill Development Corporation) / Skill Based Subjects

### Credit Calculation Table

(UGC Guidelines for curricular aspects, Assessment criteria and credit system in skill based vocational courses under NSQF)

Method of teaching	Hours	Credits
Lecture	1	1
Tutorial/Demonstration	1	1
Practical/Internship/On the job training/ self Learning	2	1

### Scheme for Internal Marks in Theory (Max.marks-25)

Seminar and Assignment – 10 (each 5 marks)

Internal Tests- 10 (Best two out of three tests: Each 5 Marks)

Attendance -5 marks

### Scheme for Internal Marks in Practical (Max.marks-40)

Internal Tests – 25 (Best two out of three tests: Each 12.5 Marks)

Attendance -5 marks

Record - 10 marks (Average of marks obtained for each experiment in observation note book)

### Scheme of valuation for Dissertation

**Internal:** 40 Marks (Introduction and Objectives – 5 marks, Review of literature – 5 Marks, Methodology – 10 Marks, Results and Discussion – 15 Marks, Bibliography - 5 Marks)

**External:** 40 Marks (Introduction and objectives – 5 marks, Review of literature – 5 Marks, Methodology – 10 Marks, Results and Discussion – 15 Marks, Bibliography - 5 Marks) **Viva-voce** - 20 marks

### Pattern of Question paper (Theory)

Duration of the examination - 3 hours, Maximum marks – 75

#### Part A

Answer All Questions (Multiple choice questions) 25X1 = 25

#### Part B

Answer the following questions (Answer any 10 out of 12 questions) 2X10 =20

#### Part C

Answer All Questions (Either or choice) 5X6 = 30

Total 75 marks

(All parts of question should have equal importance to all five units in the syllabus)

# *Semester I*

## PART I-TAMILI

SUB.CODE: 15BFSNL01  
MAX.MARKS: 100

HOURS T+P=C  
3+0=3

### **பொதுத்தமிழ்**

#### **இளநிலை பட்டப்படிப்பு அடிப்படைப் பாடம்**

##### **அலகு: 1 – உணவு அறிமுகம்**

உணவு என்ற சொல் - உணவும் அதன் இன்றியமையாமையும் - உணவின் பெயர்கள் - உணவும் தமிழரும் - உணவு வகை, உணவுப் பொருட்களின் மறுபெயர்கள் பற்றி நிகண்டுகள் குறிப்பிடுவது - உணவின் பிறப்பெயர்கள் - நில அடிப்படையில் உணவு - குறிஞ்சி - முல்லை - மருதம் - நெய்தல் - பாலை முதலான ஐந்தில உணவுப் பொருட்கள்

##### **அலகு: 2 – திவ்வுணவும் நீருணவும்**

தாவர உணவு - துணைக்கழி உணவுப் பொருட்கள் - இலை வகைகள் - பூக்கள் - காய்கள் - கனிகள் - விதைகள் - கிழங்குகள் - பலகாரங்கள் - குழம்பு - இறைச்சி வகைகள் - நி - அருவிநி - காட்டாற்று நி - கரும்பின் சாறு - நங்கு - முந்தி - பால் - பால்பொருட்கள்- தயிர் - மேர் - நெய் - தேவி போன்றவை

##### **அலகு: 3 – உணவின் பண்பாடும் உண்ணும் முறையும்**

உண்ணும் உணவின் அளவு - உண்ணும் நேரம் - காலை உணவு - நண்பகல் உணவு - மாலை உணவு - உண்ணும் முறை - உண்பன - தின்பன - கொரிப்பன - பருகுனன - பண்பாடு - வீடுதோம்பல் - இரப்போர்க்கு சுவதில் பண்பாடு - கடவுளாக்கும் உணவு படைத்த பண்பாடு - உண்ணுதலில் பண்பு

##### **அலகு: 4 – தமிழ்ச் சமுதாயத்தில் உணவு**

நிலைக்கு ஏற்ப உணவு - செல்வர் உணவு - உணவு பெற்று நிலை - உணவு படைக்கப்பட்ட நிலை - வறியர் உணவு - பல்வேறு பிரிவினர்க்குரிய உணவு - அந்தணர் உணவு - பெண்டிர் உணவு - கைமடப் பெண்டிர் உணவு - வீரர் உணவு - வீரத உணவு - உணவு சேகரித்த நிலை - பக்குவம் செய்த முறை - உணவு வீற்றலில் சில

நிலைகள் - நம்பிக்கைகளும் உணவும் - இன்றையத் தமிழர்  
பயன்படுத்தும் உணவுப் பொருட்கள்

**அலகு: 5 - உணவின் சிக்கல்களும் தீவுகளும்**

உணவினால் அறியப்படும் தொழில் முன்னேற்றம் - பண்டமாற்று  
முறை - பிற்கால உணவு வகைகள் - பயனியின் உணவு - உணவு  
விதிகள் - உணவுப் பொய்கள் - சமையல் கலை - தமிழர்கள் என்ன  
சாப்பிட்டார்கள் - விவசாயத்தில் பன்னாட்டு நிறுவனங்கள் - உணவில்  
பன்னாட்டுச் சத்தை - உணவின் சிக்கல்களும் தீவுகளும்

**பார்வை நூல்கள்**

1. தமிழர் உணவு - சே. நமச்சிவாயம்
2. உணவு யுத்தம் - எஸ். இராமகிருஷ்ணன்
3. ஆயுதகலைகள் - முனைவர் பாசியமேரி
4. தமிழர் சாப்பு - க. வித்தியாணத்தம்
5. சங்ககால னாழ்வியல் - டாக்டர் ந. கப்பிரமணியன்
6. தமிழர் நாகரிக வரலாறு - பா. இளையரசன்

## **PART II - FUNCTIONAL ENGLISH – I (PRACTICAL)**

**SUB.CODE: 15BFSNE01**  
**MAX.MARK: 60+40=100**

**HOURS: T+P=C**  
**2+2=3**

### **Objectives**

To enable the students

- To gain a working knowledge of English relevant to the job
- To continue learning as per job requirements in the long run
- To carry the core competences and apply them in life situations

<b>S.No.</b>	<b>Topics/Modules</b>	<b>Key Learning Outcomes</b>	<b>Duration in Hrs</b>
1.	Reading Skills	<ul style="list-style-type: none"><li>• Reading – Components of effective reading and decoding-phonics and word attack skills, fluency-why develop confidence and love of reading</li><li>• Functional vocabulary</li></ul>	12
2.	Comprehension skills	<ul style="list-style-type: none"><li>• Comprehension skills based on real-life situations with proper vocabulary exposure- decode ability to various reports, checklists, job advertisements, policy documents - scanning a pamphlet.</li><li>• Grammar functions in functional language-statements, questions, etiquettes.</li></ul>	16
3.	Life skills	<ul style="list-style-type: none"><li>• Life skills-Fear of speaking fears, knowing oneself &amp; core values.</li><li>• Speaking practice at work place- introducing themselves- making promises and predictions,- Taking responsibility etc.</li></ul>	14
4.	Listening skills	<ul style="list-style-type: none"><li>• Listening skills- components of active listening.</li><li>• Collaboration with teams through effective communication - asking and answering questions about time, addresses and discussing daily activities - giving and responding to commands.</li></ul>	15
5.	Writing skills	<ul style="list-style-type: none"><li>• Writing skills-letter writing- note taking- reminders to develop reports etc- giving information about materials- filling forms- recognizing information requested on a personal information form- taking phone messages/instructions- listing planning activities.</li></ul>	15
<b>Total Duration</b>			<b>72</b>

### **References:**

1. Core Skills/Generic Skills of QPs in Food Processing Sector



**CORE PAPER - SCIENCE AND HANDLING OF RAW MATERIALS**

**SUB.CODE: 15BFSNC01**  
**MAX.MARK:25+75= 100**

**HOURS: T+P=C**  
**3+0=3**

**Objectives**

- To learn production, classification, harvesting practices, methods, safe storage and proper distribution of food and agricultural commodities.

S. No.	Topic/Module	Key Learning Outcomes	Duration in Hrs
1	Cereals, Pseudo cereals, Millets and Pulses	<ul style="list-style-type: none"><li>• Production trend</li><li>• Classification</li><li>• Domestic and Industrial use</li><li>• Structure and Nutritive value</li><li>• Composition</li><li>• Storage structure and methods</li><li>• Government initiatives for food storage</li><li>• Requirements for safe storage</li><li>• Distribution channels</li></ul>	9
2	Fruits and Vegetables	<ul style="list-style-type: none"><li>• Production trend</li><li>• Classification</li><li>• Structure and Nutritive value</li><li>• Harvesting practices, tools and containers</li><li>• Domestic and Industrial uses</li><li>• Storage conditions, structures and methods/ techniques</li><li>• Government initiatives for food storage</li><li>• Transport mode and methods</li><li>• Distribution channels</li><li>• Batch inspection and Quality checking of distributed goods</li></ul>	9
3	Nuts & Oilseeds	<ul style="list-style-type: none"><li>• Production trend</li><li>• Structure and Nutritive value</li><li>• Collection Techniques/ Harvesting methods</li><li>• Domestic and Industrial uses</li><li>• Types</li><li>• Storage condition, structures and methods/ techniques</li><li>• Government initiatives for food storage</li><li>• Transport mode and methods</li><li>• Distribution channels</li><li>• Batch inspection and Quality checking of distributed goods</li></ul>	9

4	Spices & Condiments	<ul style="list-style-type: none"> <li>• Production trend</li> <li>• Structure and Nutritive value</li> <li>• Classification of Spices &amp; Condiments</li> <li>• Harvesting techniques/methods</li> <li>• Domestic and Industrial uses</li> <li>• Storage condition, structures and methods/ techniques</li> <li>• Government initiatives for food storage</li> <li>• Transport mode and methods</li> <li>• Distribution channels</li> <li>• Batch inspection and Quality checking of distributed goods</li> </ul>	9
5	Milk & Egg	<ul style="list-style-type: none"> <li>• Production trend</li> <li>• Types</li> <li>• Domestic and Industrial uses</li> <li>• Composition and nutritive value</li> <li>• Storage condition, structures and methods/ techniques</li> <li>• Transport mode and methods</li> <li>• Distribution channels</li> <li>• Batch inspection and Quality checking of distributed goods</li> </ul>	9
6	Fleshy Foods (Meat, poultry & Sea foods)	<ul style="list-style-type: none"> <li>• Production trend</li> <li>• Types</li> <li>• Domestic and Industrial uses</li> <li>• Structure and Composition</li> <li>• Nutritive value</li> <li>• Storage condition, structures and methods/ techniques</li> <li>• Cuts and grades</li> <li>• Transport mode and methods</li> <li>• Distribution channels</li> <li>• Batch inspection and Quality checking of distributed goods</li> </ul>	9
<b>Total duration</b>			<b>54</b>

**References:**

1. Food quality and standards(2009) edited by Radomir Lasztity, EOLSS publications.
2. Food science (2015)6<sup>th</sup> edition, Srilakshmi.B, New age internationals (P) ltd., publishers
3. [www.fao.org](http://www.fao.org)

**ALLIED PAPER I – INFLOW INVENTORY MANAGEMENT PRACTICAL**

**SUB.CODE: 15BFSNA01**  
**MAX.MARKS: 50**

**HOURS T+P=C**  
**1+2=2**

**Objectives**

To enable the students to learn the complete techniques of inventory management using inflow inventory software

**Modules:**

1. Introduction to Inflow Inventory Software.
2. Managing Sales Order and Customer Information Database.
3. Managing Purchase Order and Vendor Information Database.
4. Maintaining product information, stock quantities and stock adjustments.
5. Maintaining Reports- Purchasing Reports-Sales Report-Inventory Reports.

**Reference:**

Inflow Inventory user Manual 2015.

## **VALUE EDUCATION - YOGA AND FITNESS PRACTICAL**

**SUB. CODE: 15BFSNV01**

**MAX.MARKS: 50**

**HOURS T+P=C**

**0+2=1**

### **Objectives**

To enable the students

- To develop personality, ethics and moral values

<b>S.No.</b>	<b>Topic/Module</b>	<b>Key Learning Outcomes</b>	<b>Duration in Hrs</b>
1.	Youth Empowerment	Definition - Scope- Need for Youth Empowerment in present society - Philosophy of life -Purpose of life - Education as a means for youth empowerment - Greatness of Education - Yoga for youth Empowerment.	5
2.	Human Health and Human Body	Health -Need of Health -Efficiency of Human Resources- Structure and function of Human body- Diseases - Reasons for Disease- Preventive methods of Disease -Moderation in five aspects of life - Balanced food -Need of Nutrition for Good health - A review of medical systems.	5
3.	Emotions and Thought Analysis	Role of emotions for peace and stress - Types of emotions- Analysis of thoughts- Practice- Goal setting- Self confidence- Memory type -Mnemonic techniques - Training in memory- Impact of Blessings - Managing latest technologies.	8
4.	Simplified Physical Exercises of Sky System and Meditation	Simplified Physical Exercises - Kayakalpa - Managing infatuation - Practice. Definition of Meditation - Mental Frequency - Types - General and Special meditation in SKY- Importance - Practices - Eye brow centre meditation - Genetic centre meditation- Clearance - Crown centre meditation.	10
5.	Managing Desires and Anger	Definition and nature of desires - Root causes for desires- Types of desires - Desires as a plan for success-Moralization of desires-Anger-Causes of Anger- Anger and Peace- Evil effects of anger- Tolerance and Forgiveness-Neutralization of anger-practice	8
<b>Total Duration</b>			<b>36</b>

### **References:**

1. Value Education for Health, Happiness and Harmony, World Community Service Centre, Vethathiri Publications, Erode, [www.vethathiri.edu.in](http://www.vethathiri.edu.in)

## QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR FOOD PROCESSING

### What are Occupational Standards(OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

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### Introduction

## Qualifications Pack – Purchase Assistant – Food and Agricultural Commodities

**SECTOR:** FOOD PROCESSING

**SUB-SECTOR:** FRUIT AND VEGETABLE, FOOD GRAIN MILLING (INCLUDING OILSEEDS), DAIRY PRODUCTS, MEAT AND POULTRY, FISH & SEA FOOD, BREAD AND BAKERY, ALCOHOLIC BEVERAGES, AERATED WATER/SOFT DRINKS

**OCCUPATION:** PROCURING

**REFERENCE ID:** FIC/Q7005

**ALIGNED TO:** NCO-2004/3416.90

A Purchase Assistant – Food and Agricultural Commodities is responsible for purchase of food and agricultural commodities.

**Brief Job Description:** A Purchase Assistant – Food and Agricultural Commodities is responsible for purchase of food and agricultural commodities. S/he carries out activities such as processing purchase requisitions, raising purchase orders, identifying vendors and raising orders, ensuring timely delivery of orders, and maintaining inventories.

**Personal Attributes:** A Purchase Assistant – Food and Agricultural Commodities must have the ability to plan, organize, prioritize, calculate and handle pressure. The individual must possess reading, writing and communication skills.

## Job Details

<b>Qualifications Pack Code</b>	<b>FIC/Q7005</b>		
<b>Job Role</b>	<b>Purchase Assistant – Food and Agricultural Commodities</b>		
<b>Credits (NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
<b>Sector</b>	<b>Food Processing</b>	<b>Drafted on</b>	<b>23/08/2015</b>
<b>Sub-sector</b>	Fruit & Vegetable, Food Grain Milling (including Oilseeds), Dairy Products, Meat and Poultry, Fish & Sea Food, Bread & Bakery, Alcoholic Beverages, Aerated water/ Soft drinks	<b>Last reviewed on</b>	<b>22/09/2015</b>
<b>Occupation</b>	<b>Procuring</b>	<b>Next review date</b>	<b>15/09/2016</b>

<b>Job Role</b>	<b>Purchase Assistant – Food and Agricultural Commodities</b>
<b>Role Description</b>	A Purchase Assistant – Food and Agricultural Commodities handles purchase of food and agricultural commodities as per organization specifications and standards.
<b>NSQF level</b>	Level 4
<b>Minimum Educational Qualifications</b>	Class 12
<b>Maximum Educational Qualifications</b>	Not applicable
<b>Training</b> (Suggested but not mandatory)	1. Inventory management 2. Supply chain management 3. GMP 4. HACCP 5. QMS 6. Computer basics and ERP 7. Training in Food Safety Standards and Regulations (as per FSSAI) (Mandatory)
<b>Minimum Job Entry Age</b>	18 years
<b>Experience</b>	2-3 years experience in handling purchase of food and agricultural commodities
<b>Applicable National Occupational Standards (NOS)</b>	<b>Compulsory:</b> <a href="#">1. FIC/N7013 Handle purchase requisitions</a> <a href="#">2. FIC/N7014 Raising and process purchase order and inventory management</a> <a href="#">3. FIC/N7015 Complete documentation and record keeping of purchases and inventory</a> <a href="#">4.FIC/N9001 Food safety, hygiene and sanitation for processing food products</a>  <b>Optional:</b> N.A.
<b>Performance Criteria</b>	As described in the relevant OS units

**Definitions**

Keywords /Terms	Description
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through analysis and form the basis of OS.
Job Role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
OS	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
NOS	NOS are Occupational Standards which apply uniquely in the Indian context.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Qualifications Pack	Qualifications Pack comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A Qualifications Pack is assigned a unique qualification pack code.
Unit Code	Unit Code is a unique identifier for an Occupational Standard , which is denoted by an 'N'
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
Organizational Context	Organizational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills or Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.

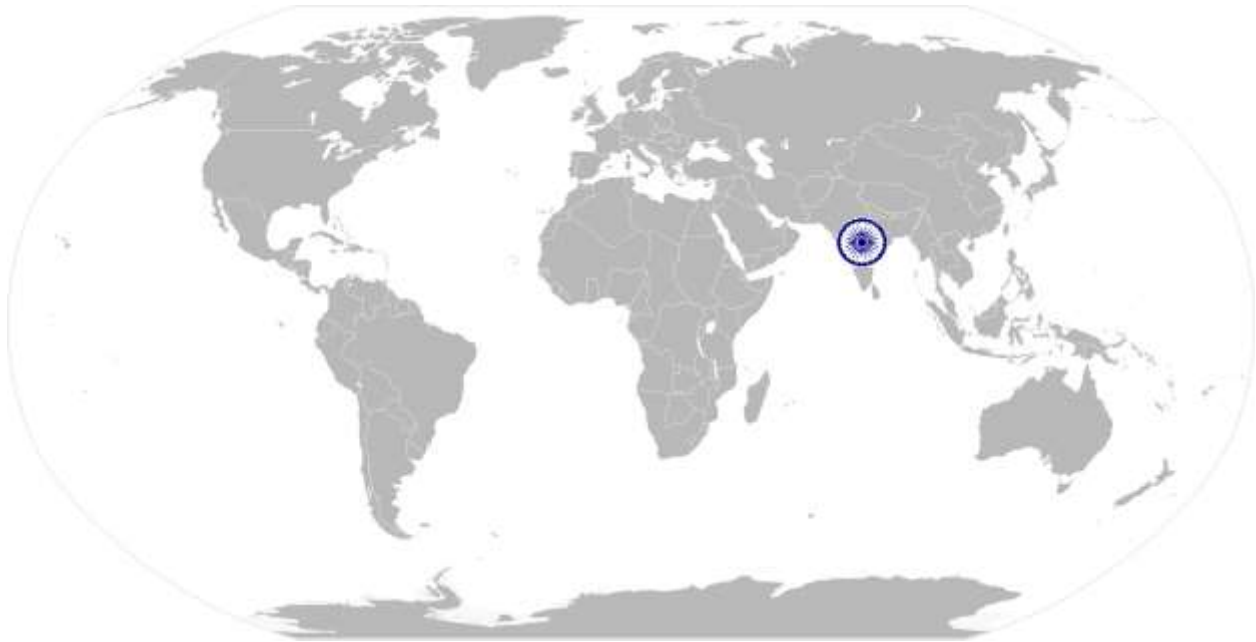


Acronyms

Keywords /Terms	Description
CIP	Clean In Place
COP	Clean Out Of Place
ERP	Enterprise Resource Planning
FIFO	First In First Out
FEFO	First Expiry First Out
FSSAI	Food Safety and Standards Authority of India
GMP	Good Manufacturing Practice
GHP	Good Hygiene Practices
HACCP	Hazard Analysis and Critical Control Point
NOS	National Occupational Standard
NSQF	National Skill Qualification Framework
NVEQF	National Vocational Educational Qualification Framework
NVQF	National Vocational Qualification Framework
OS	Occupational Standard
PC	Performance Criteria
QP	Qualification Pack
SSC	Sector Skill Council
SOP	Standard Operating Procedure
QMS	Quality Management System

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# National Occupational Standard



## Overview

This OS unit is about handling purchase requisitions obtained from various departments of the food processing unit.

**FIC/N7013**
**Handle purchase requisitions**

## National Occupational Standard

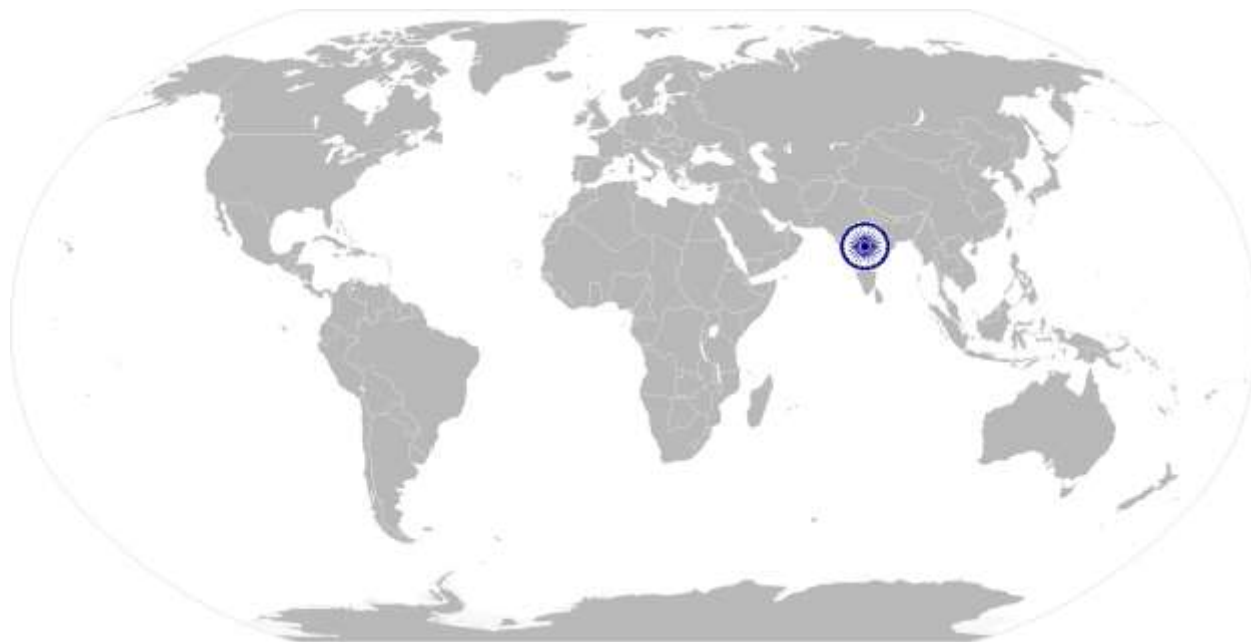
<b>Unit Code</b>	<b>FIC/N7013</b>
<b>Unit Title (Task)</b>	<b>Handle purchase requisitions.</b>
<b>Description</b>	This OS unit is about handling purchase requisitions obtained from various departments of the food processing unit.
<b>Scope</b>	This unit/task covers the following: <ul style="list-style-type: none"> <li>• Prepare for raising the purchase order</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Prepare for raising the purchase order</b>	PC1. read and understand the work instructions from the manager PC2. arrange the purchase requisition in order of date /priority PC3. read and understand the items indented and purchase conditions PC4. verify the organisation database on approved items (raw materials, packaging materials, equipments, machineries, tools and spares, lab chemicals, glassware, consumable, etc.) to conform if the requisition/indented item is approved by the organisation PC5. verify the budget allotment for the requested items (like within or exceeding the allotted quantity/amount) PC6. report any discrepancies to the manager and take immediate corrective action PC7. take proper approvals for processing the purchase requisitions PC8. keep approvals ready for raising purchase order
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: <ul style="list-style-type: none"> <li>KA1. organization standards, process standards and procedures followed in the organisation</li> <li>KA2. types of products produced by the organisation</li> <li>KA3. code of business conduct</li> <li>KA4. dress code to be followed</li> <li>KA5. job responsibilities/duties and standard operating procedures</li> <li>KA6. internal processes like procurement, store management, inventory management, quality management and key contact points for query resolution</li> <li>KA7. provision of wages, working hours and accident compensation as per organisation policy</li> <li>KA8. food safety and hygiene standards followed</li> </ul>
<b>B. Technical Knowledge</b>	The user/individual on the job needs to know and understand: <ul style="list-style-type: none"> <li>KB1. organisation work structure, various departments and its activity</li> <li>KB2. organisation approved materials</li> <li>KB3. purchase process</li> <li>KB4. organisation standards for purchase requisition process</li> </ul>

**FIC/N7013**
**Handle purchase requisitions**

<b>Skills (S) [Optional]</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. note the information communicated by the supervisor</p> <p>SA2. note the raw materials used for production and the finished products produced</p> <p>SA3. note the readings of the process parameters and provide necessary information to fill the process chart</p> <p>SA4. note down observations (if any) related to the process</p> <p>SA5. write information documents to internal departments/ internal teams</p> <p>SA6. note down the data for online ERP or as per applicability in the organization</p>
	<b>Reading Skills</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA7. read and interpret the process required for producing various types of products</p> <p>SA8. read and interpret and process flowchart for all products produced</p> <p>SA9. read equipment manuals and process documents to understand the equipments operation and process requirement</p> <p>SA10. read internal information documents sent by internal teams</p>
	<b>Oral Communication (Listening and Speaking skills)</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA11. discuss task lists, schedules and activities with the supervisor</p> <p>SA12. effectively communicate with the team members</p> <p>SA13. question the supervisor in order to understand the nature of the problem and to clarify queries</p> <p>SA14. attentively listen and comprehend the information given by the speaker</p> <p>SA15. communicate clearly with the supervisor and cross department teams on the issues faced during process</p>
<b>B. Professional Skills</b>	<b>Decision Making</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue</p> <p>SB2. handle issues in case the supervisor is not available (as per the authority matrix defined by the organization)</p>
	<b>Plan and Organize</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB3. plan and organize the work order and jobs received from the supervisor</p> <p>SB4. organize raw materials and packaging materials required for all products following the instruction provided by the supervisor</p> <p>SB5. plan and prioritize the work based on the instructions received from the supervisor</p> <p>SB6. plan to utilise time and equipment's effectively</p> <p>SB7. organize all process/ equipment manuals so as to access information easily</p> <p>SB8. support the supervisor in scheduling tasks for helper(s)</p>

**FIC/N7013**
**Handle purchase requisitions**

	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to: SB9. understand customer requirements and their priority and respond as per their needs
	<b>Problem Solving</b>
	SB10. support supervisor in solving problems by detailing out problems SB11. discuss the possible solutions with the supervisor for problem solving
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB12. apply domain information about maintenance processes and technical knowledge about tools and equipment
	<b>Critical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB13. use common sense and make judgments on day to day basis SB14. use reasoning skills to identify and resolve basic problems SB15. use intuition to detect any potential problems which could arise during operations SB16. use acquired knowledge of the process for identifying and handling issues



**FIC/N7013**
**Handle purchase requisitions**

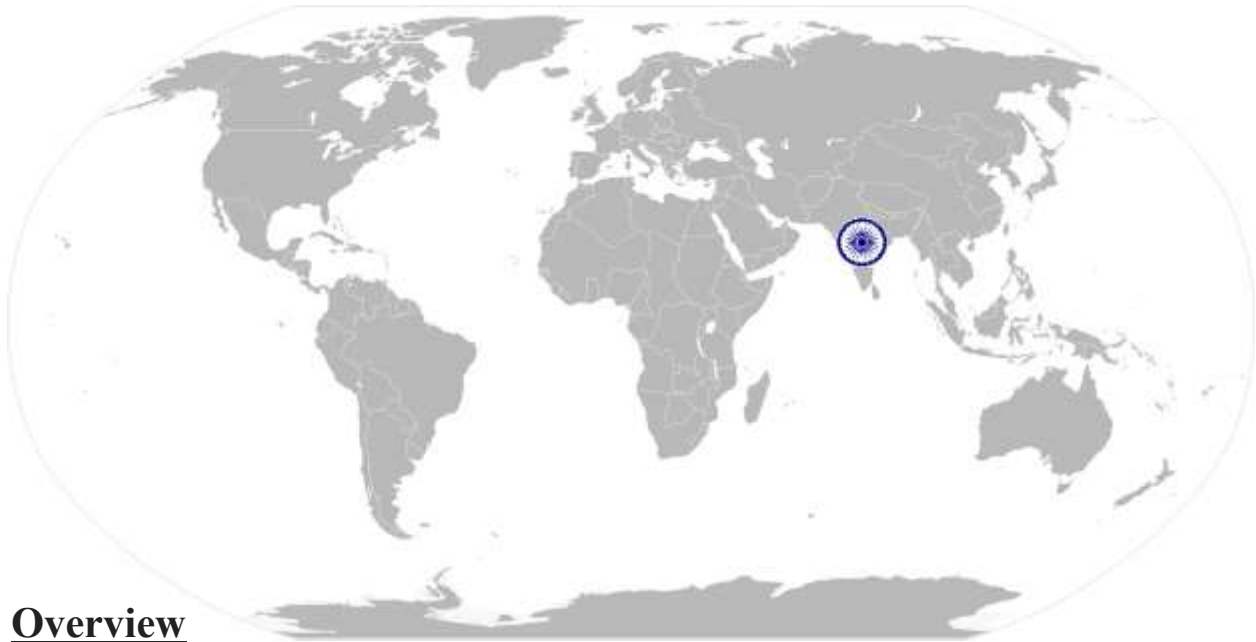
## NOS Version Control

NOS Code	FIC/N7013		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	23/08/2015
Industry Sub-sector	Fruit & Vegetable, Food Grain Milling (including Oilseeds), Dairy Products, Meat and Poultry, Fish & Sea Food, Bread & Bakery, Alcoholic Beverages, Aerated water/ Soft drinks	Last reviewed on	22/09/2015
Occupation	Procuring	Next review date	15/09/2016

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# National Occupational Standard



## Overview

This OS unit is about raising purchase orders, managing supplies from the vendor and managing the inventory of supplies.



**FIC/N7014**
**Raise and process purchase order and inventory management**

National Occupational Standard

Unit Code	FIC/N7014
Unit Title (Task)	Raise and process purchase order and inventory management
Description	This OS unit is about raising purchase orders, managing supplies from the vendor and managing the inventory of supplies.
Scope	This unit/task covers the following: <ul style="list-style-type: none"> <li>• Raise the purchase order</li> <li>• Manage supplies from the vendor</li> <li>• Manage inventory of regular supplies</li> </ul>
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
<b>Raise the purchase order</b>	PC1. receive purchase requisition from various departments PC2. review requisition to verify for requirements and specifications PC3. check for the approved vendors in the database PC4. identify new vendors using sources PC5. collect required documents from vendor, take necessary internal approvals and include in the approved vendor category PC6. take quotation from vendors and negotiate price and supply terms and conditions PC7. compare the quotations for prices, specifications, and delivery dates PC8. select vendor based on price, quality, availability, reliability, service, support, production and distribution capabilities, supplier's reputation and supply history PC9. take proper approvals and raise purchase order PC10. maintain list/database of vendors with details PC11. maintain knowledge of all organizational rules affecting purchases, and provide information about these rules to organization staff and to vendors
<b>Manage supplies from the vendor</b>	PC12. send purchase order to the vendor and to departments from where requests have come PC13. based on conditions (if applicable), arrange for samples from vendor PC14. check the quality of the sample through internal/external lab PC15. verify quality report for conformance to organisation standards PC16. based on the quality report, decide to accept or cancel order and instruct vendor accordingly PC17. follow up with the vendor on the status of order (in case of direct delivery), to schedule or expedite deliveries, and confirm despatch PC18. update vendor on change in the status of the purchase order like change in order quantity, conditions, cancellations etc PC19. update ordering department on the status of the purchase order PC20. check deliveries from vendor to ensure that purchase order conditions have been met

**FIC/N7014**
**Raise and process purchase order and inventory management**

	<p>PC21. co-ordinate with quality assurance department on quality report on the supplies</p> <p>PC22. verify quality report for conformance to organisation standards</p> <p>PC23. based on the quality report accept, reject or hold the supplies</p> <p>PC24. co-ordinate with vendor and internal department and resolve the issue to close the purchase order</p> <p>PC25. contact suppliers to resolve supply issues like shortage, missed or any other problems</p> <p>PC26. compare vendor invoice against purchase order to verify accuracy</p> <p>PC27. take proper approval of vendor invoice for payment process</p> <p>PC28. forward invoices to accounts department for payment</p> <p>PC29. prepare, maintain, and review purchasing files, reports and price lists</p> <p>PC30. monitor vendor performance and recommend contract modifications, if necessary</p>
<b>Manage inventory of regular supplies</b>	<p>PC31. maintain a record of all inventories and identify regular requirements and orders</p> <p>PC32. set and maintain minimum order level (pre-determined inventory levels) for regular orders</p> <p>PC33. take necessary pre-approvals for raising auto (system generated/manual) purchase order on inventory reaching minimum order level</p> <p>PC34. monitor in-house inventory movement (in ERP) and raise purchase order</p> <p>PC35. ensure minimum order level (pre-determined inventory levels) is maintained</p> <p>PC36. complete inventory transfer forms for bookkeeping purposes</p>
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. organization standards, process standards and procedures followed in the organisation</p> <p>KA2. types of products produced by the organisation</p> <p>KA3. code of business conduct</p> <p>KA4. dress code to be followed</p> <p>KA5. job responsibilities/duties and standard operating procedures</p> <p>KA6. internal processes like procurement, store management, inventory management, quality management and key contact points for query resolution</p> <p>KA7. provision of wages, working hours and accident compensation as per organisation policy</p> <p>KA8. food safety and hygiene standards followed</p>

**FIC/N7014**
**Raise and process purchase order and inventory management**

<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <ul style="list-style-type: none"><li>KB1. organisation work structure, departments</li><li>KB2. organisation approved materials</li><li>KB3. purchase process</li><li>KB4. organisation work structure, various departments and their activity</li><li>KB5. list of approved vendors</li><li>KB6. developing new vendor</li><li>KB7. vendor approval process</li><li>KB8. vendor management</li><li>KB9. purchase/supply chain management</li><li>KB10. list of materials used in the organisation</li><li>KB11. products produced and its process methods</li><li>KB12. quality checks on the incoming supplies</li><li>KB13. receiving and handling control substances hazardous to health</li><li>KB14. receiving, handling, storage, disposal of hazardous materials</li><li>KB15. procedure for acceptance and rejection of orders</li><li>KB16. inventory management</li><li>KB17. payment process</li><li>KB18. mathematic calculations</li><li>KB19. using computers, computer software on supply chain and ERP system used in the organisation</li><li>KB20. food laws and regulations on materials, product and packaging materials</li><li>KB21. food safety and hygiene</li><li>KB22. GMP</li><li>KB23. HACCP</li></ul>
<b>Skills (S) [Optional]</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	<p>The user/ individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"><li>SA1. note the information communicated by the supervisor</li><li>SA2. note the raw materials used for production and the finished products produced</li><li>SA3. note the readings of the process parameters and provide necessary information to fill the process chart</li><li>SA4. note down observations (if any) related to the process</li><li>SA5. write information documents to internal departments/ internal teams</li><li>SA6. note down the data for online ERP or as per applicability in the organization</li></ul>
	<b>Reading Skills</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"><li>SA7. read and interpret the process required for producing various types of products</li><li>SA8. read and interpret and process flowchart for all products produced</li><li>SA9. read equipment manuals and process documents to understand the equipments operation and process requirement</li><li>SA10. read internal information documents sent by internal teams</li></ul>
	<b>Oral Communication (Listening and Speaking skills)</b>

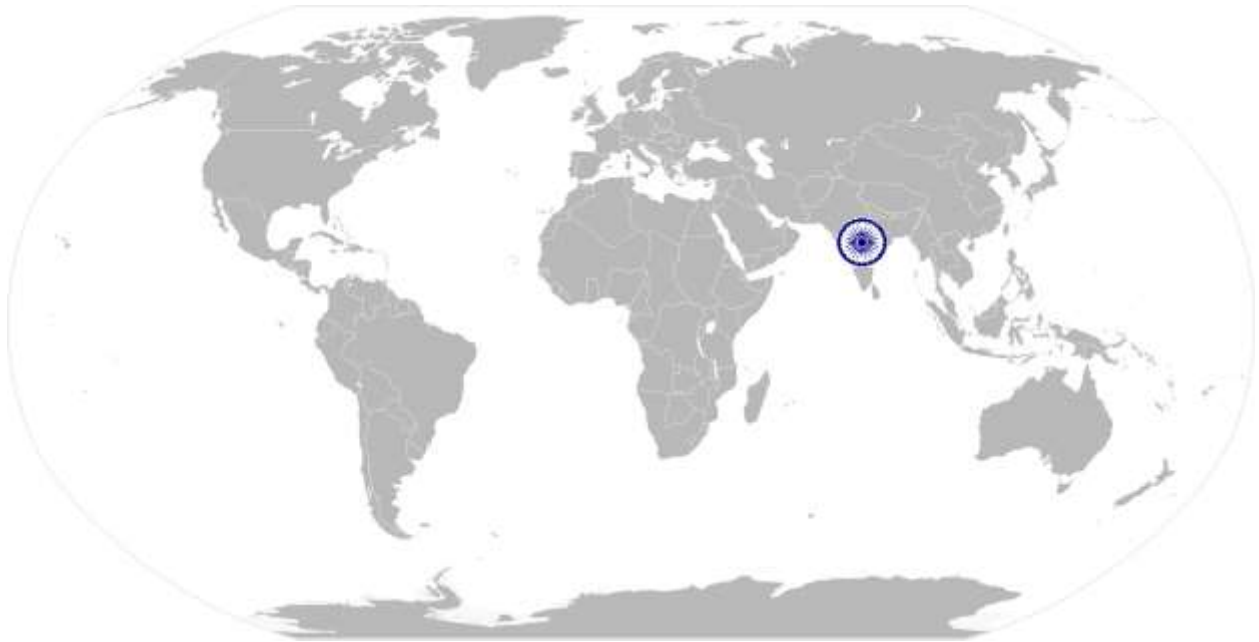
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA11. discuss task lists, schedules and activities with the supervisor</p> <p>SA12. effectively communicate with the team members</p> <p>SA13. question the supervisor in order to understand the nature of the problem and to clarify queries</p> <p>SA14. attentively listen and comprehend the information given by the speaker</p> <p>SA15. communicate clearly with the supervisor and cross department teams on the issues faced during process</p>
<b>B. Professional Skills</b>	<b>Decision Making</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue</p> <p>SB2. handle issues in case the supervisor is not available (as per the authority matrix defined by the organization)</p>
	<b>Plan and Organize</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB3. plan and organize the work order and jobs received from the supervisor</p> <p>SB4. organize raw materials and packaging materials required for all products following the instruction provided by the supervisor</p> <p>SB5. plan and prioritize the work based on the instructions received from the supervisor</p> <p>SB6. plan to utilise time and equipment's effectively</p> <p>SB7. organize all process/ equipment manuals so as to access information easily</p> <p>SB8. support the supervisor in scheduling tasks for helper(s)</p>
	<b>Customer Centricity</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB9. understand customer requirements and their priority and respond as per their needs</p>
	<b>Problem Solving</b>
	<p>SB10. support supervisor in solving problems by detailing out problems</p> <p>SB11. discuss the possible solutions with the supervisor for problem solving</p>
	<b>Analytical Thinking</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB12. apply domain information about maintenance processes and technical knowledge about tools and equipment</p>
	<b>Critical Thinking</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB13. use common sense and make judgments on day to day basis</p> <p>SB14. use reasoning skills to identify and resolve basic problems</p> <p>SB15. use intuition to detect any potential problems which could arise during operations</p> <p>SB16. use acquired knowledge of the process for identifying and handling issues</p>

## NOS Version Control

NOS Code	FIC/N7014		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	23/08/2015
Industry Sub-sector	Fruit & Vegetable, Food Grain Milling (including Oilseeds), Dairy Products, Meat and Poultry, Fish & Sea Food, Bread & Bakery, Alcoholic Beverages, Aerated water/ Soft drinks	Last reviewed on	22/09/2015
Occupation	Procuring	Next review date	15/09/2016

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# National Occupational Standard



## Overview

This OS unit is documenting and maintaining records of purchases and inventory.



**FIC/N7015**

## Complete documentation and record keeping of purchases and inventory

National Occupational Standard

<b>Unit Code</b>	<b>FIC/N7015</b>
<b>Unit Title (Task)</b>	<b>Complete documentation and record keeping of purchases and inventory</b>
<b>Description</b>	This OS unit is about documenting and maintaining records of purchase and inventory.
<b>Scope</b>	This unit/task covers the following: <ul style="list-style-type: none"> <li>• Document and maintain records of purchase of raw materials and packaging materials</li> <li>• Document and maintain records of purchase of machineries</li> <li>• Document and maintain records of inventory</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Document and maintain records of purchase of raw materials and packaging materials</b>	PC1. document and maintain records of the purchase requisitions, purchase order, vendor database, vendor documents for vendor approval process, documents on supplies like supplier invoice, transport documents, supplier quality documents for each purchase, internal quality report, purchase cancellation document, material on-hold or rejection document, etc. as per organisation standards PC2. maintain/ record observations and deviations (if any) PC3. load the details in ERP for future reference PC4. track documents in case of quality concerns / disputes
<b>Document and maintain records of purchase of machineries</b>	PC5. document and maintain purchase document on machinery purchase like purchase requisitions, purchase order, vendor database, vendor documents for vendor approval process, documents on supplies like supplier invoice, warranty documents, manuals on machineries, incoming inspection report, approval or rejection documents, etc. as per organisation standards PC6. maintain record of observations and deviations (if any) PC7. load the details in ERP for future reference PC8. track documents in case of quality concerns / disputes
<b>Document and maintain records of inventory</b>	PC9. document and maintain inventory document of raw materials, ingredients, packaging materials, machinery spares, tools etc like purchase quantity, consumption for a particular/defined period, minimum ordering level for all materials, as per organisation standards PC10. maintain record of observations or deviations (if any) PC11. load the details in ERP for future reference PC12. track documents in case of quality concerns / disputes
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company /	The user/individual on the job needs to know and understand: <ul style="list-style-type: none"> <li>KA1. organization standards, process standards and procedures followed in the organisation</li> <li>KA2. types of products produced by the organization</li> <li>KA3. code of business conduct</li> </ul>



**FIC/N7015**

## Complete documentation and record keeping of purchases and inventory

organization and its processes)	KA4. dress code to be followed KA5. job responsibilities/duties and standard operating procedures KA6. internal processes like procurement, store management, inventory management, quality management and key contact points for query resolution KA7. provision of wages, working hours and accident compensation as per organisation policy KA8. food safety and hygiene standards followed
<b>B. Technical Knowledge</b>	The user/individual on the job needs to know and understand: KB1. documentation system followed in the organisation KB2. details to be recorded related to purchase of raw materials and packaging materials KB3. details to be recorded and maintained of purchase of machineries KB4. details to be recorded of inventory management KB5. methods to records and maintain records on observations (if any) related to all purchase KB6. methods to track back the record KB7. basic computer knowledge KB8. entering the details in ERP system used by the organisation
<b>Skills (S) [Optional]</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	The user/ individual on the job needs to know and understand how to: SA1. note the information communicated by the supervisor SA2. note the raw materials used for production and the finished products produced SA3. note the readings of the process parameters and provide necessary information to fill the process chart SA4. note down observations (if any) related to the process SA5. write information documents to internal departments/ internal teams SA6. note down the data for online ERP or as per applicability in the organization
	<b>Reading Skills</b>
	The user/individual on the job needs to know and understand how to: SA7. read and interpret the process required for producing various types of products SA8. read and interpret and process flowchart for all products produced SA9. read equipment manuals and process documents to understand the equipments operation and process requirement SA10. read internal information documents sent by internal teams
	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/individual on the job needs to know and understand how to: SA11. discuss task lists, schedules and activities with the supervisor SA12. effectively communicate with the team members SA13. question the supervisor in order to understand the nature of the problem and to clarify queries SA14. attentively listen and comprehend the information given by the speaker

**FIC/N7015**

## Complete documentation and record keeping of purchases and inventory

	SA15. communicate clearly with the supervisor and cross department teams on the issues faced during process
<b>B. Professional Skills</b>	<b>Decision Making</b>
	The user/individual on the job needs to know and understand how to: SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue SB2. handle issues in case the supervisor is not available (as per the authority matrix defined by the organization)
	<b>Plan and Organize</b>
	The user/individual on the job needs to know and understand how to: SB3. plan and organize the work order and jobs received from the supervisor SB4. organize raw materials and packaging materials required for all products following the instruction provided by the supervisor SB5. plan and prioritize the work based on the instructions received from the supervisor SB6. plan to utilise time and equipment's effectively SB7. organize all process/ equipment manuals so as to access information easily SB8. support the supervisor in scheduling tasks for helper(s)
	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to: SB9. understand customer requirements and their priority and respond as per their needs
	<b>Problem Solving</b>
	SB10. support supervisor in solving problems by detailing out problems SB11. discuss the possible solutions with the supervisor for problem solving
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB12. apply domain information about maintenance processes and technical knowledge about tools and equipment
	<b>Critical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB13. use common sense and make judgments on day to day basis SB14. use reasoning skills to identify and resolve basic problems SB15. use intuition to detect any potential problems which could arise during operations SB16. use acquired knowledge of the process for identifying and handling issues

**FIC/N7015**

**Complete documentation and record keeping of purchases  
and inventory**

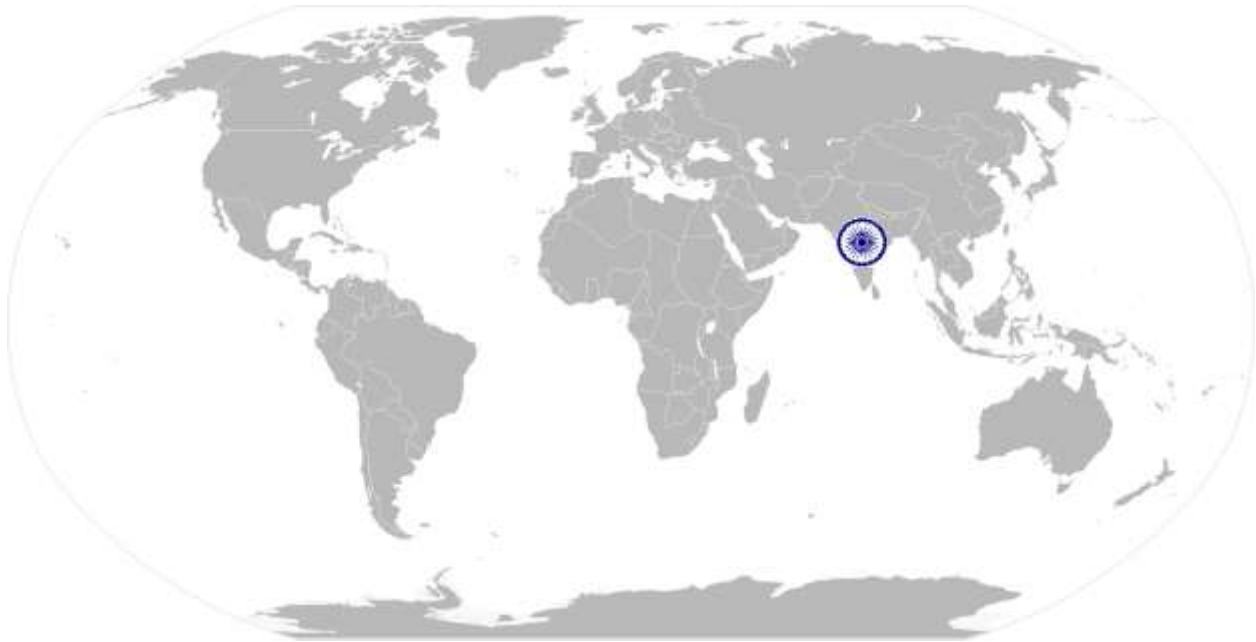
## **NOS Version Control**

NOS Code	FIC/N7015		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	23/08/2015
Industry Sub-sector	Fruit & Vegetable, Food Grain Milling (including Oilseeds), Dairy Products, Meat and Poultry, Fish & Sea Food, Bread & Bakery, Alcoholic Beverages, Aerated water/ Soft drinks	Last reviewed on	22/09/2015
Occupation	Procuring	Next review date	15/09/2016

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# National Occupational Standard



## Overview

This OS unit is about maintaining food safety, hygiene and sanitation in work area and processing unit for processing food products.

**FIC/N9001**
**Food safety, hygiene and sanitation for processing food products**

National Occupational Standard

<b>Unit Code</b>	<b>FIC/N9001</b>
<b>Unit Title (Task)</b>	<b>Food safety, hygiene and sanitation for processing food products</b>
<b>Description</b>	This unit is about maintaining food safety, hygiene and sanitation in work area and processing unit for processing food products
<b>Scope</b>	The scope of this role will include: <ul style="list-style-type: none"> <li>• Perform safety and sanitation related functions (for processing food products)</li> <li>• Apply food safety practices (for processing food products)</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Perform safety and sanitation related functions (for processing food products)</b>	PC1. comply with food safety and hygiene procedures followed in the organisation PC2. ensure personal hygiene by use of gloves, hairnets, masks, ear plugs, goggles, shoes, etc. PC3. ensure hygienic production of food by inspecting raw materials, ingredients, finished products, etc. for compliance to physical, chemical and microbiological parameters PC4. pack products in appropriate packaging materials, label and store them in designated area, free from pests, flies and infestations PC5. clean, maintain and monitor food processing equipment periodically, using it only for the specified purpose PC6. use safety equipment such as fire extinguisher, first aid kit and eye-wash station when required PC7. follow housekeeping practices by having designated area for materials/tools PC8. follow industry standards like GMP and HACCP and product recall process PC9. attend training on hazard management to understand types of hazards such as physical, chemical and biological hazards and measures to control and prevent them PC10. identify, document and report problems such as rodents and pests to management PC11. conduct workplace checklist audits before and after work to ensure safety and hygiene PC12. document and maintain raw material, packaging material, process and finished products for the credibility and effectiveness of the food safety control system
<b>Apply food safety practices (for processing food products)</b>	PC13. determine the quality of food using criteria such as odour, appearance, taste and best before date, and take immediate measures to prevent spoilage PC14. store raw materials, finished products, allergens separately to prevent cross-contamination PC15. label raw materials and finished products and store them in designated storage areas according to safe food practices

**FIC/N9001**
**Food safety, hygiene and sanitation for processing food products**

	PC16. follow stock rotation based on FEFO/ FIFO
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <ul style="list-style-type: none"> <li>KA1. organization standards, process standards and procedures followed in the organisation</li> <li>KA2. types of products produced by the organisation</li> <li>KA3. code of business conduct</li> <li>KA4. dress code to be followed</li> <li>KA5. job responsibilities/duties and standard operating procedures</li> <li>KA6. internal processes such as procurement, store management, inventory management, quality management and key contact points for query resolution</li> <li>KA7. provision of wages, working hours as per organisation policy</li> <li>KA8. food safety and hygiene standards followed</li> </ul>
<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <ul style="list-style-type: none"> <li>KB1. possible physical, chemical and biological hazards and methods of prevention of various hazards</li> <li>KB2. personal hygiene requirement</li> <li>KB3. different types of sanitizers used for process area, equipment and the procedure to use them</li> <li>KB4. knowledge on Food Safety Standards and Regulations (as per FSSAI)</li> <li>KB5. quality parameters and quality assessment based on physical parameters, basic food microbiology</li> <li>KB6. labelling/marketing requirements for raw materials, finished goods, stored materials, packaging materials and their designated storage area</li> <li>KB7. cleaning and sanitation of equipment and work area</li> <li>KB8. CIP and COP methods and procedures</li> <li>KB9. storage norms for raw materials, packaging material and finished products</li> <li>KB10. stock rotation of ingredients and finished products based on FEFO/FIFO</li> <li>KB11. method of maintaining safety check lists for all machineries</li> <li>KB12. GHP</li> <li>KB13. GMP</li> <li>KB14. HACCP</li> </ul>
<b>Skills (S) [Optional]</b>	
<b>A. Core Skills/ Generic Skills</b>	<p><b>Writing Skills</b></p> <p>The user/ individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> <li>SA1. note the information communicated by the supervisor</li> <li>SA2. note the raw materials used for production and the finished products produced</li> <li>SA3. note the readings of the process parameters and provide necessary information to fill the process chart</li> <li>SA4. note down observations (if any) related to the process</li> <li>SA5. write information documents to internal departments/ internal teams</li> <li>SA6. note down the data for online ERP or as per applicability in the organization</li> </ul>



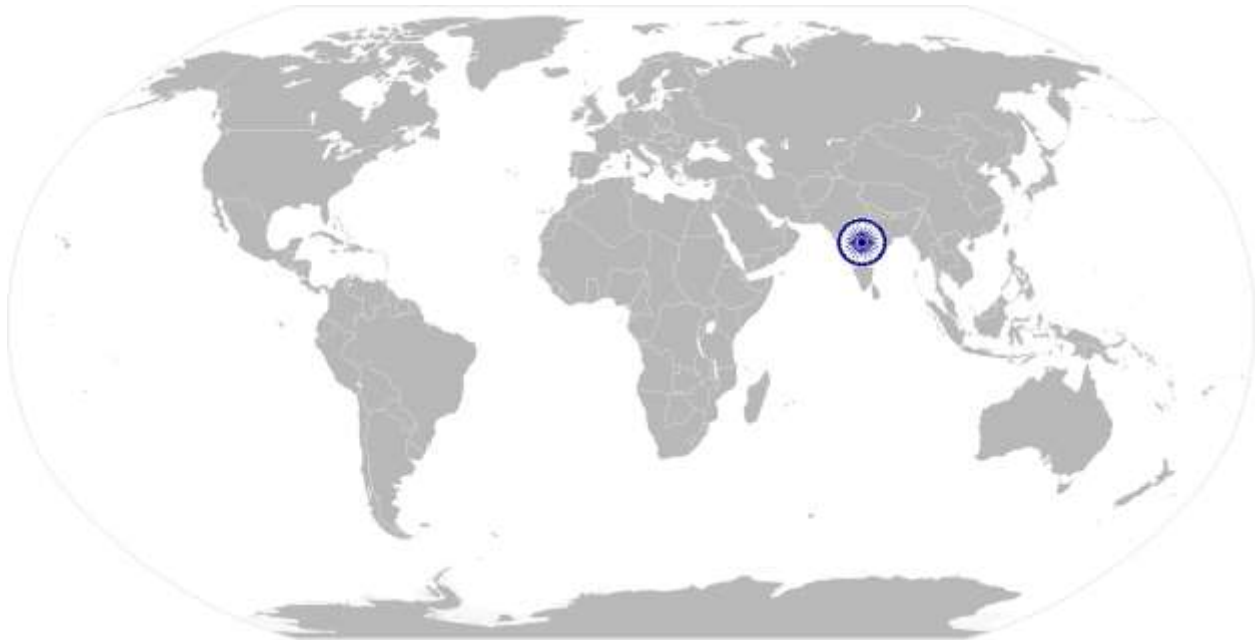
**FIC/N9001**
**Food safety, hygiene and sanitation for processing food products**

	<b>Reading Skills</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA7. read and interpret the process required for producing various types of products</p> <p>SA8. read and interpret and process flowchart for all products produced</p> <p>SA9. read equipment manuals and process documents to understand the equipments operation and process requirement</p> <p>SA10. read internal information documents sent by internal teams</p>
	<b>Oral Communication (Listening and Speaking skills)</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA11. discuss task lists, schedules and activities with the supervisor</p> <p>SA12. effectively communicate with the team members</p> <p>SA13. question the supervisor in order to understand the nature of the problem and to clarify queries</p> <p>SA14. attentively listen and comprehend the information given by the speaker</p> <p>SA15. communicate clearly with the supervisor and cross department teams on the issues faced during process</p>
<b>B. Professional Skills</b>	<b>Decision Making</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue</p> <p>SB2. handle issues in case the supervisor is not available (as per the authority matrix defined by the organization)</p>
	<b>Plan and Organize</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB3. plan and organize the work order and jobs received from the supervisor</p> <p>SB4. organize raw materials and packaging materials required for all products following the instruction provided by the supervisor</p> <p>SB5. plan and prioritize the work based on the instructions received from the supervisor</p> <p>SB6. plan to utilise time and equipment's effectively</p> <p>SB7. organize all process/ equipment manuals so as to access information easily</p> <p>SB8. support the supervisor in scheduling tasks for helper(s)</p>
	<b>Customer Centricity</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB9. understand customer requirements and their priority and respond as per their needs</p>
	<b>Problem Solving</b>
	<p>SB10. support supervisor in solving problems by detailing out problems</p> <p>SB11. discuss the possible solutions with the supervisor for problem solving</p>
	<b>Analytical Thinking</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB12. apply domain information about maintenance processes and technical knowledge about tools and equipment</p>
	<b>Critical Thinking</b>

**FIC/N9001**

**Food safety, hygiene and sanitation for processing food products**

	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB13. use common sense and make judgments on day to day basis</p> <p>SB14. use reasoning skills to identify and resolve basic problems</p> <p>SB15. use intuition to detect any potential problems which could arise during operations</p> <p>SB16. use acquired knowledge of the process for identifying and handling issues</p>
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**FIC/N9001**
**Food safety, hygiene and sanitation for processing food products**

## NOS Version Control

NOS Code	FIC/N9001		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	23/08/2015
Industry Sub-sector	Fruit & Vegetable, Food Grain Milling (including Oilseeds), Dairy Products, Meat and Poultry, Fish & Sea Food, Bread & Bakery, Alcoholic Beverages, Aerated water/ Soft drinks	Last reviewed on	22/09/2015
Occupation	Procuring	Next review date	15/09/2016

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## **CRITERIA FOR ASSESSMENT OF TRAINEES**

**Job Role** Purchase Assistant – Food and Agricultural Commodities

**Qualification Pack** FIC/N7005

**Sector Skill Council** Food Processing

### **Guidelines for Assessment**

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC
3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below)
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria
5. To pass the Qualification Pack, every trainee should score a minimum of 70% in every NOS
6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack

		Marks Allocation			
		Total Marks	Out Of	Theory	Skills Practical
<b>1. FIC/N7013 (Handle purchase requisitions)</b>	PC1. Read and understand the work instructions from the manager		10	3	7
	PC2. Arrange the purchase requisition in order of date /priority		10	3	7
	PC3. Read and understand the items indented and purchase conditions		10	4	6
	PC4. Verify the organisation database on approved items (raw materials, packaging materials, equipments, machineries, tools and spares, lab chemicals, glassware, consumable, etc.)To conform if the requisition/indented item is approved by the organisation		20	8	12
	PC5. Verify the budget allotment for the requested items (like within or exceeding the allotted quantity/amount)		20	8	12

	PC6. Report any discrepancies to the manager and take immediate corrective action		10	3	7
	PC7. Take proper approvals for processing the purchase requisitions		10	3	7
	PC8. Keep approvals ready for raising purchase order		10	3	7
			<b>100</b>	<b>35</b>	<b>65</b>
<b>2. FIC/N7014 (Raise and process purchase order and inventory management)</b>	PC1. Receive purchase requisition from various departments		1	0.5	0.5
	PC2. Review requisition to verify for requirements and specifications		2	0.5	1.5
	PC3. Check for the approved vendors in the database		1	0.5	0.5
	PC4. Identify new vendors using sources		3	1	2
	PC5. Collect required documents from vendor, take necessary internal approvals and include in the approved vendor category		3	1	2
	PC6. Take quotation from vendors and negotiate price and supply terms and conditions		3	1	2
	PC7. Compare the quotations for prices, specifications, and delivery dates		2	0.5	1.5
	PC8. Select vendor based on price, quality, availability, reliability, service, support, production and distribution capabilities, supplier's reputation and supply history		3	1	2
	PC9. Take proper approvals and raise purchase order		3	1	2
	PC10. Maintain list/database of vendors with details		2	0.5	1.5
	PC11. Maintain knowledge of all organizational rules affecting purchases, and provide information about these rules to organization		2	0.5	1.5

staff and to vendors				
PC12. Send purchase order to the vendor and to departments from where requests have come		2	0.5	1.5
PC13. Based on conditions (if applicable), arrange for samples from vendor		3	1	2
PC14. Check the quality of the sample through internal/external lab		3	1	2
PC15. Verify quality report for conformance to organisation standards		2	0.5	1.5
PC16. Based on the quality report, decide to accept or cancel order and instruct vendor accordingly		3	1.5	1.5
PC17. Follow up with the vendor on the status of order (in case of direct delivery), to schedule or expedite deliveries, and confirm despatch		2	1.5	0.5
PC18. Update vendor on change in the status of the purchase order like change in order quantity, conditions, cancellations etc		2	0.5	1.5
PC19. Update ordering department on the status of the purchase order		3	1	2
PC20. Check deliveries from vendor to ensure that purchase order conditions have been met		2	1	1
PC21. Co-ordinate with quality assurance department on quality report on the supplies		2	0.5	1.5
PC22. Verify quality report for conformance to organisation standards		3	1	2
PC23. Based on the quality report accept, reject or hold the supplies		5	2	3
PC24. Co-ordinate with vendor and internal department and resolve the issue to close the purchase order		5	2	3

	PC25. Contact suppliers to resolve supply issues like shortage, missed or any other problems		5	2	3
	PC26. Compare vendor invoice against purchase order to verify accuracy		5	2	3
	PC27. Take proper approval of vendor invoice for payment process		3	1	2
	PC28. Forward invoices to accounts department for payment		3	1	2
	PC29. Prepare, maintain, and review purchasing files, reports and price lists		3	1	2
	PC30. Monitor vendor performance and recommend contract modifications, if necessary		3	1	2
	PC31. Maintain a record of all inventories and identify regular requirements and orders		3	1	2
	PC32. Set and maintain minimum order level (pre-determined inventory levels) for regular orders		3	1	2
	PC33. Take necessary pre-approvals for raising auto (system generated/manual) purchase order on inventory reaching minimum order level		3	1	2
	PC34. Monitor in-house inventory movement (in erp) and raise purchase order		2	0.5	1.5
	PC35. Ensure minimum order level (pre-determined inventory levels) is maintained		2	0.5	1.5
	PC36. Complete inventory transfer forms for bookkeeping purposes		3	1	2
			<b>100</b>	<b>35</b>	<b>65</b>
<b>3. FIC/N7015 (Complete documentation and record keeping of purchases and inventory)</b>	PC1. Document and maintain records of the purchase requisitions, purchase order, vendor database, vendor documents for vendor approval process, documents on supplies like	<b>100</b>	15	10	5

	supplier invoice, transport documents, supplier quality documents for each purchase, internal quality report, purchase cancellation document, material on-hold or rejection document, etc. As per organisation standards				
	PC2. Maintain/ record observations and deviations (if any)		5	3	2
	PC3. Load the details in ERP for future reference		5	3	2
	PC4. Track documents in case of quality concerns / disputes		9	6	3
	PC5. Document and maintain purchase document on machinery purchase like purchase requisitions, purchase order, vendor database, vendor documents for vendor approval process, documents on supplies like supplier invoice, warranty documents, manuals on machineries, incoming inspection report, approval or rejection documents, etc. As per organisation standards		15	7.5	7.5
	PC6. Maintain record of observations and deviations (if any)		5	3	2
	PC7. Load the details in ERP for future reference		5	3	2
	PC8. Track documents in case of quality concerns / disputes		9	6	3
	PC9. Document and maintain inventory document of raw materials, ingredients, packaging materials, machinery spares, tools etc like purchase quantity, consumption for a particular/defined period, minimum ordering level for all materials, as per organisation standards		15	7.5	7.5
	PC10. Maintain record of observations or deviations (if any)		5	3	2
	PC11. Load the details in ERP for future reference		5	3	2

	PC12. Track documents in case of quality concerns / disputes		7	5	2
			<b>100</b>	<b>60</b>	<b>40</b>
<b>4.FIC/N9001 (Food safety, hygiene and sanitation for processing food products)</b>	PC1. Comply with food safety and hygiene procedures followed in the organisation	<b>100</b>	5	2	3
	PC2. Ensure personal hygiene by using of gloves, hairnets, masks, ear plugs, goggles, shoes, etc.		6	1	5
	PC3. Ensure hygienic production of food by inspecting raw materials, ingredients, finished products, etc. for compliance to physical, chemical and microbiological parameters		5	2	3
	PC4. Pack products in appropriate packaging materials, label and store them in designated area, free from pests, flies and infestations		10	4	6
	PC5. Clean maintain and monitor food processing equipment periodically, using it only for specified purpose		5	2	3
	PC6. Use safety equipment such as fire extinguisher, first aid kit and eye-wash station when required		10	4	6
	PC7. Follow housekeeping practices by having designated area for materials/tools		5	2	3
	PC8. Follow industry standards like GMP and HACCP and product recall process		10	4	6
	PC9. Attend training on hazard management to understand types of hazards such as physical, chemical and biological hazards and measures to control and prevent them		5	1	4
	PC10. Identify, document and report problems such as rodents and pests to management		5	1	4
	PC11. Conduct workplace checklist audits before and after work to ensure safety and hygiene		5	1	4
	PC12. Document and maintain raw material,		4	1	3

	packaging material, process and finished products for the credibility and effectiveness of the food safety control system			
	PC13. Determine the quality of food using criteria such as aroma, appearance, taste and best before date, and take immediate measures to prevent spoilage	5	2	3
	PC14. Store raw materials, finished products, allergens separately to prevent cross-contamination	5	2	3
	PC15. Label raw materials and finished products and store them in designated storage areas according to safe food practices	5	2	3
	PC16. Follow stock rotation based on FEFO / FIFO	10	4	6
		<b>100</b>	<b>35</b>	<b>65</b>



# *Semester II*

## **PART I - TAMIL- II**

பொதுத்தமிழ் - இரண்டாம் பருவம்

**SUB.CODE: 15BFSNL02**  
**MAX.MARKS:100**

**HOURS T+P=C**  
**3+0=3**

**அலகு - 1**

அறுசுவைகளில் இனிப்பு - துடரிப்பழம் - பலாப்பழம் - வாழைப்பழம் - நாவல்பழம் - கரும்பின் சாறு - தேன் - உவர்ப்பு - எரிப்பு - கசப்பு - துவர்ப்பு - புளிப்பு - உணவுகளைப் படைக்கச் சுவைபயன்பட்டமை - சுவைப்பொருத்தம் - பொருந்தாச் சுவைகள் - சுவைமாறுபாடும் ஏற்பட்டகாலங்களும் - சுவைகளின் பட்டியல்.

**அலகு - 2**

ஐம்பூதவகை - நீர்வகைக் குணங்கள் - மழைநீர் - ஆலங்கட்டிமழைநீர் - பனிநீர் - தண்ணீர் - ஆற்றுநீர் - கங்கை, யமுனை, கோதாவரி, துங்கபுத்திரை, நர்மதா, சிந்து, சித்திரா, காவிரி, தாம்பிரபரணி பச்சையாற்று போன்றநதிகளின் தன்மை

**அலகு - 3**

குளத்துநீர் - தாமரைக் குளத்துநீர் - அல்லிக் குளத்துநீர் - ஏரிநீர் - சுனை நீர் - கிணற்றுநீர் - ஊற்றுநீர் - பாறைநீர் - சுக்கான் பாறைநீர் - கரும்பாறைநீர் - அருவிநீர் - காட்டுப்பகுதிநீர் - சிவந்தநீர் - கறுத்தநீர் - வயல் நீர் - நண்டுக்குழிநீர் - பாசிநீர் - நீராகாரநீர் - காடி நீர் - உப்புநீர் - சமுத்திரநீர் - நாவல் நீர் - வாழைநீர் - கருங்காலிநீர் - இலவுநீர் - இளநீர்வகைகளும் பயன்களும்

**அலகு - 4**

வெந்நீர்வகையும் குணமும் - பால் வகையும் குணமும் தயிர்வகை - மோர்வகை - வெண்ணெய் வகை - நெய் வகை - சாணவகை - பாகின் வகை - மதுரவகை - வெல்லத்தின் வகை - சர்க்கரைவகை - கற்கண்டின் வகை - மதுவின் வகை - தேனின் வகையும் மருத்துவப் பயனும்.

**அலகு - 5**

உணவுயுத்தம் - உணவுவிதிகள் - விவசாயத்தில் பன்னாட்டுநிறுவனங்கள் - பயணியின் உணவு - தமிழர்கள் என்னசாப்பிட்டார்கள் - உணவுப் பொய்கள் - திணைவகையின் பயன்பாடு.

**பார்வை நூல்கள்**

1. தமிழர்உணவு - சே.நமசிவாயம்
3. உணவுயுத்தம் - எஸ். இராமகிருஷ்ணன்

## **PART II - FUNCTIONAL ENGLISH – II PRACTICAL**

**SUB.CODE: 15BFSNE02**  
**MAX.MARK: 25+75=100**

**HOURS: T+P=C**  
**2+2=3**

### **Course Objective:**

*To enable the students*

1. To work in challenging environment
2. To handle the objection easily.
3. To develop them self to face the difficulties in the society
4. To speak good English in the society.

### **Learning Outcomes**

*After undergoing this course the student will be able to:*

1. Posses vocabulary required for the current situations
2. Read and comprehend business letters.
3. Deals with technical sheets accurately.
4. Develop their personality and manners
5. Handel their objections perfectly.

### **Unit-1**

1. Phonics, idioms and phrases.
2. Ability to check policy documents scanning a pamphlet etc.
3. Grammar- direct and indirect speech and sentence pattern.

### **Unit-2**

1. Dialogue writing, answering the questions, exposure to report checklists, job advertisements, introducing themselves etc.
2. Developing LSRW Skills- Listening, Speaking Reading and Writing skills

### **Unit-3**

1. Taking Responsibilities ,Speaking practises and organising events.
2. Check e-mails and reply to them.

### **Unit-4**

1. Listening activities.

2. Collaboration with teams through effective communications and responding to the commands.

## **Unit-5**

1. Writing letters- Official and non- official letters.
2. Report writing.
3. Draft writing.
4. Hints- developments etc.

## **CORE PAPER**

### **FOOD PROCESSING - I**

**(Technology of cereals, legumes, Oilseeds and Spices)**

**SUB.CODE: 15BFSNC02**

**HOURS: T+P=C**

**MAX.MARK: 100**

**3+0=3**

#### **Objectives:**

1. To learn about Principle and Techniques in Food processing of cereals, legumes, Oilseeds and Spices.

#### **Unit I**

Introduction- Historical evaluation of food processing technology – Principles in food processing- Thermal Processing – Classification and Principles- Thermal death time- Thermal Process calculation.

#### **Unit II**

Cereal technology: Rice Parboiling –Milling techniques- by Products of rice milling – Wheat milling – by products of wheat milling – Millet milling – uses of milled millets- product development - Salt processing – stages of salt processing.

#### **Unit III**

Pre-treatments of pulses and legumes - Pulses technology: Soaking – fermentation – Germination – changes during soaking and germination of Pulses and Legumes –Milling of Pulses - by products of pulses, Toxic Constituents of Pulses.

#### **Unit IV**

Manufacturing of Breakfast cereals – Extruded Products puffed and flaked Cereals – Puffed and flaked millets – Recipes of breakfast cereals, Extruded products –noodles, Pasta, etc.

#### **Unit V**

Oilseeds – Milling – Extraction of oil and its processing –Processing of Oil cakes and its uses – processing of nuts spices technology –Extraction of essential oils and oleoresins manufacturing of condiments and masala powders.

#### **Suggested Readings**

1. Blanshard J.M.V., Frazier, P.J. and Galliard, T. Ed. 1986. Chemistry and Physics of Baking. Royal Society of Chemistry, London.

2. Chakraverty, A. 1988. Postharvest Technology of Cereals, Pulses and oilseeds. Oxford and IBH, New Delhi.
3. Durbey, S.C. 1979. Basic Baking: Science and Craft. Gujarat Agricultural University, Anand (Gujrat).
4. Kent, N.L. 1983. Technology of Cereals. 3rd Edn. Pergamon Press, Oxford, UK.
5. Mathews, R.H. Ed. 1989. Legumes: Chemistry, Technology and Human Nutrition. Marcel Dekker, New York.
6. Pomeranz, Y. Ed. 1978. Wheat: Chemistry and Technology. Am. Assoc. of Cereal Chemist. St. Paul, minnesota.
7. Pomeranz, Y. 1987. Modern Cereal Science and Technology. VCH Pub., New York.
8. Salunkhe, D.K., Kadam, S.S. and Austin A. Ed. 1986. Quality of Wheat and Wheat Products. Metropolitan Book Co., New Delhi.

**ALLIED PAPER II - FOOD SCIENCE & CHEMISTRY PRACTICAL**

**SUB.CODE: 15BFSNA02**  
**MAX.MARKS: 100**

**HOURS T+P=C**  
**0+3=3**

**Objectives**

To enable the students

- To learn identify the types, assessment of household purchasing trend and quality analysis of basic five food groups.

S.No	Topic/Module	Duration (in Hours)	Key Learning Outcomes
1	Cereals, Pseudo cereals, Millets and Pulses	9:00	a. Identification of the types b. Assessment of household purchasing trend and diversity c. Physical property I. Bulk density II. Tapped density III. True density IV. Porosity d. Functional Properties i. Moisture ii. Water Absorption capacity iii. Oil absorption capacity iv. Swelling power e. Quality analysis of raw materials under storage I. Physical examination for infestation II. Storage condition assessment Temperature & RH
2	Fruits and Vegetables	9:00	a. Assessment of household diversity in consumption of fruits and vegetables b. Identification of the types of fruits and vegetables c. Maturity Index determination d. Physical selection criteria for fresh fruits and vegetables e. Quality checking of raw materials 1. Physical Examination 2. Moisture content 3. Texture analysis 4. TSS 5. pH 6. Titrable acidity

3	Nuts & Oilseeds	9:00	<ul style="list-style-type: none"> <li>a. Assessment of household diversity in consumption of Nuts &amp; oilseeds</li> <li>b. Quality checking of raw materials               <ul style="list-style-type: none"> <li>1. Physical Verification</li> <li>2. Moisture content</li> <li>3. Oil content</li> <li>4. Determination of peroxide value</li> </ul> </li> </ul>
4	Spices & Condiments	9:00	<ul style="list-style-type: none"> <li>a. Assessment of household diversity in consumption of Spices and Condiments</li> <li>b. Quality checking of raw materials               <ul style="list-style-type: none"> <li>1. Moisture content</li> <li>2. Volatile Oil estimation in Spices</li> </ul> </li> <li>c. Physical Verification Appearance, Colour and flavour</li> </ul>
5	Milk & Egg	9:00	<ul style="list-style-type: none"> <li>a. Domestic determination of Milk</li> <li>b. Assessment of household diversity in consumption of milk and egg</li> <li>c. MBRT assessment in Milk</li> <li>d. Adulteration test in Milk</li> <li>e. Egg Quality evaluation</li> <li>f. Sensory Quality evaluation of Milk</li> </ul>
6	Fleshy Foods	9:00	<ul style="list-style-type: none"> <li>a. Assessment of household diversity in consumption of fleshy foods</li> <li>b. Identification of types of Meat</li> <li>c. Proximate Composition assessment               <ul style="list-style-type: none"> <li>1. Moisture</li> <li>2. Protein</li> <li>3. Fat</li> </ul> </li> <li>d. Sensory Quality evaluation of fleshy foods               <ul style="list-style-type: none"> <li>1. Appearance</li> <li>2. Flavour</li> <li>3. Colour</li> <li>4. Texture</li> </ul> </li> </ul>
<b>Total duration</b>		<b>54:00</b>	

#### References:

1. [www.fao.org](http://www.fao.org)
2. The food chemistry laboratory: a manual for experimental foods, dietetics and food scientist (2017) 2nd edition, Connie M.Weaver and James R Daniel
3. Food science laboratory manual (1998) Karen S. Jamesen, Purdue university



**VALUE EDUCATION II**  
**ENVIRONMENTAL STUDIES**

**SUB.CODE: 15BFSNV02**

**MAX.MARK: 100**

**HOURS: T+P=C**

**2+0=1**

**Objectives:**

1. To study about Environmental Science.

**Unit 1**

The Multidisciplinary Nature of Environmental Studies: Definition, scope and importance Need for public awareness

**Unit 2**

Natural Resources Renewable and Non-renewable Resources:  $\Sigma$  Natural resources and associated problems - Role of an individual in conservation of natural resources - Equitable use of resources for sustainable lifestyles.

**Unit 3**

Ecosystems: Concept of an ecosystem - Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

**Unit 4**

Biodiversity and Its Conservation: Introduction, definition: genetic, species and ecosystem diversity. Bio geographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India

**Unit 5**

Environmental Pollution: Definition - Causes, effects and control measures of (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards

Ref: file:///C:/Users/Admin/Downloads/UGCsyllabusforEnvironmentalStudies.pdf

## QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR FOOD PROCESSING

### What are Occupational Standards(OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

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1. Introduction and Contacts.....Page 1
2. Qualifications Pack.....Page 2
3. Glossary of Key Terms ..... Page 3
4. OS units.....Page 5
5. Assessment Criteria.....Page 33

## Introduction

### Qualifications Pack – Plant Baker

**SECTOR:** FOOD PROCESSING

**SUB-SECTOR:** BREAD AND BAKERY

**OCCUPATION:** PROCESSING

**REFERENCE ID:** FIC/5001

**ALIGNED TO:** NCO-2004/7412.10

A Plant Baker produces/ supervises the production of baked products (breads, biscuits, cakes, etc.)

**Brief Job Description:** A Plant Baker produces/ supervises the production of baked products (breads, biscuits, cakes, etc.) in industrial units by weighing, mixing, kneading, fermenting, shaping, rolling/sheeting, cutting, moulding, baking, cooling, etc. using various industrial equipments.

**Personal Attributes:** A Plant Baker must have the ability to plan, organize, prioritize, calculate and handle pressure. S/he must possess reading, writing and communication skills. In addition, the individual must have stamina to be able to stand for long hours, have personal and professional hygiene and an understanding of food safety standards and requirements.

## Job Details

Qualifications Pack Code	FIC/Q5001		
Job Role	Plant Baker		
Credits (NSQF)	TBD	Version number	1.0
Sector	Food Processing	Drafted on	23/06/2015
Sub-sector	Bread and bakery	Last reviewed on	03/07/2015
Occupation	Processing	Next review date	02/07/2016

Job Role	Plant Baker
Role Description	A Plant Baker produces/ supervises the production of baked products (breads, biscuits, cakes, etc.) in industrial units.
NSQF level	5
Minimum Educational Qualifications	Preferably Class 12
Maximum Educational Qualifications	Not Applicable
Training (Suggested but not mandatory)	1. Baking process for all baked products 2. Food standards for baked products 3. Operation and basic maintenance of various baking machineries and equipment 4. GMP 5. HACCP 6. QMS 7. Computer basics and ERP system followed by the organization 8. Training in food Safety Standards and Regulations (as per FSSAI) (Mandatory)
Experience	NA
Applicable National Occupational Standards (NOS)	<b>Compulsory:</b> <a href="#">1. FIC/N5001 Prepare and maintain work area and process machineries for producing baked products in industrial units</a> <a href="#">2. FIC/N5002 Prepare for production of baked products in industrial units</a> <a href="#">3. FIC/N5003 Produce baked products in industrial units</a> <a href="#">4. FIC/N5004 Complete documentation and record keeping related to production of baked products in industrial units</a> <a href="#">5. FIC/N9001 Food safety, hygiene and sanitation for processing food products</a> <b>Optional:</b> Not Applicable
Performance Criteria	As described in the relevant OS units

Definitions

Keywords /Terms	Description
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through analysis and form the basis of OS.
Job Role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
OS	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
NOS	NOS are Occupational Standards which apply uniquely in the Indian context.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Qualifications Pack	Qualifications Pack comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A Qualifications Pack is assigned a unique qualification pack code.
Unit Code	Unit Code is a unique identifier for an Occupational Standard , which is denoted by an 'N'
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
Organizational Context	Organizational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills or Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.

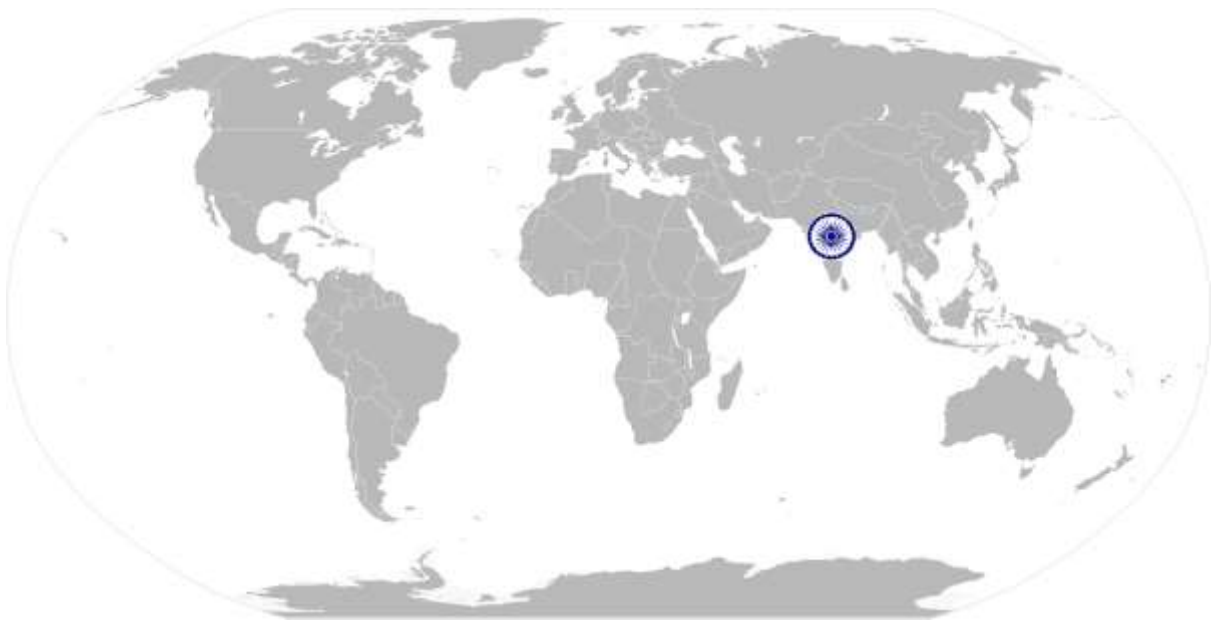
Acronyms

Keywords /Terms	Description
CIP	Clean In Place
COP	Clean Out Of Place
ERP	Enterprise Resource Planning
FIFO	First In First Out
FEFO	First Expiry First Out
FSSAI	Food Safety and Standards Authority of India
GMP	Good Manufacturing Practice
GHP	Good Hygiene Practices
HACCP	Hazard Analysis and Critical Control Point
NOS	National Occupational Standard
NSQF	National Skill Qualification Framework
NVEQF	National Vocational Educational Qualification Framework
NVQF	National Vocational Qualification Framework
OS	Occupational Standard
PC	Performance Criteria
QP	Qualification Pack
SSC	Sector Skill Council
SOP	Standard Operating Procedure
SKU	Stock Keeping Unit
QMS	Quality Management System

**FIC/N5001      Prepare and maintain work area and process machineries for producing baked products in industrial units**

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# National Occupational Standard



## Overview

This OS unit is about preparing work area ensuring hygiene and safety, checking the performance and efficiency of process machineries and tools for producing baked products in industrial units, as per the specifications and standards of the organization

**FIC/N5001 Prepare and maintain work area and process machineries for producing baked products in industrial units**

National Occupational Standard

<b>Unit Code</b>	<b>FIC/N5001</b>
<b>Unit Title(Task)</b>	<b>Prepare and maintain work area and process machineries for producing baked products in industrial units</b>
<b>Description</b>	This unit is about preparing work area ensuring hygiene and safety, checking the performance and efficiency of process machineries and tools for producing baked products in industrial units, as per the specifications and standards of the organization.
<b>Scope</b>	This unit/task covers the following: <ul style="list-style-type: none"> <li>• Prepare and maintain work area ( for production of baked products in industrial units)</li> <li>• Prepare and maintain process machineries and tools ( for production of baked products in industrial units)</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Prepare and maintain work area ( for production of baked products in industrial units)</b>	PC1. clean and maintain the cleanliness of the work area using approved sanitizers and keep it free from dust, waste, flies and pests PC2. ensure that the work area is safe and hygienic for food processing PC3. dispose waste materials as per SOP and industry requirements
<b>Prepare and maintain process machineries and tools ( for production of baked products in industrial units)</b>	PC4. check the working and performance of all machineries and tools used for production such as weighing scales, mixer/ kneader, dough divider, dough rounder, dough moulder, sheeting machine, rotary cutter, dough depositor, baking oven, packaging machines, etc. PC5. clean the machineries and tools used with approved sanitizers following specifications and SOPs PC6. place the necessary tools required for the process PC7. attend minor repairs/ faults of machines, if required
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the organization and its processes)	The user/individual on the job needs to know and understand: <ul style="list-style-type: none"> <li>KA1. organization standards, storage standards and procedures followed in the organization</li> <li>KA2. types of food stored by the organization</li> <li>KA3. code of business conduct</li> <li>KA4. dress code to be followed</li> <li>KA5. job responsibilities/duties and standard operating procedures</li> <li>KA6. internal departments and its functions</li> <li>KA7. provision of wages, working hours as per organization policy</li> <li>KA8. food safety and hygiene standards followed</li> </ul>
<b>B. Technical Knowledge</b>	The user/individual on the job needs to know and understand: <ul style="list-style-type: none"> <li>KB1. types of chemicals, materials and equipment required for cleaning and maintenance</li> <li>KB2. cleaning process to disinfect equipment/ tools</li> <li>KB3. supplier/manufacturers instructions related to cleaning and maintenance</li> </ul>



**FIC/N5001 Prepare and maintain work area and process machineries for producing baked products in industrial units**

	<p>KB4. knowledge on Food Safety Standards and Regulations (as per FSSAI)</p> <p>KB5. knowledge on legal regulations pertaining to work place such as health and safety, recommended dosage for use of sanitizers, control of substances hazardous to health, handling/storage/ disposal/ cautions for use of sanitizers and disinfectants, fire precautions/ occurrences, hygiene practice, disposal of waste, environmental protection, etc.</p>
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<p><b>Writing Skills</b></p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. note the information communicated by the supervisor</p> <p>SA2. note the details of food stored, storage parameters and provide necessary information to fill the storage chart</p> <p>SA3. note the details of the refrigeration system and components, maintenance and service reports</p> <p>SA4. note down observations (if any) related to the storage</p> <p>SA5. write information documents to internal departments/ internal teams</p> <p>SA6. note down the data for erp or as required by the organization</p>
	<p><b>Reading Skills</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA7. read and interpret design, drawings and construction of the storage facility</p> <p>SA8. read and interpret the storage methods and conditions for storing all types of food</p> <p>SA9. read and interpret storage parameters for storing various food</p> <p>SA10. read equipment manuals and storage documents to understand the equipments operation and storage requirement</p> <p>SA11. read internal information documents sent by internal teams</p>
	<p><b>Oral Communication (Listening and Speaking skills)</b></p> <p>The user/individual on the job needs to know and understand how to :</p> <p>SA12. discuss task lists, schedules and activities with the supervisor</p> <p>SA13. effectively communicate with the team members</p> <p>SA14. question the supervisor in order to understand the nature of the problem and to clarify queries</p> <p>SA15. attentively listen and comprehend the information given by the speaker</p> <p>SA16. communicate clearly with the supervisor and cross department team on the issues faced during storage process</p>
	<p><b>Decision Making</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue</p> <p>SB2. handle issues in case the supervisor is not available (as per the authority matrix defined by the organization)</p>
<b>B. Professional Skills</b>	<p><b>Plan and Organize</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB3. plan and organize the work order and jobs received from the supervisor</p>



**FIC/N5001 Prepare and maintain work area and process machineries for producing baked products in industrial units**

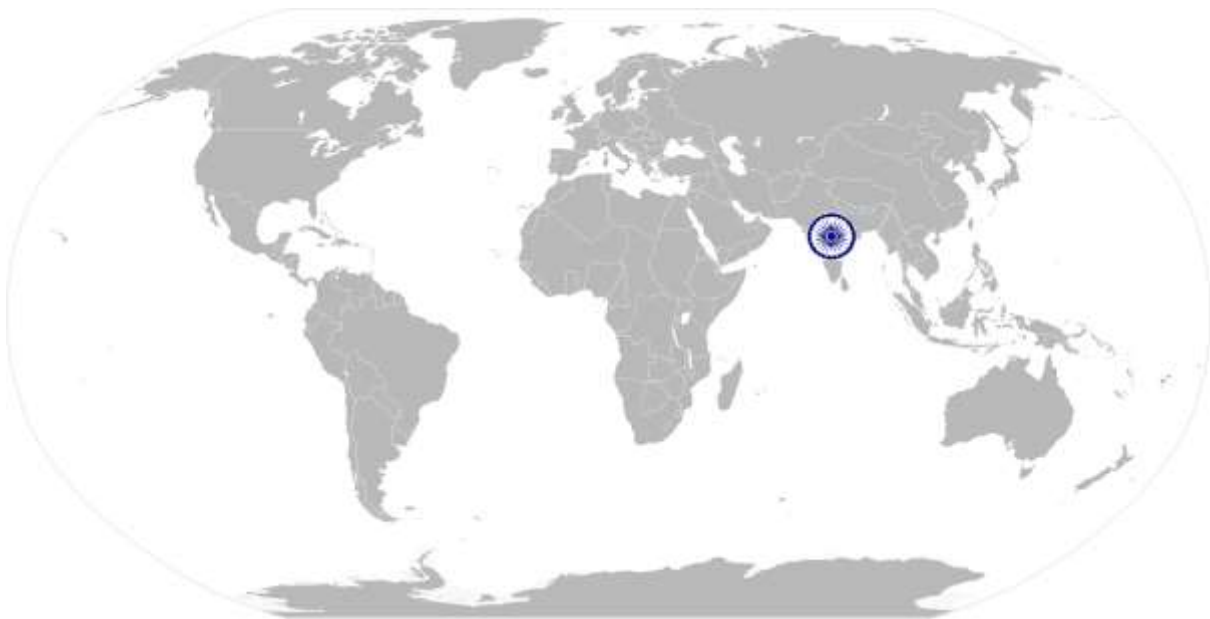
	<p>SB4. organize raw materials and packaging materials required for all products following the instruction provided by the supervisor</p> <p>SB5. plan and prioritize the work based on the instructions received from the supervisor</p> <p>SB6. plan to utilise time and equipment's effectively</p> <p>SB7. organize all process/ equipment manuals so as to access information easily</p> <p>SB8. support the supervisor in scheduling tasks for helper(s)</p>
	<b>Customer Centricity</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB9. understand customer requirements and their priority and respond as per their needs</p>
	<b>Problem Solving</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB10. support supervisor in solving problems by detailing out problems</p> <p>SB11. discuss the possible solutions with the supervisor for problem solving</p>
	<b>Analytical Thinking</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB12. apply domain information about maintenance Processes and technical knowledge about tools and equipment</p>
	<b>Critical Thinking</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB13. use common sense and make judgments on day to day basis</p> <p>SB14. use reasoning skills to identify and resolve basic problems</p> <p>SB15. use intuition to detect any potential problems which could arise during operations</p> <p>SB16. use acquired knowledge of the process for identifying and handling issues</p>

**FIC/N5001 Prepare and maintain work area and process machineries for producing baked products in industrial units**

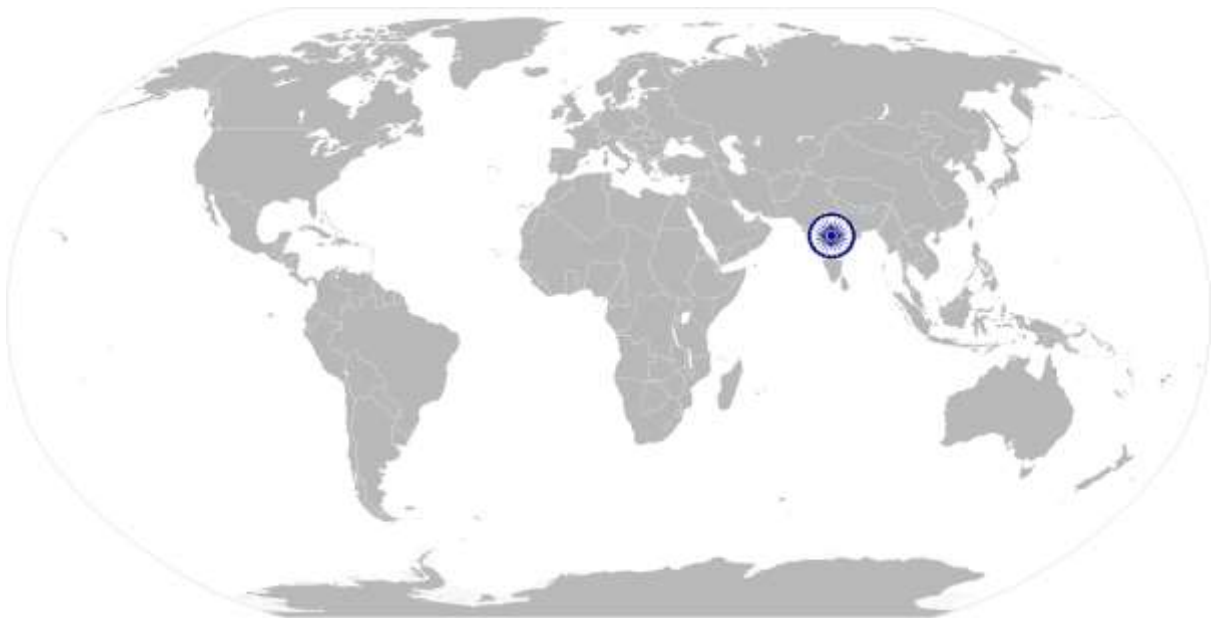
## **NOS Version Control**

NOS Code	FIC/N5001		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	23/06/2015
Industry Sub-sector	Bread and Bakery	Last reviewed on	03/07/2015
Occupation	Processing	Next review date	02/07/2016

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# National Occupational Standard



## Overview

This OS unit is about preparation of raw materials and machineries for production of various baked products in industrial units

<b>Unit Code</b>	<b>FIC/N5002</b>
<b>Unit Title(Task)</b>	<b>Prepare for production of baked products in industrial units</b>
<b>Description</b>	This unit is about preparation of raw materials and machineries for production of various baked products in industrial units.
<b>Scope</b>	<p>The scope of this role will include:</p> <ul style="list-style-type: none"> <li>• Prepare raw materials for production ( for baked products in industrial units)</li> <li>• Prepare machineries for production ( for baked products in industrial units)</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Prepare raw materials for production ( for baked products in industrial units)</b>	<p>PC1. read and understand the production order from the supervisor</p> <p>PC2. refer to the process chart/ product flow chart/formulation chart for the product(s) to be produced</p> <p>PC3. organize raw materials and ingredients required for production of products in the work order</p> <p>PC4. check the quality documents from supplier/internal lab for each raw materials and ingredient required for products to be produced, for its conformance to organization standards</p> <p>PC5. check the quality of raw materials and ingredients through physical parameters such as appearance, colour, aroma texture, etc.</p>
<b>Prepare machineries for production ( for baked products in industrial units)</b>	<p>PC6. check and ensure the cleaning and maintenance of the machineries required for production</p> <p>PC7. calibrate equipments such as weighing scale following methods defined by the organization</p> <p>PC8. change dies, moulds, blades and other parts of machineries, if required</p> <p>PC9. start each machine and check and ensure its working and performance</p> <p>PC10. make minor adjustments or repairs (if required)</p> <p>PC11. keep tools accessible to attend repairs/faults in case of breakdown</p> <p>PC12. allot responsibilities/ work to the assistants and helpers</p>
<b>Knowledge and Understanding (K)</b>	
<b>B. Organizational Context</b> (Knowledge of the organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. organization standards, process standards and procedures followed in the organization</p> <p>KA2. types of products produced by the organization</p> <p>KA3. code of business conduct</p> <p>KA4. dress code to be followed</p> <p>KA5. job responsibilities/duties and standard operating procedures</p> <p>KA6. internal processes such as procurement, store management, inventory management, quality management and key contact points for query resolution</p> <p>KA7. provision of wages, working hours as per organization policy</p> <p>KA8. food safety and hygiene standards followed</p>
<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. technology and methods for production of various types of baked products</p> <p>KB2. types of raw materials and ingredients used in various baked products</p> <p>KB3. methods for baking various types of baked products</p>

	<p>KB4. types of machineries used for baking various products and machineries used in the organization</p> <p>KB5. maintenance of baking machineries and equipment</p> <p>KB6. supplier/manufacturer instructions related to machineries</p> <p>KB7. basic mathematics</p> <p>KB8. calculation of raw material for required quantity of finished product</p> <p>KB9. quality parameters and quality assessment based on physical parameters</p> <p>KB10. food safety and hygiene</p> <p>KB11. knowledge on Food Safety Standards and Regulations (as per FSSAI)</p> <p>KB12. GMP</p> <p>KB13. HACCP</p>
<b>Skills (S)</b>	
<b>Core Skills/ Generic Skills</b>	<p><b>Writing Skills</b></p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. note the information communicated by the supervisor</p> <p>SA2. note the raw materials used for production and the finished products produced</p> <p>SA3. note the readings of the process parameters and provide necessary information to fill the process chart</p> <p>SA4. note down observations (if any) related to the process</p> <p>SA5. write information documents to internal departments/ internal teams</p> <p>SA6. note down the data for erp or as required by the organization</p>
	<p><b>Reading Skills</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA7. read and interpret the process required for producing various types of products</p> <p>SA8. read and interpret and process flowchart for all products produced</p> <p>SA9. read equipment manuals and process documents to understand the equipment operation and process requirement</p> <p>SA10. read internal information documents sent by internal teams</p>
	<p><b>Oral Communication (Listening and Speaking skills)</b></p> <p>The user/individual on the job needs to know and understand how to :</p> <p>SA11. discuss task lists, schedules and activities with the supervisor</p> <p>SA12. effectively communicate with the team members</p> <p>SA13. question the supervisor in order to understand the nature of the problem and to clarify queries</p> <p>SA14. attentively listen and comprehend the information given by the speaker</p> <p>SA15. communicate clearly with the supervisor and cross department team on the issues faced</p>
	<p><b>B. Professional Skills</b></p> <p><b>Decision Making</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue</p> <p>SB2. handle issues in case the supervisor is not available (as per the authority matrix defined by the organization)</p>
	<p><b>Plan and Organize</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB3. plan and organize the work order and jobs received from the supervisor</p>

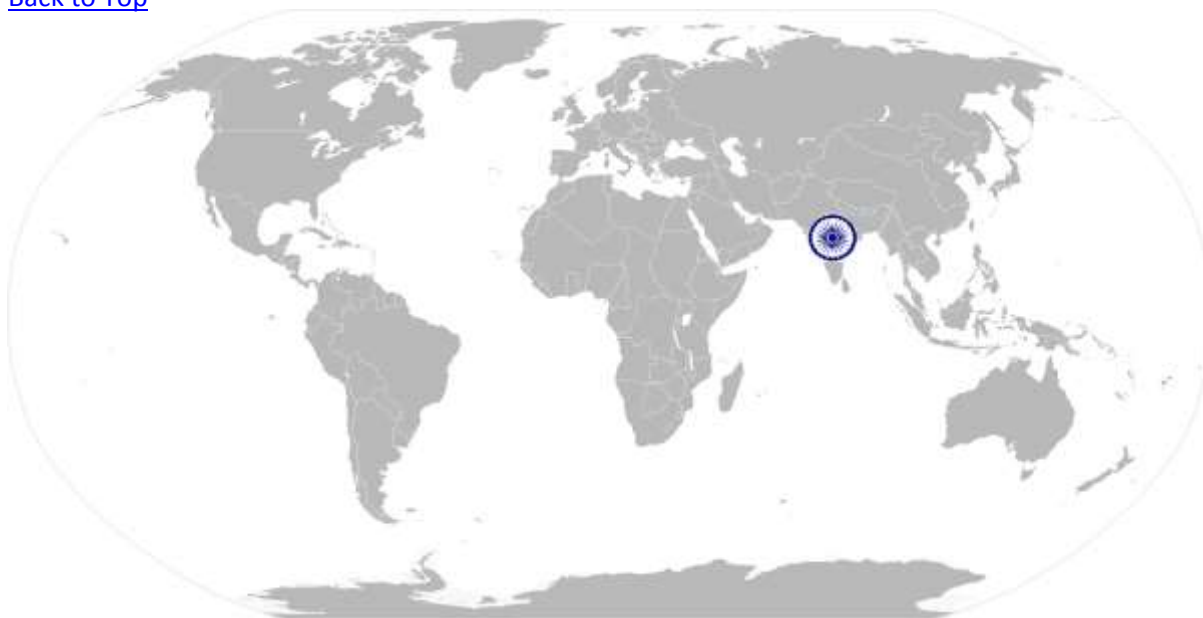
	SB4. organize raw materials and packaging materials required for all products following the instruction provided by the supervisor
	SB5. plan and prioritize the work based on the instructions received from the supervisor
	SB6. plan to utilise time and equipment's effectively
	SB7. organize all process/ equipment manuals so as to access information easily
	SB8. support the supervisor in scheduling tasks for helper(s)
	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to:
	SB9. understand customer requirements and their priority and respond as per their needs
	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to:
	SB10. support supervisor in solving problems by detailing out problems
	SB11. discuss the possible solutions with the supervisor for problem solving
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to:
	SB12. apply domain information about maintenance Processes and technical knowledge about tools and equipment
	<b>Critical Thinking</b>
	The user/individual on the job needs to know and understand how to:
	SB13. use common sense and make judgments on day to day basis
	SB14. use reasoning skills to identify and resolve basic problems
	SB15. use intuition to detect any potential problems which could arise during operations
	SB16. use acquired knowledge of the process for identifying and handling issues



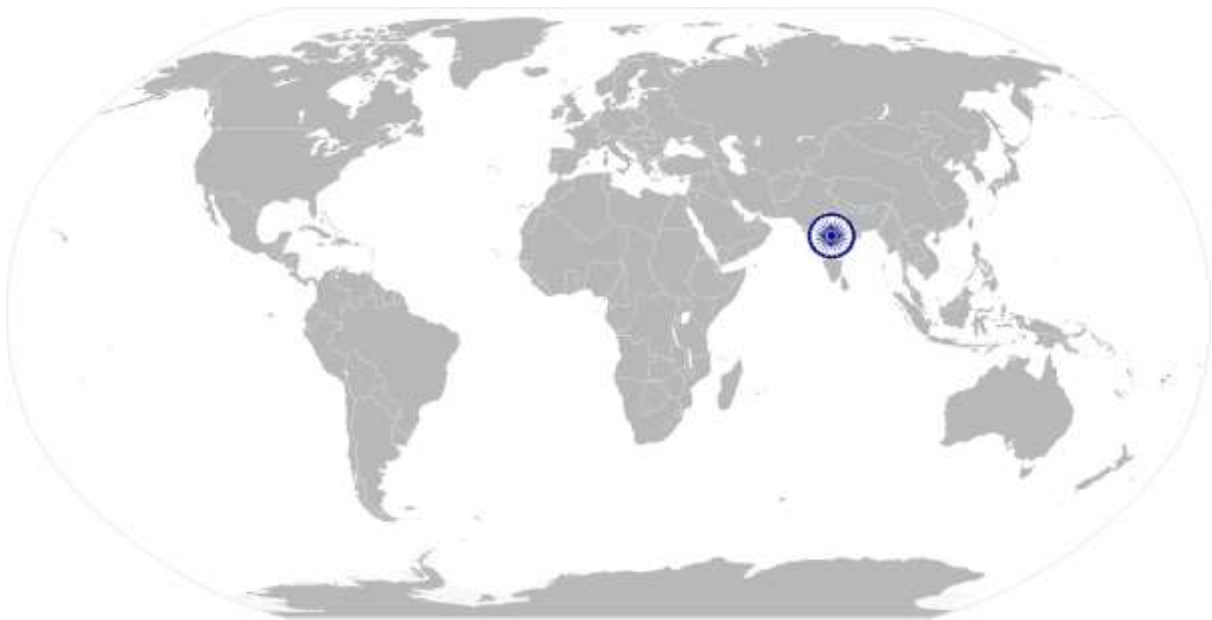
## **NOS Version Control**

NOS Code	FIC/N5002		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	23/06/2015
Industry Sub-sector	Bread and Bakery	Last reviewed on	03/07/2015
Occupation	Processing	Next review date	02/07/2016

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# National Occupational Standard



## Overview

This OS unit is about supervising and controlling the production of various baked products in industries using continuous processing machineries or automated machineries, as per the specifications and standards of the organization.



**FIC/N5003**

**Produce baked products in industrial units**

National Occupational Standard

Unit Code	FIC/N5003
Unit Title(Task)	Produce baked products in industrial units
Description	This unit is about supervising and controlling the production of various baked products in industries using continuous processing machineries or automated machineries, as per the specifications and SOP's.
Scope	<p>The scope of this role will include:</p> <ul style="list-style-type: none"> <li>• Weigh and mix ingredients</li> <li>• Fermentation, moulding and proofing dough( for bread)</li> <li>• Roll, shape and cut dough (for biscuits)</li> <li>• Mould cake batter</li> <li>• Bake and pack baked products</li> <li>• Post production cleaning and regular maintenance of equipments</li> </ul>
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
<b>Weigh and mix Ingredients</b>	<p>PC1. refer the production order and formulation for the product/SKU, and organize all the ingredients required for the product/batch</p> <p>PC2. check the quality of each ingredient through physical parameters such as appearance, colour, odour, texture etc. for its conformance to standards and specifications</p> <p>PC3. set and control metering devices that measure each ingredient as per the formulation, and check the scale indicators to confirm if the specified amount of ingredients have been added</p> <p>PC4. start flour sifter and pre-mixer to blend ingredients</p> <p>PC5. transfer all the ingredients together or sequentially into the mixing machine, and set the mixer speed, time and temperature depending on the mixing process, following the SOP</p> <p>PC6. start the mixing machine to knead/mix the ingredients and observe dials and recording instruments to verify dough temperature, viscosity of batter, speed and time of mixing</p> <p>PC7. check and feel the dough/batter to ascertain its consistency meets the standard, and unload dough/ batter in the trough/ hopper</p>
<b>Fermentation,moulding and proofing dough(for bread)</b>	<p>PC8. set and maintain temperature, humidity of fermentation chamber/room, transfer dough into fermentation chamber/room and allow to stand for specified time for fermentation</p> <p>PC9. check the fermented dough at regular intervals for required consistency</p> <p>PC10. transfer the fermented dough into the mixer for second stage mixing following the SOP, set the speed and time of the mixer and start to mix the fermented dough</p> <p>PC11. transfer the dough into the trough/ hopper and load the dough onto the dough divider and adjust controls to set speed of the divider and start divider blades that cut off specified weight of dough and drop onto the conveyor</p> <p>PC12. set and control the speed of the divider conveyor that pass the dough</p>

FIC/N5003	Produce baked products in industrial units
	<p>through the line that shapes the dough into balls, dust with flour and transport the shaped dough to the moulder conveyor without sticking</p> <p>PC13. weigh the dough balls at regular intervals to check its conformance to standards</p> <p>PC14. load or ensure loading (by helpers) of specified size baking moulds/ pans on the panning conveyor and ensure that speed of the moulder and conveyor are synchronised to allow smooth passage of dough</p> <p>PC15. allow the dough to pass through moulding line that fold and roll the dough to desired shape and allow the shaped dough to arrange in the baking moulds/ pans passing on the panning conveyor</p> <p>PC16. set and control the speed of the conveyor that take the moulded dough into the proofer and turn controls to set the temperature, relative humidity of the proofer following the SOP</p> <p>PC17. monitor the proofed dough passing out of the proofer to confirm it has rise to specified height</p>
<b>Roll, shape and cut dough (for biscuits)</b>	<p>PC18. load the dough trough containing dough, in the elevator and start the elevator to lift the dough trough and dump the dough in the dough feeder (if dough feeder is in the elevated position)</p> <p>PC19. set the controls of each roller of the laminator machine and start the machine to produce continuous sheet of dough</p> <p>PC20. set the controls of rotary cutter machine to cut the sheet of dough to desired size, shape and design and set the controls of the separating machine to separate the cut dough and control scrap return</p> <p>PC21. observe operation of laminator, rotary cutter and separating machine, and remove malformed biscuit shapes and control scrap return</p> <p>PC22. load topping materials like salt, sugar, choco chips etc in sprinkler machine following the SOP for the product/SKU and set the controls of the machines to sprinkle measured quantity of topping material over the cut dough</p>
<b>Mould cake batter</b>	<p>PC23. prepare the baking pans by placing the paper liners in the moulds of the baking pans</p> <p>PC24. adjust controls of the batter depositor machine to fill measured quantity of batter into the moulds of baking pans</p> <p>PC25. start the conveyor and control speed such that the moulds of the baking pans are positioned below the filling nozzle of the batter depositor machine</p> <p>PC26. start machine to pump measured quantity of batter into the moulds of the baking pans</p> <p>PC27. fill the topping materials such as fruits, nuts, chocolate chips, etc. in the topping machine following the SOP for the product/SKU and start the topping machine to deposit measured quantity of topping materials on the batter in the baking pans</p> <p>PC28. check the weight of the filled moulds at regular intervals to ensure its conformance to standards</p>
<b>Bake and pack baked products</b>	<p>PC29. set the oven parameters such as baking temperature, baking time, speed of the panning conveyor etc., and monitor and control the dough/batter filled baking pans entering the oven (tunnel oven)</p> <p>PC30. observe baking of products through the observation window of the tunnel oven and monitor the oven parameters during the entire baking process</p> <p>PC31. observe the product coming out the oven for its quality through physical parameters such as colour, aroma, texture etc. to detect burning /over</p>

FIC/N5003 Produce baked products in industrial units	
	<p>baking/under baking and accordingly control oven parameters to achieve finished product of uniform quality, and remove the non-conforming products from the conveyor</p> <p>PC32. check the quality of the finished products (bread, biscuit and cake) through physical parameters such as colour, size, appearance, texture, aroma, etc. and compare against standard</p> <p>PC33. control the vacuum system that remove the baked product from the baking moulds/ pans through suction</p> <p>PC34. set, control and maintain speed of the cooling conveyor and fans to cool the finished products and ensure the products are cooled to the required temperature</p> <p>PC35. check the weight of finished product periodically and ensure its conformance to standards</p> <p>PC36. adjust controls of the conveyor and slicer to allow the bread loaves/cakes to pass through slicer and ensure it is cut to required thickness</p> <p>PC37. adjust controls to allow the finished products to move to the automatic packaging machine</p> <p>PC38. sample the packed product and transfer to quality lab for analysis</p> <p>PC39. report discrepancies/concerns in each stage of production to department supervisor for immediate action</p>
<b>Post production cleaning and regular maintenance of equipments</b>	<p>PC40. clean the work area, machineries, equipment and tools using recommended cleaning agents and sanitizers</p> <p>PC41. attend minor repairs/faults of all machines (if any)</p> <p>PC42. ensure periodic (daily/weekly/monthly/quarterly/half yearly/annual) maintenance of all machines and equipment following the SOP or following suppliers instructions/manuals</p>
Knowledge and Understanding (K)	
<b>C. Organizational Context</b> (Knowledge of the organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. organization standards, process standards and procedures followed in the organization</p> <p>KA2. types of products produced by the organization</p> <p>KA3. code of business conduct</p> <p>KA4. dress code to be followed</p> <p>KA5. job responsibilities/duties and standard operating procedures</p> <p>KA6. internal processes such as procurement, store management, inventory management, quality management and key contact points for query resolution</p> <p>KA7. provision of wages, working hours as per organization policy</p> <p>KA8. food safety and hygiene standards followed</p>
<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. types of raw materials, ingredients and finishing materials required for making various baked products</p> <p>KB2. production process, process parameters and formulation of all types of baked products</p> <p>KB3. types of machineries used for baking various products and machineries used in the organization</p> <p>KB4. handling and maintenance of baking equipment</p> <p>KB5. hand-in machine safety</p>

<b>FIC/N5003</b>	<b>Produce baked products in industrial units</b>  KB6. process parameters and machine parameters for all products handled KB7. basic mathematics KB8. quality parameters, quality standards to be maintained and quality assessment based on physical parameters KB9. types of packaging materials for various type of products KB10. types of chemicals, materials, tools and equipment required for cleaning and maintenance KB11. clean-in-place and clean-out-of-place methods and procedures KB12. methods to clean and disinfect equipment, tools and work area KB13. food safety and hygiene KB14. knowledge on Food Safety Standards and Regulations (as per FSSAI) KB15. GMP KB16. HACCP
<b>Skills (S)</b>	
<b>B. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	The user/ individual on the job needs to know and understand how to: SA1. note the information communicated by the supervisor SA2. note the raw materials used for production and the finished products produced SA3. note the readings of the process parameters and provide necessary information to fill the process chart SA4. note down observations (if any) related to the process SA5. write information documents to internal departments/ internal teams SA6. note down the data for ERP or as required by the organization
	<b>Reading Skills</b>
	The user/individual on the job needs to know and understand how to: SA7. read and interpret the process required for producing various types of products SA8. read and interpret and process flowchart for all products produced SA9. read equipment manuals and process documents to understand the equipment operation and process requirement SA10. read internal information documents sent by internal teams
<b>B. Professional Skills</b>	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/individual on the job needs to know and understand how to : SA11. discuss task lists, schedules and activities with the supervisor SA12. effectively communicate with the team members SA13. question the supervisor in order to understand the nature of the problem and to clarify queries SA14. attentively listen and comprehend the information given by the speaker SA15. communicate clearly with the supervisor and cross department team on the issues faced
<b>B. Professional Skills</b>	<b>Decision Making</b>
	The user/individual on the job needs to know and understand how to: SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue SB2. handle issues in case the supervisor is not available (as per the authority matrix defined by the organization)

**FIC/N5003**
**Produce baked products in industrial units**

	<b>Plan and Organize</b>
	The user/individual on the job needs to know and understand how to:
	SB3. plan and organize the work order and jobs received from the supervisor
	SB4. organize raw materials and packaging materials required for all products following the instruction provided by the supervisor
	SB5. plan and prioritize the work based on the instructions received from the supervisor
	SB6. plan to utilise time and equipment's effectively
	SB7. organize all process/ equipment manuals so as to access information easily
	SB8. support the supervisor in scheduling tasks for helper(s)
	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to:
	SB9. understand customer requirements and their priority and respond as per their needs
	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to:
	SB10. support supervisor in solving problems by detailing out problems
	SB11. discuss the possible solutions with the supervisor for problem solving
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to:
	SB12. apply domain information about maintenance Processes and technical knowledge about tools and equipment
	<b>Critical Thinking</b>
	The user/individual on the job needs to know and understand how to:
	SB13. use common sense and make judgments on day to day basis
	SB14. use reasoning skills to identify and resolve basic problems
	SB15. use intuition to detect any potential problems which could arise during operations
	SB16. use acquired knowledge of the process for identifying and handling issues



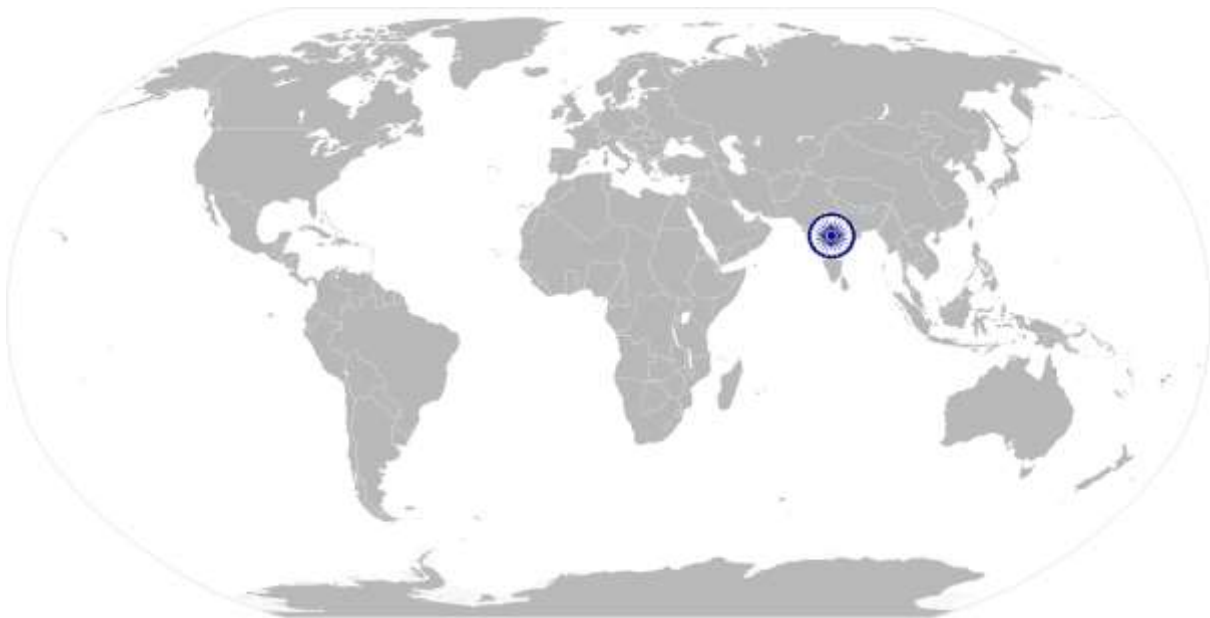
**FIC/N5003**

**Produce baked products in industrial units**

## **NOS Version Control**

NOS Code	FIC/N5003		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processsing	Drafted on	23/06/2015
Industry Sub-sector	Bread and Bakery	Last reviewed on	03/07/2015
Occupation	Processing	Next review date	02/07/2016

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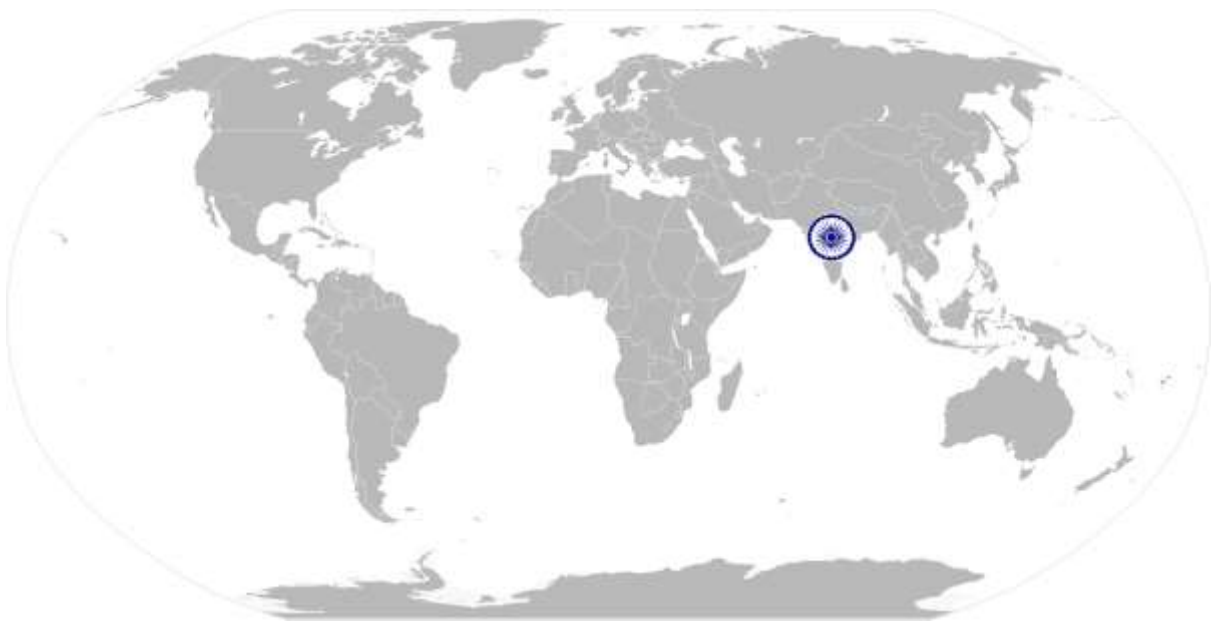


**FIC/N5004**

**Complete documentation and record keeping related to production of baked products in industrial units**

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# National Occupational Standard



## Overview

This OS unit is about documenting and maintaining records on raw materials, process and finished products for baked products in industrial units.

**FIC/N5004 Complete documentation and record keeping related to production of baked products in industrial units**

National Occupational Standard

<b>Unit Code</b>	<b>FIC/N5004</b>
<b>Unit Title(Task)</b>	<b>Complete documentation and record keeping related to production of baked products in industrial units</b>
<b>Description</b>	This unit is about documenting and maintaining records of raw materials, process and finished products for baked products in industrial units.
<b>Scope</b>	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> <li>Document and maintain records of raw materials ( for production of baked products in industrial units)</li> <li>Document and maintain record of production schedule and process parameters ( for production of baked products in industrial units)</li> <li>Document and maintain record of finished products ( for production of baked products in industrial units)</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Document and maintain record of raw material ( for production of baked products in industrial units)</b>	<p>PC1. document and maintain record of details of all raw materials used such as names of raw materials, supplier details, receiving date/ date of manufacture, expiry date, supplier quality document, quality parameters for all raw materials, internal quality analysis report, etc., as per organization standards</p> <p>PC2. maintain record of observations (if any) related to raw materials and packaging materials</p> <p>PC3. load the raw material details in computer or in the erp system followed by the organization for future reference</p> <p>PC4. verify the documents and track from finished product to raw materials, in case of quality concerns and during quality management system audits</p>
<b>Document and maintain record of production schedule and process parameters ( for production of baked products in industrial units)</b>	<p>PC5. document and maintain records of production details such as the product produced, production sequence, equipment and machinery details, efficiency and capacity utilization of equipment, etc.</p> <p>PC6. document and maintain records of process details such as type of raw material used, process parameters (temperature, time etc. as applicable) for the entire process in process chart or production log for all products produced</p> <p>PC7. document and maintain record of batch size, raw material used, yield after each stage of process, wastage, energy utilization and final products produced</p> <p>PC8. maintain record of observations or deviations (if any) related to production and process parameters</p> <p>PC9. load the production and process parameter details in computer or in the ERP system followed by the organization for future reference</p> <p>PC10. verify documents and track them from finished product to raw materials, in case of quality concerns, and during quality management system audits</p>
<b>Document and maintain records of the finished products(for</b>	<p>PC11. document and maintain records of the types of finished products produced</p> <p>PC12. document and maintain records of finished products details such as name of the product, batch number, time of packing, date of manufacture, date of expiry, other label details, primary and secondary packaging materials for all</p>



**FIC/N5004 Complete documentation and record keeping related to production of baked products in industrial units**

<b>production of baked products in industrial units)</b>	<p>finished products, storage conditions, etc., as per organization standards</p> <p>PC13. maintain record of observations or deviations (if any) related to finished products</p> <p>PC14. load the finished product details in computer or in the ERP system followed by the organization for future reference</p> <p>PC15. verify the documents and track them from finished product to raw materials, in case of quality concerns, and during quality management system audits</p>
<b>Knowledge and Understanding (K)</b>	
<b>D. Organizational Context</b> (Knowledge of the organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. organization standards, process standards and procedures followed in the organization</p> <p>KA2. types of products produced by the organization</p> <p>KA3. code of business conduct</p> <p>KA4. dress code to be followed</p> <p>KA5. job responsibilities/duties and standard operating procedures</p> <p>KA6. internal processes such as procurement, store management, inventory management, quality management and key contact points for query resolution</p> <p>KA7. provision of wages, working hours as per organization policy</p> <p>KA8. food safety and hygiene standards followed</p>
<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. documentation system followed in the organization such as production chart, process chart and finished goods chart</p> <p>KB2. details of raw materials and finished products to be recorded</p> <p>KB3. details of production plan and process parameters to be recorded</p> <p>KB4. methods to record and maintain record of observations (if any) related to raw materials, process and finished products</p> <p>KB5. method to track back the record from finished product to raw material</p> <p>KB6. knowledge on Food Safety Standards and Regulations (as per FSSAI)</p> <p>KB7. enter details in ERP system followed by the organization</p>
<b>Skills (S)</b>	
<b>C. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. note the information communicated by the supervisor</p> <p>SA2. note the raw materials used for production and the finished products produced</p> <p>SA3. note the readings of the process parameters and provide necessary information to fill the process chart</p> <p>SA4. note down observations (if any) related to the process</p> <p>SA5. write information documents to internal departments/ internal teams</p> <p>SA6. note down the data for ERP or as required by the organization</p>
	<b>Reading Skills</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA7. read and interpret the process required for producing various types of products</p>

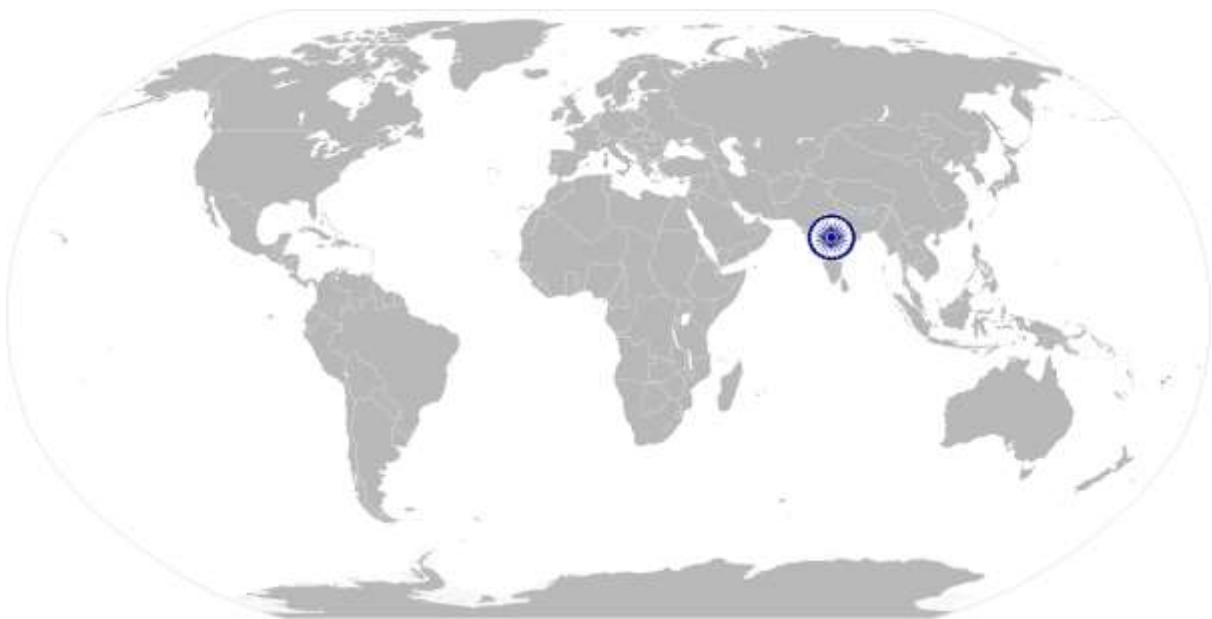
**FIC/N5004**

**Complete documentation and record keeping related to production of baked products in industrial units**

	<p>SA8. read and interpret and process flowchart for all products produced</p> <p>SA9. read equipment manuals and process documents to understand the equipment operation and process requirement</p> <p>SA10. read internal information documents sent by internal teams</p>
	<p><b>Oral Communication (Listening and Speaking skills)</b></p> <p>The user/individual on the job needs to know and understand how to :</p> <p>SA11. discuss task lists, schedules and activities with the supervisor</p> <p>SA12. effectively communicate with the team members</p> <p>SA13. question the supervisor in order to understand the nature of the problem and to clarify queries</p> <p>SA14. attentively listen and comprehend the information given by the speaker</p> <p>SA15. communicate clearly with the supervisor and cross department team on the issues faced</p>
<b>B. Professional Skills</b>	<p><b>Decision Making</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue</p> <p>SB2. handle issues in case the supervisor is not available (as per the authority matrix defined by the organization)</p>
	<p><b>Plan and Organize</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB3. plan and organize the work order and jobs received from the supervisor</p> <p>SB4. organize raw materials and packaging materials required for all products following the instruction provided by the supervisor</p> <p>SB5. plan and prioritize the work based on the instructions received from the supervisor</p> <p>SB6. plan to utilise time and equipment's effectively</p> <p>SB7. organize all process/ equipment manuals so as to access information easily</p> <p>SB8. support the supervisor in scheduling tasks for helper(s)</p>
	<p><b>Customer Centricity</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB9. understand customer requirements and their priority and respond as per their needs</p>
	<p><b>Problem Solving</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB10. support supervisor in solving problems by detailing out problems</p> <p>SB11. discuss the possible solutions with the supervisor for problem solving</p>
	<p><b>Analytical Thinking</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB12. apply domain information about maintenance Processes and technical knowledge about tools and equipment</p>
	<p><b>Critical Thinking</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB13. use common sense and make judgments on day to day basis</p> <p>SB14. use reasoning skills to identify and resolve basic problems</p> <p>SB15. use intuition to detect any potential problems which could arise during</p>

**FIC/N5004      Complete documentation and record keeping related to production of baked products in industrial units**

	operations SB16. use acquired knowledge of the process for identifying and handling issues
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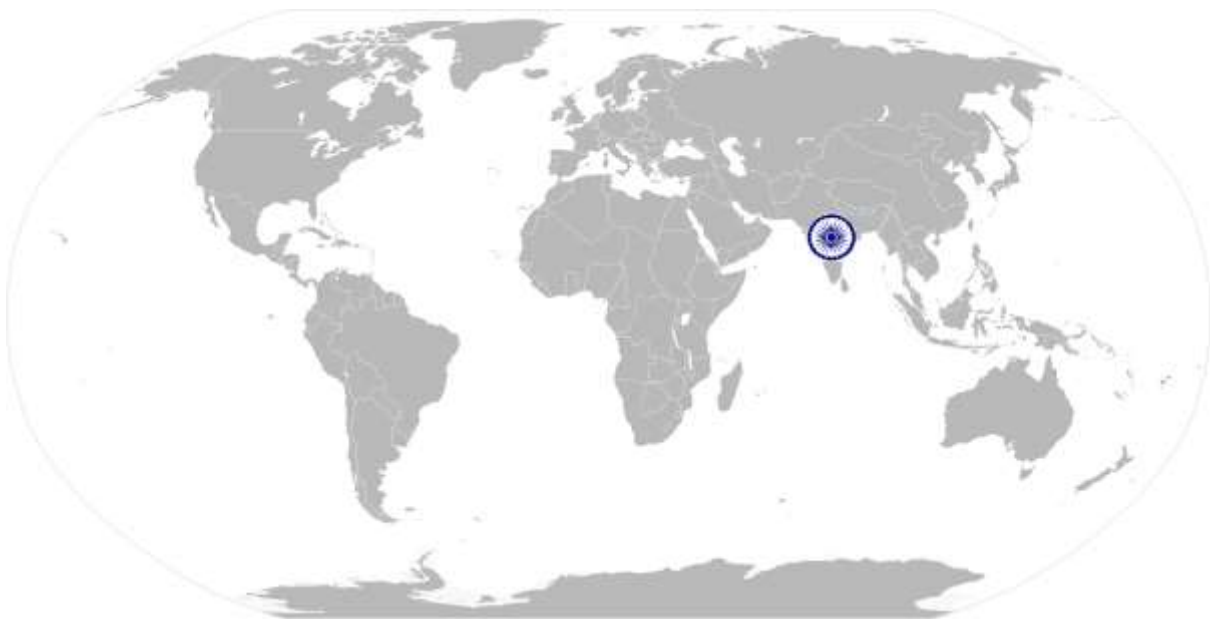


**FIC/N5004**      **Complete documentation and record keeping related to production of baked products in industrial units**

## **NOS Version Control**

NOS Code	FIC/N5004		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	23/06/2015
Industry Sub-sector	Bread and Bakery	Last reviewed on	03/07/2015
Occupation	Processing	Next review date	02/07/2016

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# National Occupational Standard



## Overview

This OS unit is about maintaining food safety, hygiene and sanitation in work area and processing unit for processing food products

FIC/N9001

Food safety, hygiene and sanitation for processing food products

National Occupational Standard

Unit Code	FIC/N9001
Unit Title(Task)	Food safety, hygiene and sanitation for processing food products
Description	This unit is about maintaining food safety, hygiene and sanitation in work area and processing unit for processing food products
Scope	<p>The scope of this role will include:</p> <ul style="list-style-type: none"> <li>• Perform safety and sanitation related functions (for processing food products)</li> <li>• Apply food safety practices (for processing food products)</li> </ul>
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
<b>Perform safety and sanitation related functions (for processing food products)</b>	<p>PC1. comply with food safety and hygiene procedures followed in the organization</p> <p>PC2. ensure personal hygiene by use of gloves, hairnets, masks, ear plugs, goggles, shoes, etc.</p> <p>PC3. ensure hygienic production of food by inspecting raw materials, ingredients, finished products, etc. for compliance to physical, chemical and microbiological parameters</p> <p>PC4. pack products in appropriate packaging materials, label and store them in designated area, free from pests, flies and infestations</p> <p>PC5. clean, maintain and monitor food processing equipment periodically, using it only for the specified purpose</p> <p>PC6. use safety equipment such as fire extinguisher, first aid kit and eye-wash station when required</p> <p>PC7. follow housekeeping practices by having designated area for materials/tools</p> <p>PC8. follow industry standards like GMP and HACCP and product recall process</p> <p>PC9. attend training on hazard management to understand types of hazards such as physical, chemical and biological hazards and measures to control and prevent them</p> <p>PC10. identify, document and report problems such as rodents and pests to management</p> <p>PC11. conduct workplace checklist audits before and after work to ensure safety and hygiene</p> <p>PC12. document and maintain raw material, packaging material, process and finished products for the credibility and effectiveness of the food safety control system</p>
<b>Apply food safety practices (for processing food products)</b>	<p>PC13. determine the quality of food using criteria such as aroma, appearance, taste and best before date, and take immediate measures to prevent spoilage</p> <p>PC14. store raw materials, finished products, allergens separately to prevent cross-contamination</p> <p>PC15. label raw materials and finished products and store them in designated storage areas according to safe food practices</p> <p>PC16. follow stock rotation based on FEFO/ FIFO</p>
Knowledge and Understanding (K)	



**FIC/N9001**

**Food safety, hygiene and sanitation for processing food products**

<b>E. Organizational Context</b> (Knowledge of the organization and its processes)	The user/individual on the job needs to know and understand: KA1. organization standards, process standards and procedures followed in the organization KA2. types of products produced by the organization KA3. code of business conduct KA4. dress code to be followed KA5. job responsibilities/duties and standard operating procedures KA6. internal processes such as procurement, store management, inventory management, quality management and key contact points for query resolution KA7. provision of wages, working hours as per organization policy KA8. food safety and hygiene standards followed
<b>B. Technical Knowledge</b>	The user/individual on the job needs to know and understand: KB1. possible physical, chemical and biological hazards and methods of prevention of various hazards KB2. personal hygiene requirement KB3. different types of sanitizers used for process area, equipment and the procedure to use them KB4. knowledge on Food Safety Standards and Regulations (as per FSSAI) KB5. quality parameters and quality assessment based on physical parameters, basic food microbiology KB6. labelling/marketing requirements for raw materials, finished goods, stored materials, packaging materials and their designated storage area KB7. cleaning and sanitation of equipment and work area KB8. CIP and COP methods and procedures KB9. storage norms for raw materials, packaging material and finished products KB10. stock rotation of ingredients and finished products based on FEFO/FIFO KB11. method of maintaining safety check lists for all machineries KB12. GHP KB13. GMP KB14. HACCP
<b>Skills (S)</b>	
<b>D. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	The user/ individual on the job needs to know and understand how to: SA1. note the information communicated by the supervisor SA2. note the raw materials used for production and the finished products produced SA3. note the readings of the process parameters and provide necessary information to fill the process chart SA4. note down observations (if any) related to the process SA5. write information documents to internal departments/ internal teams SA6. note down the data for erp or as required by the organization
	<b>Reading Skills</b>
	The user/individual on the job needs to know and understand how to: SA7. read and interpret the process required for producing various types of products SA8. read and interpret and process flowchart for all products produced SA9. read equipment manuals and process documents to understand the equipment operation and process requirement

**FIC/N9001**

**Food safety, hygiene and sanitation for processing food products**

	SA10.read internal information documents sent by internal teams
	<b>Oral Communication (Listening and Speaking skills)</b>
	<p>The user/individual on the job needs to know and understand how to :</p> <p>SA11.discuss task lists, schedules and activities with the supervisor</p> <p>SA12.effectively communicate with the team members</p> <p>SA13.question the supervisor in order to understand the nature of the problem and to clarify queries</p> <p>SA14.attentively listen and comprehend the information given by the speaker</p> <p>SA15.communicate clearly with the supervisor and cross department team on the issues faced</p>
<b>B. Professional Skills</b>	<b>Decision Making</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue</p> <p>SB2. handle issues in case the supervisor is not available (as per the authority matrix defined by the organization)</p>
	<b>Plan and Organize</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB3. plan and organize the work order and jobs received from the supervisor</p> <p>SB4. organize raw materials and packaging materials required for all products following the instruction provided by the supervisor</p> <p>SB5. plan and prioritize the work based on the instructions received from the supervisor</p> <p>SB6. plan to utilise time and equipment's effectively</p> <p>SB7. organize all process/ equipment manuals so as to access information easily</p> <p>SB8. support the supervisor in scheduling tasks for helper(s)</p>
	<b>Customer Centricity</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB9. understand customer requirements and their priority and respond as per their needs</p>
	<b>Problem Solving</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB10. support supervisor in solving problems by detailing out problems</p> <p>SB11. discuss the possible solutions with the supervisor for problem solving</p>
	<b>Analytical Thinking</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB12. apply domain information about maintenance processes and technical knowledge about tools and equipment</p>
	<b>Critical Thinking</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB13. use common sense and make judgments on day to day basis</p> <p>SB14. use reasoning skills to identify and resolve basic problems</p> <p>SB15. use intuition to detect any potential problems which could arise during operations</p> <p>SB16. use acquired knowledge of the process for identifying and handling issues</p>



**FIC/N9001**

**Food safety, hygiene and sanitation for processing food products**

## **NOS Version Control**

<b>NOS Code</b>	<b>FIC/N9001</b>		
<b>Credits (NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
<b>Industry</b>	<b>Food Processing</b>	<b>Drafted on</b>	<b>23/06/2015</b>
<b>Industry Sub-sector</b>	<b>Bread and bakery</b>	<b>Last reviewed on</b>	<b>03/07/2015</b>
<b>Occupation</b>	<b>Processing</b>	<b>Next review date</b>	<b>02/07/2016</b>

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## Assessment Criteria

### CRITERIA FOR ASSESSMENT OF TRAINEES

**Job Role** Plant Baker

**Qualification Pack** FIC/Q5001

**Sector Skill Council** Food Processing

#### Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC
3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below)
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria
5. To pass the Qualification Pack, every trainee should score a minimum of 50% in every NOS and overall 50% pass percentage in every QP
6. To pass the Qualification Pack, every trainee should score a minimum of 33% in Theory and 50% in Practical
7. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack

		Marks Allocation			
		Total Marks	Out Of	Theory	Skills Practical
<b>1. FIC/N5001 (Prepare and maintain work area and process machineries for producing baked products in industrial units)</b>	PC1. Clean and maintain the cleanliness of the work area using approved sanitizers and keep it free from dust, waste, flies and pests	<b>100</b>	25	10	15
	PC2. Ensure that the work area is safe and hygienic for food processing		10	3	7
	PC3. Dispose waste materials as per standard operating procedures and industry requirements		15	5	10
	PC4. Check the working and performance of all machineries and tools used for production such as weighing scales, mixer/ kneader, dough divider, dough rounder, dough moulder, sheeting machine, rotary cutter, dough depositor, baking oven, packaging machines, etc.		15	5	10
	PC5. Clean the machineries and tools used with approved sanitizers following specifications and SOPs		15	5	10

### Assessment Criteria

	PC6. Place the necessary tools required for the process		5	2	3
	PC7. Attend minor repairs/ faults of machines, if required		15	5	10
			<b>100</b>	<b>35</b>	<b>65</b>
<b>2. FIC/N5002 (Prepare for production of baked products in industrial units)</b>	PC1. Read and understand the production order from the supervisor	<b>100</b>	10	4	6
	PC2. Refer to the process chart/ product flow chart/formulation chart for the product(s) to be produced		10	4	6
	PC3. Organize raw materials and ingredients required for production of products in the work order		10	4	6
	PC4. Check the quality documents from supplier/internal lab for each raw materials and ingredient required for products to be produced, for its conformance to organization standards		10	4	6
	PC5. Check the quality of raw materials and ingredients through physical parameters such as appearance, colour, aroma texture, etc.		10	3	7
	PC6. Check and ensure the cleaning and maintenance of the machineries required for production		8	3	5
	PC7. Calibrate equipments such as weighing scale following methods defined by the organization		8	3	5
	PC8. Change dies, moulds, blades and other parts of machineries, if required		8	2	6
	PC9. Start each machine and check and ensure its working and performance		8	2	6
	PC10. Make minor adjustments or repairs (if required)		8	2	6
	PC11. Keep tools accessible to attend repairs/faults in case of breakdown		5	2	3
	PC12. Allot responsibilities/ work to the assistants and helpers		5	2	3
			<b>100</b>	<b>35</b>	<b>65</b>

### Assessment Criteria

<b>3. FIC/N5003 (Produce baked products in industrial units)</b>	PC1.	Refer to the production order and formulation for the product/SKU, and organize all the ingredients required for the product/batch	<b>100</b>	2	0.5	1.5
	PC2.	Check the quality of each ingredient through physical parameters such as appearance, colour, aroma, texture etc. for its conformance to SOP (Standard Operating Procedure)		3	1	2
	PC3.	Set and control metering devices that measure each ingredient as per the formulation, and check the scale indicators to confirm if the specified amount of ingredients have been added		2	0.5	1.5
	PC4.	Start flour sifter and pre-mixer to blend ingredients		3	1	2
	PC5.	Transfer all the ingredients together or sequentially into the mixing machine, and set the mixer speed, time and temperature depending on the mixing process, following the SOP		2	0.5	1.5
	PC6.	Start the mixing machine to knead/mix the ingredients and observe dials and recording instruments to verify dough temperature, viscosity of batter, speed and time of mixing		2	0.5	1.5
	PC7.	Check and feel the dough/batter to ascertain its consistency meets the standard, and unload dough/ batter in the trough/ hopper		3	1	2
	PC8.	Set and maintain temperature, humidity of fermentation chamber/room, transfer dough into fermentation chamber/room and allow to stand for specified time for fermentation		2	0.5	1.5
	PC9.	Check the fermented dough at regular intervals for required consistency		2	0.5	1.5
	PC10.	Transfer the fermented dough into the mixer for second stage mixing following the SOP, set the speed and time of the mixer and start to mix the fermented dough		2	1	1

## Assessment Criteria

	PC11. Transfer the dough into the trough/hopper and load the dough onto the dough divider and adjust controls to set speed of the divider and start divider blades that cut off specified weight of dough and drop onto the conveyor		2	1	1
	PC12. Set and control the speed of the divider conveyor that pass the dough through the line that shapes the dough into balls, dust with flour and transport the shaped dough to the moulder conveyor without sticking		2	1	1
	PC13. Weigh the dough balls at regular intervals to check its conformance to standards		2	1	1
	PC14. Load or ensure loading (by helpers) of specified size baking moulds/ pans on the panning conveyor and ensure that speed of the moulder and conveyor are synchronised to allow smooth passage of dough		2	0.5	1.5
	PC15. Allow the dough to pass through moulding line that fold and roll the dough to desired shape and allow the shaped dough to arrange in the baking moulds/ pans passing on the panning conveyor		2	1	1
	PC16. Set and control the speed of the conveyor that take the moulded dough into the proofer and turn controls to set the temperature, relative humidity of the proofer following the SOP		2	1	1
	PC17. Monitor the proofed dough passing out of the proofer to confirm it has rise to specified height		2	1	1
	PC18. Load the dough trough containing dough, in the elevator and start the elevator to lift the dough trough and dump the dough in the dough feeder (if dough feeder is in the elevated position)		2	1	1
	PC19. Set the controls of each roller of the laminator machine and start the machine to produce continuous sheet of dough		2	1	1

### Assessment Criteria

	PC20. set the controls of rotary cutter machine to cut the sheet of dough to desired size, shape and design and set the controls of the separating machine to separate the cut dough and control scrap return		5	2	3
	PC21. Observe operation of laminator, rotary cutter and separating machine, and remove malformed biscuit shapes and control scrap return		3	1	2
	PC22. Load topping materials like salt, sugar, choco chips etc in sprinkler machine following the SOP for the product/SKU and set the controls of the machines to sprinkle measured quantity of topping material over the cut dough		2	0.5	1.5
	PC23. Prepare the baking pans by placing the paper liners in the moulds of the baking pans		2	0.5	1.5
	PC24. Adjust controls of the batter depositor machine to fill measured quantity of batter into the moulds of baking pans		2	0.5	1.5
	PC25. Start the conveyor and control speed such that the moulds of the baking pans are positioned below the filling nozzle of the batter depositor machine		2	0.5	1.5
	PC26. Start machine to pump measured quantity of batter into the moulds of the baking pans		2	0.5	1.5
	PC27. Fill the topping materials such as fruits, nuts, chocolate chips, etc. in the topping machine following the SOP for the product/SKU and start the topping machine to deposit measured quantity of topping materials on the batter in the baking pans		3	1	2
	PC28. Check the weight of the filled moulds at regular intervals to ensure its conformance to standards		5	2	3
	PC29. Set the oven parameters such as baking temperature, baking time, speed of the panning conveyor etc., and monitor and control the dough/batter filled baking pans		5	2	3

### Assessment Criteria

	entering the oven (tunnel oven)				
	PC30. Observe baking of products through the observation window of the tunnel oven and monitor the oven parameters during the entire baking process		3	1	2
	PC31. Observe the product coming out the oven for its quality through physical parameters such as colour, aroma, texture etc. to detect burning /over baking/under baking and accordingly control oven parameters to achieve finished product of uniform quality, and remove the non-conforming products from the conveyor		2	0.5	1.5
	PC32. Check the quality of the finished products (bread, biscuit and cake) through physical parameters such as colour, size, appearance, texture, aroma, etc. and compare against standard		2	0.5	1.5
	PC33. Control the vacuum system that remove the baked product from the baking moulds/ pans through suction		2	0.5	1.5
	PC34. Set, control and maintain speed of the cooling conveyor and fans to cool the finished products and ensure the products are cooled to the required temperature		2	1	1
	PC35. Check the weight of finished product periodically and ensure its conformance to standards		2	1	1
	PC36. Adjust controls of the conveyor and slicer to allow the bread loaves/cakes to pass through slicer and ensure it is cut to required thickness		2	1	1
	PC37. Adjust controls to allow the finished products to move to the automatic packaging machine		2	0.5	1.5
	PC38. Sample the packed product and transfer to quality lab for analysis		2	0.5	1.5
	PC39. Report discrepancies/concerns in each stage of production to department supervisor for immediate action		3	1	2

### Assessment Criteria

	PC40. Clean the work area, machineries, equipment and tools using recommended cleaning agents and sanitizers		2	0.5	1.5
	PC41. Attend minor repairs/faults of all machines (if any)		2	0.5	1.5
	PC42. Ensure periodic (daily/weekly/monthly/quarterly/half yearly/annual) maintenance of all machines and equipment following the SOP or following suppliers instructions/manual		2	0.5	1.5
			<b>100</b>	<b>35</b>	<b>65</b>
<b>4. FIC/N5004 ( Complete documentation and record keeping related to production of baked products in industrial units)</b>	PC1. Document and maintain record of details of all raw materials used such as names of raw materials, supplier details, receiving date/ date of manufacture, expiry date, supplier quality document, quality parameters for all raw materials, internal quality analysis report, etc., as per organization standards	<b>100</b>	10	6	4
	PC2. Maintain record of observations (if any) related to raw materials and packaging materials		5	3	2
	PC3. Load the raw material details in computer or in the ERP system followed by the organization for future reference		5	3	2
	PC4. Verify the documents and track from finished product to raw materials, in case of quality concerns and during quality management system audits		5	3	2
	PC5. Document and maintain records of production details such as the product produced, production sequence, equipment and machinery details, efficiency and capacity utilization of equipment, etc.		10	6	4
	PC6. Document and maintain records of process details such as type of raw material used, process parameters (temperature, time etc. as applicable) for the entire process in process chart or production log for all products produced		15	9	6
	PC7. Document and maintain record of batch size, raw material used, yield		10	6	4



### Assessment Criteria

	after each stage of process, wastage, energy utilization and final products produced			
	PC8. Maintain record of observations or deviations (if any) related to production and process parameters		5	3
	PC9. Load the production and process parameter details in computer or in the ERP system followed by the organization for future reference		5	3
	PC10. Verify documents and track them from finished product to raw materials, in case of quality concerns, and during quality management system audits		5	3
	PC11. Document and maintain records of the types of finished products produced		5	3
	PC12. Document and maintain records of finished products details such as name of the product, batch number, time of packing, date of manufacture, date of expiry, other label details, primary and secondary packaging materials for all finished products, storage conditions, etc., as per organization standards		5	3
	PC13. Maintain record of observations or deviations (if any) related to finished products		5	3
	PC14. Load the finished product details in computer or in the ERP system followed by the organization for future reference		5	3
	PC15. Verify the documents and track them from finished product to raw materials, in case of quality concerns, and during quality management system audits		5	3
			<b>100</b>	<b>60</b>
				<b>40</b>
<b>5. FIC/N9001 (Food safety hygiene and sanitation for processing food products)</b>	PC1. Comply with food safety and hygiene procedures followed in the organization		5	2
	PC2. Ensure personal hygiene by using of gloves, hairnets, masks, ear plugs, goggles, shoes, etc.		6	1

### Assessment Criteria

PC3. Ensure hygienic production of food by inspecting raw materials, ingredients, finished products, etc. for compliance to physical, chemical and microbiological parameters
PC4. Pack products in appropriate packaging materials, label and store them in designated area, free from pests, flies and infestations
PC5. Clean maintain and monitor food processing equipment periodically, using it only for specified purpose
PC6. Use safety equipment such as fire extinguisher, first aid kit and eye-wash station when required
PC7. Follow housekeeping practices by having designated area for materials/tools
PC8. Follow industry standards like GMP and HACCP and product recall process
PC9. Attend training on hazard management to understand types of hazards such as physical, chemical and biological hazards and measures to control and prevent them
PC10. Identify, document and report problems such as rodents and pests to management
PC11. Conduct workplace checklist audits before and after work to ensure safety and hygiene
PC12. Document and maintain raw material, packaging material, process and finished products for the credibility and effectiveness of the food safety control system
PC13. Determine the quality of food using criteria such as aroma, appearance, taste and best before date, and take immediate measures to prevent spoilage
PC14. Store raw materials, finished products, allergens separately to prevent cross-contamination
PC15. Label raw materials and finished products and store them in

100

5	2	3
10	4	6
5	2	3
10	4	6
5	2	3
10	4	6
5	1	4
5	1	4
5	1	4
4	1	3
5	2	3
5	2	3
5	2	3

### Assessment Criteria

	designated storage areas according to safe food practices				
	PC16. Follow stock rotation based on FEFO / FIFO		10	4	6
			<b>100</b>	<b>35</b>	<b>65</b>

# *Semester III*

**CORE III - FOOD PROCESSING II**  
**Technology of Fruits and Vegetables, Sugar and Salt)**

**SUB.CODE: 15BFSNC03**  
**MAX.MARK: 100**

**HOURS: T+P=C**  
**3+0=3**

**Objectives:**

- To know about different practices used in post harvest management of fruits and vegetables; manufacturing process of sugar and salt.

S. No.	Topics/Modules	Key Learning Outcomes	Duration in Hrs
1.	Fruits and Vegetables	a) Water activity and fruit spoilage, minimally processed fruits and vegetables, intermediate moisture fruits and vegetables – principle, methods and products.	5
		b) Preservation by use of high temperature- pasteurization, sterilization, canning – principles, steps involved and advantages, defects in canning and spoilage of canned foods.	5
		c) Preservation by use of low temperature - refrigeration – principles, refrigerants, changes in refrigerated food, factors affecting the quality of refrigerated products, spoilage of refrigerated products and maintenance of refrigerator.	5
		d) Preservation by use of very low temperature- freezing – principle and steps in freezing, methods and types of freezing, advantages and disadvantages, frozen products.	5
		e) Preservation by drying and dehydration – difference between drying and dehydration, preparation of food for drying, methods of drying, types of drier, methods of dehydration, dried and dehydrated products.	5
		f) Preservation by sugar – principle of gel formation, method of preparation, FSSAI, AGMARK, and ISO standards for Jam, Jelly, marmalade, candy, preserve, unfermented fruit beverages – squash, RTS beverages, cordial, syrup, fruit juice concentrate.	5
		g) Preservation by chemicals – principle, permitted chemical preservative in food processing, clarification of fruit Juices, application in value added fruits and vegetable products.	5
		h) Preservation by salts and acids – principle, pickle, sauce and ketch up.	4
2.	Sugar	a) Sugars- types and sources, methods of preparation of sugars, jaggery, khandsari, raw and refined sugar, principles of sugar cookery.	5
		b) Confectionery - history, types, classification, role of sugar in confectionery, role of chemical additives in confectionery.	3
		c) Preparation of caramel, toffee, candy, chewing gum,	2

		bubble gum and chocolates.	
3.	Salt	Types of salt, uses of salt – brine, preparation of brines, composition of brines used in canning, pickling and curing.	5
<b>Total Duration</b>			<b>54</b>

**References:**

1. Raina et.al. (2003). Basic Food Preparation-A complete Manual. 3rd Ed. Orient Longman Pvt. Ltd.
2. Manay, S. & Shadaksharaswami, M. (2004). Foods: Facts and Principles, New Age Publishers.
3. Beckett S.T. (2009). Industrial Chocolate Manufacture, Blackwell Publishing Ltd.
4. Minifie B.W. (1999). Chocolate, Cocoa and Confectionary, Aspen Publication.
5. Mohini Sethi, Eram Rao (2011) Food science- Experiments and applications, 2nd ed., CBS publishers & Distributors pvt ltd.
6. Girdharilal, Siddappa, G.S and Tandon, G.L. 1998. Preservation of fruits & Vegetables, ICAR, New Delhi
7. W B Cruse. (2004). Commercial Unit and Vegetable Products, W.V. Special Indian Edition, Pub: Agrobios India

**CORE IV - FOOD PROCESSING -III**  
(Technology of Milk, Egg and Fleshy Foods)

**SUB.CODE: 15BFSNC04**  
**MAX.MARK: 100**

**HOURS: T+P=C**  
**3+0=3**

**Objectives**

1. To enable the students to learn about processing and preservation technology of milk, egg, meat and poultry products

S. No.	Topics/Modules	Key Learning Outcomes	Duration in Hrs
1.	Milk	a. Raw Milk handling – Buying and collection of milk, cooling and transportation of milk, receiving, preheating, filtration, clarification, cooling and storage of raw milk.	3
		b. Milk processing – standardization, pasteurization vacuum pasteurization, homogenization, ultra filtration and reverse osmosis.	5
		c. Milk products – cream, butter, butter oil, special milks – sterilized milk, homogenized milk, soft curd milk, flavoured milk, fermented milk, yoghurt, cheese, ice cream, ghee, Khoa, Chhana, Paneer, Dahi, Shrikhand, Kheer, Rabri, Kulfi and Lassi, casein powder (edible) and milk powder.	8
2.	Egg	Preservation of shell eggs, egg cleaning, oil treatment, cold storage, thermo stabilisation, immersion in liquids, preservation of albumin and yolk powder production.	5
3.	Fleshy foods	a. Preslaughter care requirements, ante mortem examination of animal, slaughtering of meat – scientific methods of slaughter, ritual, religious methods of slaughter, dressing and cutting of carcass in sheep, pig, buffalo and poultry.	4
		b. Post mortem examination of carcass, grading and packaging of meat, post mortem changes in meat, methods of tenderization and factors affecting tenderization.	3
		c. Meat preservation – chilling, freezing, curing, smoking, canning, dehydration, irradiation and hurdle concept.	5
		d. Meat and poultry products – meat emulsion, sausage, patties, roll, loaves, luncheon meats, meat balls, nuggets, fermented sausages, ham and bacon, indigenous meat products, cured meats, canned products, restricted meat products, sectioned and formed meat products, intermediate moisture meat product.	8



4.	Fishes and Marine products	a. Onboard handling – Handling, washing, sorting, Evisceration, removal of gills, bleeding icing, bulking, shelving and boxing	3
		b. Processing – postmortern changes, drying, dehydration, smoking, marination, salting, canning, fermentation, freezing, chemical treatments, low dose irradiation, high pressure treatment, MAP, vaccum packaging, gas packaging, hurdle concept	5
		c. Value added Fish and marine products – minced fish, fish finger, surimi, fish burger, fish protein concentrates, flakes, fish oils, chitin, chitosan, seaweeds, shark fin and fin rays.	5
Total Duration			54

### References

1. Lawrie R A, Lawrie's Meat Science, 5th Ed, Woodhead Publisher, England, 1998
2. Parkhurst & Mountney, Poultry Meat and Egg Production, CBS Publication, New Delhi, 1997
3. Pearson & Gillet Processed Meats, 3 Ed, CBS Publication, New Delhi, 1997
4. Shai Barbut, Poultry Products Processing, CRC Press 2005
5. Stadelman WJ, Owen J Cotterill Egg Science and Technology, 4th Ed. CBS Publication New Delhi, 2000
6. Hall GM, Fish Processing Technology, VCH Publishers Inc., NY, 1992
7. Sen DP, Advances in Fish Processing Technology, Allied Publishers Pvt. Limited 2005

**ALLIED PAPER III - FOOD PRODUCT DEVELOPMENT AND MARKETING- I**

**SUB.CODE: 15BFSNA03**  
**MAX.MARKS: 100**

**HOURS T+P=C**  
**1+2=2**

**Objectives**

- To develop innovative food product based of locally available raw materials.
- To standardize the developed product and evaluate sensory attributes.

<b>S.No</b>	<b>Topic/Module</b>	<b>Key Learning Outcome</b>	<b>Duration in Hrs</b>
1	Market survey of existing various products	i. Market analysis of ready to serve, ready to cook, ready mix and health mix powders using questionnaire	12
2	Raw material availability survey	i. Availability of raw materials for a new product	6
3	Product formulation	i. Aim of the product ii. Product formula iii. Equipments and utensils required iv. Manufacturing protocol v. Nutritive value calculation vi. Discussion	12
4	Assessment on innovative concept in product	i. Innovative concept in product formula ii. Innovative concept in manufacturing protocol	6
5	Product standardisation	i. Standardisation of finished product (portion size and number of servings)	6
6	Assessment of product feasibility	i. Financial, technical and marketing perspective	6
7	Sensory evaluation of the new developed product	i. Subjective ii. objective	6
<b>Total Duration</b>			<b>54</b>

**References**

1. Usha Chandrasekhar, 2002, Food science and application in Indian Cookery, 1<sup>st</sup> Edition.
2. M Earle, R Earle , A Anderson, Sep 2001, Food product development, 1<sup>st</sup> Edition.
3. Srilakshmi, 2016, Food science, 7<sup>th</sup> Edition.

**CORE PAPER V - FOOD PROCESSING AND PRESERVATION PRACTICAL – I**

**SUB.CODE: 15BFSNC05**  
**MAX.MARKS: 100**

**HOURS T+P=C**  
**1+2=2**

**Objectives**

- To learn how to preserve non perishable and perishable food items by using preservative and processing techniques.

S.No	Topic/Module	Key Learning Outcomes	Duration in Hrs
1	Non – perishable items	i. Preparation of puffed and popped cereals; papads	9
		ii. Preparation of health mixes	6
		iii. Preparation of ice cream cone	6
		iv. Preparation of masala powders	9
		v. Preparation of ready mixes	6
		vi. Preparation of extruded products	9
2	Semi – perishable items	i. Preparation of enrobed mix for fleshy foods	9
<b>Total Duration</b>			<b>54</b>

**Reference**

1. Dauthy, M.E. 1995, fruit and vegetable processing, FAO Agricultural services Bulletin, 119, Rom.
2. Desrosier N.W. 1973, The technology of food preservation. The AV publishing co. inc. wet poet, Connecticut.

## ELECTIVE PAPER I - NUTRITIONAL CHEMISTRY

SUB.CODE: 15BFSNEL01  
MAX.MARKS: 100

HOURS: T+P=C  
2+1=2

### Objectives

- To gain knowledge on classification, properties and functional characteristics of nutrients in food.

S.No.	Topics/Modules	Key Learning Outcomes	Duration in Hrs
1.	Colloids and Water	a. Colloids - definition, types, properties & uses in food system. b. Water- Structure, Functions of water, Hydrogen bonding, Types of water in foods, Water content in foods; Water activity- Definition, Relationship between water activity and water, Effect of water activity on food safety, Analysis of water and water activity.	2 5
2.	Carbohydrates	a. Carbohydrates - classification, sources, structure, functions, physico-chemical reactions - Hygroscopicity & solubility, optical rotation, maillard reaction, caramalisation, gelatinization, dextrinization and retrogradation. b. Fibre - classification, sources, functional properties and uses.	10 3
3.	Proteins	classification, sources, structure, functions of proteins, physico-chemical reactions of protein in food system- dissociation, denaturation, hydration, swelling, foam formation & stabilisation, emulsification, amino acid in Maillard reaction.	10
4.	Lipids	Classification, sources, functions; Fatty acid – Classification, structure and properties, physico-chemical reactions – isomerisation, hydrogenation, unsaturation, inter-esterification, emulsification, auto-oxidation and rancidity.	10
5.	Vitamins	classification, sources and functions of vitamins in food.	5
6.	Minerals	classification, sources and functions of minerals in food.	5
7.	Phytochemicals	Phyto nutrients and bio active compounds – classification, sources and its functions	4
<b>Total Duration</b>			<b>54</b>

### References:

- Coultatte, T.O., "Food – The Chemistry of Components", Rsc, Royal Society of Chemistry.
- Iqbal.s.a., Mido.Y, " Food Chemistry" Discovered Publishing Houses, New Delhi, 2005.
- Lilian hoagland Meyer, " Food Chemistry", CBS Publishers and Distributors, 4596/1-A, 11 Darya Ganj, New Delhi- 110 002 (India).
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# *Semester IV*

## Core VI- Food Quality Control

SUB. CODE:15BFSNC06

MAX.MARKS: 100

HOURS T+P=C

3+0=3

### Objectives

- To provide a basic understanding of safety, quality concepts and practice in food industries
- To plan and organize a quality control system
- To provide basic acquaintance with standards and specifications

S.No.	Topics/Modules	Key Learning Outcomes	Duration in Hrs
1.	Introduction to food Safety and sanitation	<ul style="list-style-type: none"><li>• Definition of food safety and hazard, types of hazards – physical, chemical and biological hazards and management of hazards</li><li>• Hygiene and sanitation in food industries – physical and chemical contaminants in food chain, control methods using physical and chemical agents, waste disposal, pest and rodent control and personnel hygiene</li></ul>	6
2.	Introduction to food quality	<ul style="list-style-type: none"><li>• Definition of food quality, quality concepts, quality perception, quality attributes – physical, chemical, nutritional and sensory and its role in food quality</li><li>• Objectives, importance and functions of quality control</li></ul>	12
3.	Food quality assessment	<ul style="list-style-type: none"><li>• Quality assessment of cereals and legumes, fruits and vegetables, dairy products, meat, poultry, egg and processed food products</li><li>• Sensory evaluation of food quality –introduction, panel screening, selection of panel members, methods of sensory evaluation</li><li>• Statistical quality control of foods</li><li>• Consumer studies – types of consumer studies, factors influencing consumer survey, comparison of laboratory panels with consumer panels, limitations of consumer survey</li></ul>	12
4.	Food quality management	<ul style="list-style-type: none"><li>• Objectives, importance and functions of quality control and quality assurance</li><li>• Quality management systems in India</li><li>• Food safety management tools – Basic concept, GHPs, GMPs, HACCP, ISO series, TQM, risk analysis, Accreditation and Auditing</li><li>• Core developments in food quality management</li></ul>	12
5.	Food laws and legislations	<ul style="list-style-type: none"><li>• Food grades and standards</li><li>• Different existing food legislations</li><li>• International food regulations and certifications</li><li>• Indian food regulations and certifications</li></ul>	12
Total Duration			54

**References:**

1. Philip. A.C. Reconceptualizing Quality. New Age International Publishers, Bangalore. 2001
2. Bhatia, R. AbdIchhpiyan, R.L. Quality assurance in microbiology. CBS publishers and Distributors, New Delhi. 2004.
3. Kher, C.P. Quality Control for the food Industry. ITC Publishers. Geneva. 2000
4. Gould, W.A and Gould, R.W. (1998). Total Quality Assurance for the Food Industries, CTI Publications Inc. Baltimore.
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**Core VII – Instrumentation and Process Control****SUB.CODE: 15BFSNC07****MAX.MARKS: 100****HOURS T+P=C****3+0=3****Objectives**

- To acquaint knowledge on fundamentals of food processing equipments and its process control
- To provide sound knowledge in the basic concepts of process control and automation in a food processing unit

S.No.	Topics/Modules	Key Learning Outcomes	Duration in Hrs
1.	Unit operations in food processing	<ul style="list-style-type: none"><li>• classifications; Design and selection of Food Processing equipments</li><li>• Mechanical transport equipment- pumps, process piping and valves, conveyors</li><li>• Food storage equipment – solid and liquid food storage equipments</li><li>• Mechanical processing equipment - peelers, dehullers / dehuskers, size reduction- slicers/ dicers, mincers, cutters, crushers and grinders; Size enlargement- Agglomerators, homogenizers and mixers</li><li>• Mechanical separation equipment – Sorters, separators – solid /solid separators, solid / liquid separators.</li></ul>	12
2.	Heat processing equipments	<ul style="list-style-type: none"><li>• Heat transfer equipments – heat exchangers;</li><li>• Heat generation equipments- microwave oven, ohmic heating system, infrared emitters</li><li>• Food evaporation equipments- Evaporators</li><li>• Thermal processing equipments – Blanchers, sterilizers and pasteurizers</li></ul>	8
3.	Mass transfer equipments	<ul style="list-style-type: none"><li>• Distillers, extraction and leaching equipments, gas and liquid absorption equipments, adsorption and ion exchange equipments, crystallizers</li><li>• Food Dehydration equipment- dryers</li><li>• Refrigeration and freezing equipment – refrigerators, freezers, thawers, freeze driers or lyophilizers</li></ul>	8
4.	Equipments for novel food processes	<ul style="list-style-type: none"><li>• Membrane separation equipment, irradiation system, extruders, fermenters, pulse electric field processing equipment , High pressure processing equipment, pulsed light processing equipment</li></ul>	8
5.	Food packaging	<ul style="list-style-type: none"><li>• fillers, closures, sealers, wrappers, aseptic</li></ul>	6

	equipments	packaging equipment and palletizers	
6.	Instrumentation and process control	<ul style="list-style-type: none"> <li>• Process variables and its measurement</li> <li>• Introduction to sensors and sensing elements for temperature, pressure, flow, level, speed, forces, torque, pH, colour, opacity, viscosity etc.</li> <li>• Introduction to control system, types of control system, advantages and disadvantages</li> <li>• Data logging basics, interface between data logger and sensors</li> <li>• Introducing automation in food industry – HMI/SCADA systems for automation – advantages of real time data of high precision</li> </ul>	12
<b>Total Duration</b>			<b>54</b>

#### References:

1. Donald R. Coughanowr., "Process System analysis and control" Mc- Graw Hill International Edition, Second Edition,
2. Nagoorkani.A "Control Systems", RBA publications, first edition ninth reprint 2002
3. S.Baskar,"Instrumentation control system measurements and controls"Anuradha Agencies Publishers,2004
4. Eckman, D.P., Industrial Instrumentation, Wiley Eastern Ltd., New York 1990.
5. Process system Analysis & Control, D.R. Coughanoowr, McGraw Hill Publication
6. Fellows, P.J. (2000), Food Processing technology: Principles and Practice, Second edition, CRC woodheadpublishing ltd, Cambridge.
7. Peter Zeuthen and Leif Bogh – Sorensen, (2003), Food Preservation techniques, Woodhead publishing ltd.
8. George D. Saravacos and Athanasios E. Kostaropoulos (2002) Handbook of Food Processing Equipment, Kluwer Academic /Plenum publishers.

**ALLIED PAPER IV - FOOD PRODUCT DEVELOPMENT AND MARKETING PRACTICAL- II**

**SUB.CODE: 15BFSNA04**  
**MAX.MARKS: 100**

**HOURS T+P=C**  
**1+2=2**

**Objectives**

- To estimate the quality of the developed food product
- To find out the suitable packaging material and steps in applying for FSSAI licensing

<b>S.no</b>	<b>Topic/Module</b>	<b>Key learning Outcome</b>	<b>Duration in Hrs</b>
1	Raw material	i. Justification for the raw materials used ii. CCP (critical control points) and GHP (good hygienic practises)	12
2	Process line standardisation	i. Analyse the CCP,GHP and GMP followed during product formulation	6
3	Product quality control	i. Standard Operating Procedure for the developed product	15
4	Packaging and labelling	i. Types of packaging materials used ii. Parts of labelling iii. Creation of new label for the developed product	12
5	FSSAI licence	i. Licensing procedure	9
<b>Total Duration</b>			<b>54</b>

**References**

1. [www.fssai.gov.in](http://www.fssai.gov.in)

**CORE PAPER VIII - FOOD PROCESSING AND PRESERVATION PRACTICAL – II**

**SUB.CODE: 15BFSNC08**  
**MAX.MARKS: 100**

**HOURS T+P=C**  
**1+2=2**

**Objectives**

- To learn how to preserve non perishable and perishable food items by using preservative and processing techniques.

S.No.	Topics/Modules	Key Learning Outcomes	Duration in Hrs
1.	Fruits	Preparation of preserved items from fruits a. Jam and osmotic dehydrated fruit – preserve b. Squash and fruit juice concentrate	12
2.	Vegetables	i. Preparation of pickle ii. Preparation of sauce and ketchup iii. Preparation of dried and dehydrated vegetables	12
3.	Milk	i. Preparation of cream, butter and ghee ii. Preparation of paneer iii. Preparation of ice-cream and custard	15
4.	Fleshy Foods	i. Preparation of dried fish ii. Preparation of salted and dried meat iii. Preparation of pickle from prawn, fish and meat	15
<b>Total Duration</b>			<b>54</b>

**References**

1. Dauthy, M.E. 1995, fruit and vegetable processing, FAO Agricultural services Bulletin, 119, Rom.
2. Desrosier N.W. 1973, The technology of food preservation. The AV publishing co. inc. wet poet, Connecticut.

## **ELECTIVE II – FOOD FOR LIFE**

**SUB.CODE. 15BFSNEL02**  
**MAX.MARKS: 100**

**HOURS T+P=C**  
**2+1=2**

### **Objectives:**

- To highlight the principles of menu planning and nutritional requirements in different stages of life cycle
- To exhibit the current view on dietary guidelines for Indians, food preparation, selection, consumption trend and food equity in India

<b>S.No.</b>	<b>Topics/Modules</b>	<b>Key Learning Outcomes</b>	<b>Duration in Hrs</b>
1.	Principles of meal planning	<ul style="list-style-type: none"><li>• Food groups and Food exchange list</li><li>• Factors affecting meal planning and food related behaviour</li><li>• Methods of assessment of nutrient requirements</li><li>• Steps in planning balanced diet</li></ul>	8
2.	Dietary Guidelines for Indians	<ul style="list-style-type: none"><li>• Current diet and nutrition scenario</li><li>• Dietary goals</li><li>• 15 dietary guidelines for Indians</li><li>• Energy cost for exercise and physical activity</li><li>• Menu planning considerations for special occasions</li><li>• Menu planning considerations in catering and service operations</li></ul>	8
3.	Food preparation, selection and consumption	<ul style="list-style-type: none"><li>• Food preparation – preparation of food, methods of cooking, medium of cooking and changes during cooking</li><li>• Criteria for selection and purchase of nutritious food</li><li>• Role of nutritional labeling in selection and purchase of food</li><li>• Transition in food consumption pattern</li><li>• Factors affecting food consumption pattern – social, economic, nutritional and environmental</li><li>• Past and present food trends</li></ul>	10
4.	Food equity	<ul style="list-style-type: none"><li>• Definition of food equity and inequity</li><li>• Circumstances that relate to food inequities - access to a continuous and safe supply of water, availability of safe and nutritious food, financial means to meet food needs, knowledge of nutrition principles to enable appropriate selection of food, distribution issues</li><li>• Influences on food availability and distribution</li></ul>	12

		<p>towards food equity - geography/climate, religious/cultural beliefs, socioeconomic status, government policy such as trade restrictions, natural disasters such as flooding or drought, war, educational levels, multinationals, technological developments such as transport and refrigeration</p> <ul style="list-style-type: none"> <li>• Access to food by different groups of people – rural and isolated people, people on low incomes or unemployed, women and children, people with disabilities, the aged/elderly, Aboriginal and indigenous people, chronically ill people, people with dementia, alcohol and drug abusers, homeless people</li> <li>• Food production practices – cash cropping and subsistence farming</li> <li>• Government and voluntary support networks for food equity</li> </ul>	
5.	Diet in different stages of life cycle	<ul style="list-style-type: none"> <li>• RDA, nutritional requirements and balanced diet planning for pregnancy, lactation, infancy, childhood, adolescence, adulthood and aged</li> <li>• Factors influencing food habits in different stages of life</li> </ul>	16
<b>Total Duration</b>			<b>54</b>

## References

1. Swaminathan, M. Advanced text book on Food and Nutrition, , An mol Publication Pvt, Ltd, Second Edition. 2004.
2. Mahtab S. Bamji, Prasad Rao, N. Vinodini Reddy. Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd, Second Edition, 2003.
3. Srilakshmi, B. Nutrition Science, New Age International [p] Ltd, New Delhi
4. Sumati. R. Mudambi, M.V Rajagopal., Fundamentals of Foods & Nutrition, 4th Edition New age International publishers New Delhi, 2006.
5. Melvin H. Williams., Nutrition for health fitness & Sport. 5th edition McGraw – Hill, publishing Co., 1999.
6. Gordon M. Wardlaw, Anne M. Smith Contemporary Nutrition, McGraw – Hill International Edition - 2006.

## QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR FOOD PROCESSING

### What are Occupational Standards(OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

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6. Assessment Criteria.....[26]

### Introduction

#### Qualifications Pack – Quality Assurance Manager

**SECTOR:** FOOD PROCESSING

**SUB-SECTOR:** Fruit and vegetable, food grain milling (including oilseeds), dairy products, meat and poultry, fish & sea food, bread and bakery, alcoholic beverages, aerated water/soft drinks, soya food, packaged foods

**OCCUPATION:** Quality Assurance

**REFERENCE ID:** FIC/Q7007

**ALIGNED TO:** NCO-2004/NIL

A Quality Assurance Manager is responsible for implementing and meeting quality, safety and regulatory requirements of food products produced in the organisation.

**Brief Job Description:** A Quality Assurance Manager is responsible for implementing and ensuring that food products produced meet standards set by both the organisation and regulatory authorities, develop and review quality and safety policies, manage audits and oversee manufacturing and production processes.

**Personal Attributes:** A Quality Assurance Manager must have the ability to read, write, communicate, calculate, plan, organize and prioritize. S/he must have concentration, physical stamina, mechanical aptitude and trouble shooting skills.S/he must have an understanding of food safety standards and requirements and personal and professional hygiene.



Job Details

Qualifications Pack Code	FIC/Q7007		
Job Role	Quality Assurance Manager		
Credits (NSQF)	TBD	Version number	1.0
Sector	Food Processing	Drafted on	26/11/2015
Sub-sector	Fruit and Vegetable, Food Grain Milling (Including Oilseeds), Dairy Products, Meat and Poultry, Fish & Sea Food, Bread and bakery, Alcoholic beverages, Aerated water/soft drinks, Soya food, Packaged Foods	Last reviewed on	23/02/2016
Occupation	Quality Assurance	Next review date	30/03/2019
NSQC clearance on	N/A		

Job Role	Quality Assurance Manager
Role Description	A Quality Assurance Manager is responsible for implementing and ensuring that food products produced meet standards set by both the organisation and regulatory authorities, develop and review quality and safety policies, manage audits and oversee manufacturing and production processes.
NSQF level	6
Minimum Educational Qualifications	Masters degree in science, preferably
Maximum Educational Qualifications	Not applicable
Training (Suggested but not mandatory)	<ol style="list-style-type: none"> <li>1. Total Quality Management</li> <li>2. Occupational Health &amp; Safety Advisory Services</li> <li>3. Environmental Management System</li> <li>4. Food Safety Standards and Regulations (as per FSSAI)</li> </ol>
Minimum job entry age	30 years
Experience	8-10 years in a food processing unit
Applicable National Occupational Standards (NOS)	<p><b>Compulsory:</b></p> <ol style="list-style-type: none"> <li><a href="#">1. FIC/N7021 Lead quality function in food processing units</a></li> <li><a href="#">2. FIC/N7022 Manage quality in food processing units</a></li> <li><a href="#">3. FIC/N7023 Manage audit and implement health and safety system in food processing unit</a></li> </ol> <p><b>Optional:</b> N.A.</p>
Performance Criteria	As described in the relevant OS units

Definitions

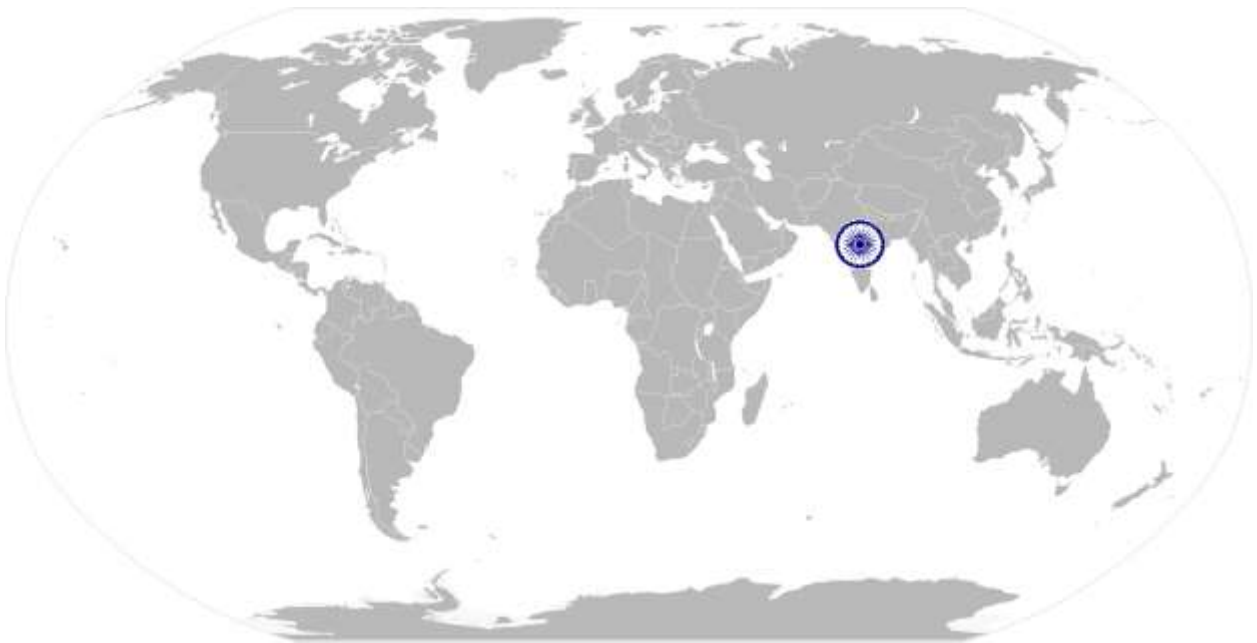
Keywords /Terms	Description
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through analysis and form the basis of OS.
Job Role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
OS	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
NOS	NOS are Occupational Standards which apply uniquely in the Indian context.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Qualifications Pack	Qualifications Pack comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A Qualifications Pack is assigned a unique qualification pack code.
Unit Code	Unit Code is a unique identifier for an Occupational Standard , which is denoted by an 'N'
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
Organizational Context	Organizational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills or Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.

Acronyms

Keywords /Terms	Description
CIP	Clean In Place
COP	Clean Out Of Place
ERP	Enterprise Resource Planning
FIFO	First In First Out
FEFO	First Expiry First Out
FSSAI	Food Safety and Standards Authority of India
GMP	Good Manufacturing Practice
GHP	Good Hygiene Practices
HACCP	Hazard Analysis and Critical Control Point
ISO	International Standard for organization
NOS	National Occupational Standard
NSQF	National Skill Qualification Framework
OS	Occupational Standard
OHSAS	Occupational Health and Safety Advisory Specification
PC	Performance Criteria
QP	Qualification Pack
SSC	Sector Skill Council
SOP	Standard Operating Procedure
QMS	Quality Management System

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# National Occupational Standard



## Overview

This OS unit is about leading quality function in food processing units by developing operational plan for quality function, providing leadership to quality team and managing budget for quality function.

**FIC/N7021**
**Lead quality function in food processing units**
**National Occupational Standard**

<b>Unit Code</b>	<b>FIC/N7021</b>
<b>Unit Title (Task)</b>	<b>Lead quality function in food processing units</b>
<b>Description</b>	This OS unit is about leading quality function in food processing units.
<b>Scope</b>	This unit/task covers the following: <ul style="list-style-type: none"> <li>• Develop and implement operational plans for quality function</li> <li>• Provide leadership to the quality team</li> <li>• Manage Budget</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Develop and implement operational plans for quality function</b>	To be competent, the user/individual must be able to: <ul style="list-style-type: none"> <li>PC1. develop operational plans for the quality department that is consistent with the objectives and goals of organisation</li> <li>PC2. develop operational plan that is flexible and complements quality from incoming materials, production of products, outgoing finished products, storage and distribution, and until the products reach the consumer</li> <li>PC3. develop operational plan for managing environmental issues</li> <li>PC4. set demanding but achievable objectives and targets for quality function and assign responsibilities to all employees of quality team</li> <li>PC5. implement plan, evaluate periodically, analyze and recommend changes</li> <li>PC6. monitor and control the operational plan to achieve its overall objectives</li> <li>PC7. design new work processes, procedures, systems, structures and roles for the changes implemented in the organisation, quality system, and legal regulations</li> <li>PC8. review and ensure implemented changes are effective and meets the requirements of the organisation</li> </ul>
<b>Provide leadership to the quality team</b>	To be competent, the user/individual must be able to: <ul style="list-style-type: none"> <li>PC9. communicate clearly and enthusiastically the organisation vision and values, make employees understand and commit their energy and expertise to achieve organisation goals</li> <li>PC10. understand the organisation and employees, develop a leadership style and apply them appropriately to achieve department targets and organisation goals</li> <li>PC11. communicate with employees regularly and effectively, help them identify their strengths, support to overcome their weakness, listen to their grievances and provide appropriate solutions, and win their trust and support</li> <li>PC12. motivate and support employees to achieve their work and development objectives, and provide recognition when they are successful</li> <li>PC13. encourage employees to take responsibilities, to take own decisions within agreed boundaries, to take lead in their own areas of expertise for their development</li> <li>PC14. initiate personnel actions, such as promotions, transfers, discharges or disciplinary measures</li> <li>PC15. lead quality department and team successfully through difficulties and challenges</li> </ul>

**FIC/N7021**
**Lead quality function in food processing units**

<b>Manage Budget</b>	<p>To be competent, the user/individual must be able to:</p> <p>PC16. consult with employees of quality department and evaluate the past, present and future trends and prepare realistic budget for functioning of quality department and for achieving quality in the organisation and producing quality products</p> <p>PC17. submit the proposed budget to the management for approval, discuss and, if required, negotiate the proposed budget to secure required fund</p> <p>PC18. propose revision of the budget, in case of any unforeseen development, discuss with the management to agree with the revisions</p> <p>PC19. identify and delegate budget control responsibilities to the team with clearly defined activities, establish systems to monitor and evaluate actual expenditure against budget</p> <p>PC20. identify the causes of any significant variances in budget control, discuss with team and ensure prompt corrective action is taken</p> <p>PC21. encourage team to think and identify ways of reducing expenditure, analyze and pursue the suggested ideas</p> <p>PC22. review the financial performance of quality department periodically and identify improvements for the future</p>
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. principles and processes involved in business and organizational planning</p> <p>KA2. organisaiton ideas, goals and policies</p> <p>KA3. business processes of the organisation</p> <p>KA4. food regualtory system related to the process and products produced in the organisation</p> <p>ka5. financial and accounting procedures of the organisation</p> <p>KA6. budget management</p> <p>KA7. code of business conduct</p> <p>KA8. resource management</p> <p>KA9. organisation policies realted to transfers, promotions, disciplinary action</p> <p>KA10. production management</p> <p>KA11. manpower modelling and handling</p>
<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. risk analysis and risk management</p> <p>KB2. principles and methods of planning for regular and contingency situations</p> <p>KB3. methods to monitor and control operational plans to achieve their objectives</p> <p>KB4. methods to communicate with people of varying nature and in different situations</p> <p>KB5. methods to identify and address difficulties and challenges</p> <p>KB6. managing changes, and techniques to manage expectations during change</p> <p>KB7. methods to motivate and lead team to achieve organisational goals</p> <p>KB8. types of difficulties and challenges that may arise, including conflict, diversity and inclusion issues within the area, and ways of identifying and overcoming them</p> <p>KB9. budgetary systems, methods to monitor, control and evaluate performance</p>



**FIC/N7021**
**Lead quality function in food processing units**

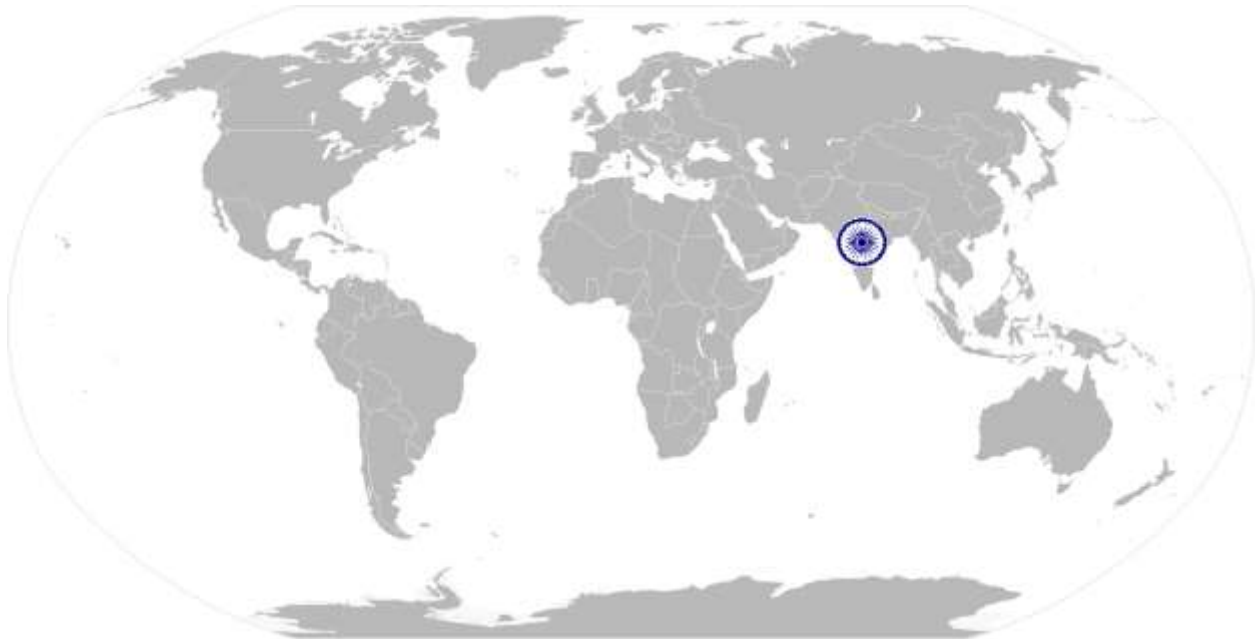
	against budgets
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. note the information communicated</p> <p>SA2. note the raw materials used for production and the finished products produced</p> <p>SA3. note the readings of the process parameters and provide necessary information to fill the process chart</p> <p>SA4. note down observations (if any) related to the process</p> <p>SA5. write information documents to internal departments/ internal teams</p> <p>SA6. note down the data for online ERP or as per applicability in the organization</p>
	<b>Reading Skills</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA7. read and interpret the process required for producing various types of products</p> <p>SA8. read and interpret and process flowchart for all products produced</p> <p>SA9. read equipment manuals and process documents to understand the equipments operation and process requirement</p> <p>SA10. read internal information documents sent by internal teams</p>
	<b>Oral Communication (Listening and Speaking skills)</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA11. discuss task lists, schedules and activities</p> <p>SA12. effectively communicate with team members</p> <p>SA13. question in order to understand the nature of the problem and to clarify queries</p> <p>SA14. attentively listen and comprehend the information given by the speaker</p> <p>SA15. communicate clearly on the issues being faced</p>
<b>B. Professional Skills</b>	<b>Decision Making</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue</p> <p>SB2. handle issues in case the manager is not available (as per the authority matrix defined by the organization)</p>
	<b>Plan and Organize</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB3. plan and organize the work order and jobs received</p> <p>SB4. organize raw materials and packaging materials required for all products</p> <p>SB5. plan and prioritize the work based on the instructions received</p> <p>SB6. plan to utilise time and equipment's effectively</p> <p>SB7. organize all process/ equipment manuals so as to access information easily</p> <p>SB8. support the manager in scheduling tasks for helper(s)</p>
	<b>Customer Centricity</b>



**FIC/N7021**

**Lead quality function in food processing units**

	The user/individual on the job needs to know and understand how to: SB9. understand customer requirements and their priority and respond as per their needs
	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to: SB10. support manager in solving problems by detailing out problems SB11. discuss the possible solutions with the manager for problem solving
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB12. apply domain information about maintenance processes and technical knowledge about tools and equipment
	<b>Critical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB13. use common sense and make judgments on day to day basis SB14. use reasoning skills to identify and resolve basic problems SB15. use intuition to detect any potential problems which could arise during operations SB16. use acquired knowledge of the process for identifying and handling issues



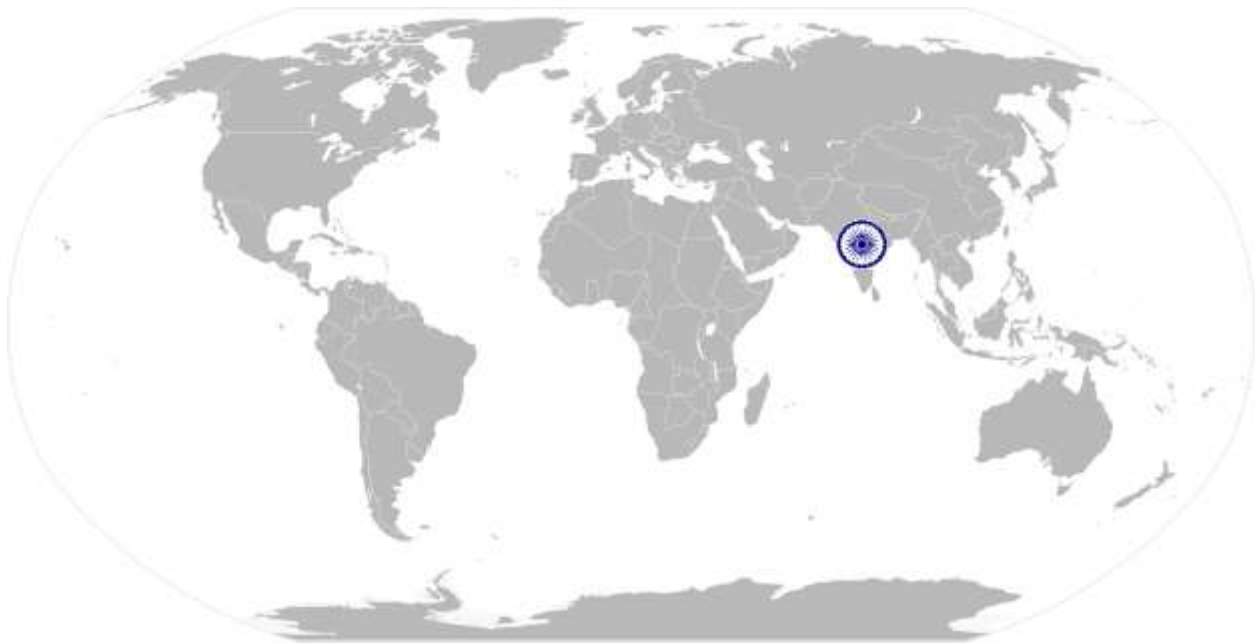
**FIC/N7021**
**Lead quality function in food processing units**

## NOS Version Control

NOS Code	FIC/N7021		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	26/11/2015
Industry Sub-sector	Fruit and Vegetable, Food Grain Milling (Including Oilseeds), Dairy Products, Meat and Poultry, Fish & Sea Food, Bread and bakery, Alcoholic beverages, Aerated water/soft drinks, Soya food, Packaged Foods	Last reviewed on	23/02/2016
Occupation	Quality Assurance	Next review date	30/03/2019

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# National Occupational Standard



## Overview

This OS unit is about managing quality in all functions of the food processing unit.

**FIC/N7022**
**Manage quality in food processing units**

National Occupational Standard

<b>Unit Code</b>	<b>FIC/N7022</b>
<b>Unit Title (Task)</b>	<b>Manage quality in food processing units</b>
<b>Description</b>	This OS unit is about managing quality in all functions of the food processing unit by implementing and monitoring quality system, and ensuring product compliance
<b>Scope</b>	This unit/task covers the following: <ul style="list-style-type: none"> <li>• Quality management in the organization (for food processing unit)</li> <li>• Implement and monitor quality system (for food processing unit)</li> <li>• Ensure product compliance (for food processing unit)</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Quality management in the organization (for food processing unit)</b>	To be competent, the user/individual must be able to: <ul style="list-style-type: none"> <li>PC1. establish objective/road map and budget for quality function</li> <li>PC2. communicate and share the company quality philosophy to key personnel in the organisation</li> <li>PC3. analyze quality performance and measure against internal and external standards</li> <li>PC4. prepare monthly summaries of quality issues for presentation to the senior management team</li> <li>PC5. keep senior management informed of significant developments in quality assurance activities</li> <li>PC6. support organization's various key decision making processes like cost reviews and its approval, identification, review and approvals of efficient contract manufactures etc</li> <li>PC7. support organisation profit making strategies by providing cost effective solution like developing new suppliers, ingredients, new method of packaging and identifying cost reduction opportunities in existing materials</li> </ul>
<b>Implement and monitor quality system (for food processing unit)</b>	To be competent, the user/individual must be able to: <ul style="list-style-type: none"> <li>PC8. implement food quality and safety regulatory requirements like FSSAI</li> <li>PC9. implement procedure, standards and specifications to meet quality goals of the organisation</li> <li>PC10. develop and review standards on environmental requirements, health and safety policies</li> <li>PC11. interact with marketing and sales departments to understand client requirements and expectations, analyze if they are met through present quality system and improve the existing system, if required</li> <li>PC12. monitor performance of the quality management system, produce data and report on performance, analyze statistical data to determine present standards, if required, make suggestions for changes and improvements and methods to implement them</li> <li>PC13. direct and coordinate company's quality program like implementation of ISO, HACCP systems and procedures</li> <li>PC14. prepare employees for a quality audit process for obtaining accreditation, certifications to a standard or a mark of quality</li> </ul>

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**Manage quality in food processing units**

	<p>PC15. establish, review and evaluate key performance indicators</p> <p>PC16. support new projects for validation, liaison with government agencies to ensure statutory and regulatory compliances</p> <p>PC17. support R&amp;D, marketing, packaging team in new concept development, review of formulation and applicable product/package regulatory requirements</p> <p>PC18. analyze ways to reduce waste and increase efficiency</p> <p>PC19. develop and implement effective consumer/customer communication and feedback system to ensure the communication down the line, and minimizing the customer complaints</p> <p>PC20. compile quality control reports, create statistical process control metrics, manage non-conformity discrepancy reports, and recommend continuous improvement activities</p>
<b>Ensure product compliance (for food processing unit)</b>	<p>To be competent, the user/individual must be able to:</p> <p>PC21. ensure food products produced meet the organisation standards, national and international regulations</p> <p>PC22. ensure routine sampling, testing and inspection of raw materials, packing materials, production on-line samples, and finished products to achieve product quality</p> <p>PC23. ensure appropriate calibration of testing equipments</p> <p>PC24. ensure all legal licenses are renewed and up-to-date</p> <p>PC25. carry out audits to identify areas of weakness within organization system, document audit findings and recommend ways to improve them</p> <p>PC26. manage audits by third-party</p> <p>PC27. analyze and understand consumer complaints on product, identify reasons, and implement control and preventive measure</p> <p>PC28. carry out assessments on cross functions, share findings with respective department managers, advise and guide them on implementing quality procedures in their areas of function</p> <p>PC29. monitor performance by gathering relevant data and producing statistical reports</p> <p>PC30. oversee production processes to ensure production of products with consistent quality standards established by the organisation and government</p> <p>PC31. monitor production processes, process layouts, process sequences to obtain quality products through processes</p> <p>PC32. direct personnel, workers engaged in inspection and testing activities to ensure continuous control over raw materials, production process, packaging, finished products, facilities, storage, distribution and sale</p> <p>PC33. encourage employees of quality department to take personal responsibility for achieving quality standards and to address or report critical issues</p> <p>PC34. monitor and rate performance of employees in quality department, identify skill gap and areas of improvement and recommend and nominate in suitable training program</p> <p>PC35. organize training and awareness programs and ensure employees are up-to-date on quality systems and requirements</p> <p>PC36. provide or organize training on organisation standards, legal regulations on food (FSSAI), testing procedures, production, effect of process parameters on</p>

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	production process and product quality, basic microbiology, health and safety, hygiene practices, Good Manufacturing Practices (GMP) etc.
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <ul style="list-style-type: none"> <li>KA1. organisation policies and goals</li> <li>KA2. quality management</li> <li>KA3. budget management</li> <li>KA4. food regulatory policies and procedures related to products produced in the organisation</li> <li>KA5. quality mark accreditations of the organisations</li> <li>KA6. audit procedures</li> <li>KA7. code of business conduct</li> <li>KA8. leadership techniques</li> <li>KA9. manage competency requirements of the qa personnels</li> <li>KA10. manpower modelling and handling</li> </ul>
<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <ul style="list-style-type: none"> <li>KB1. quality management principles and methods, tools and techniques</li> <li>KB2. current developments, tools and techniques in quality management, legal and regulatory requirements</li> <li>KB3. marks, awards or accreditation in line with organisation's values and methods to obtain them</li> <li>KB4. methods to develop and implement quality system that deliver results at reasonable cost and acceptable level of risk</li> <li>KB5. methods to maintain and ensure quality system</li> <li>KB6. methods to evaluate if processes and product quality are meeting the organisation and regulatory standards</li> <li>KB7. methods to detect and record any non-conformance related to processes and product quality</li> <li>KB8. methods to investigate reason for non- conformance and decide on appropriate corrective actions</li> <li>KB9. methods to monitor effectiveness of quality system</li> <li>KB10. methods to improve business processes, quality systems and procedures</li> <li>KB11. FSSAI</li> <li>KB12. international regulations like FDA, CODEX Alimentarius etc</li> <li>KB13. QMS</li> <li>KB14. ISO</li> <li>KB15. HACCP</li> <li>KB16. GMP</li> </ul>
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<p><b>Writing Skills</b></p> <p>The user/ individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> <li>SA1. note the information communicated</li> <li>SA2. note the raw materials used for production and the finished products produced</li> <li>SA3. note the readings of the process parameters and provide necessary</li> </ul>



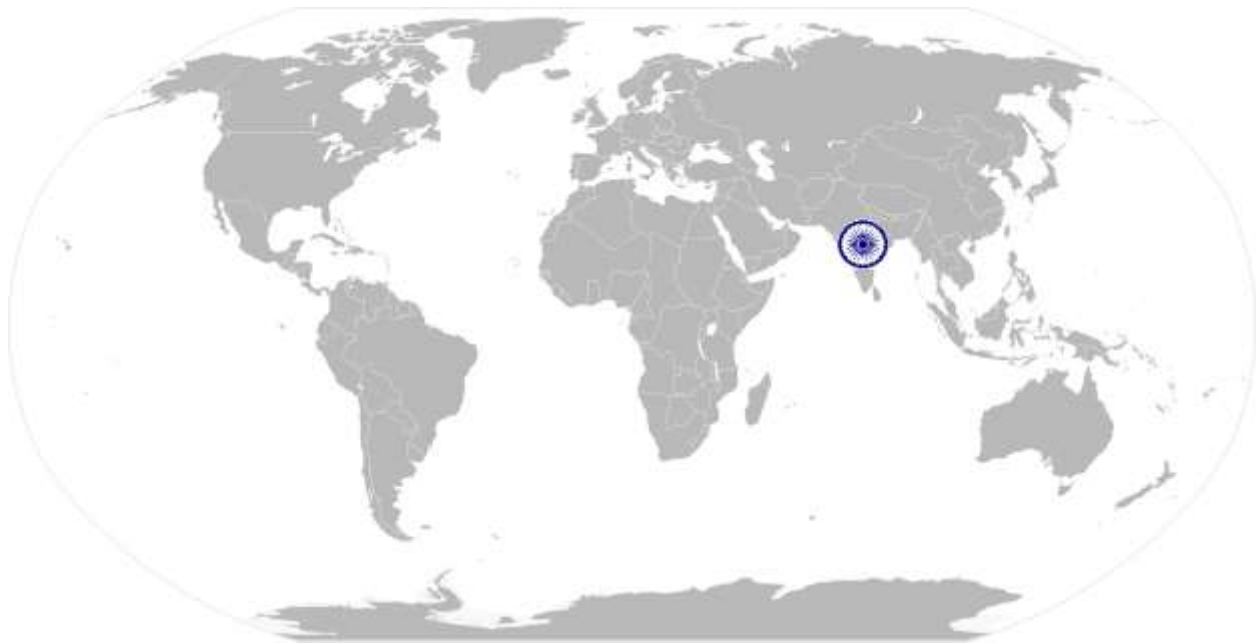
**FIC/N7022**
**Manage quality in food processing units**

	information to fill the process chart SA4. note down observations (if any) related to the process SA5. write information documents to internal departments/ internal teams SA6. note down the data for online ERP or as per applicability in the organization
	<b>Reading Skills</b>
	The user/individual on the job needs to know and understand how to: SA7. read and interpret the process required for producing various types of products SA8. read and interpret and process flowchart for all products produced SA9. read equipment manuals and process documents to understand the equipments operation and process requirement SA10. read internal information documents sent by internal teams
	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/individual on the job needs to know and understand how to: SA11. discuss task lists, schedules and activities SA12. effectively communicate with team members SA13. question in order to understand the nature of the problem and to clarify queries SA14. attentively listen and comprehend the information given by the speaker SA15. communicate clearly on the issues being faced
<b>B. Professional Skills</b>	<b>Decision Making</b>
	The user/individual on the job needs to know and understand how to: SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue SB2. handle issues in case the manager is not available (as per the authority matrix defined by the organization)
	<b>Plan and Organize</b>
	The user/individual on the job needs to know and understand how to: SB3. plan and organize the work order and jobs received SB4. organize raw materials and packaging materials required for all products SB5. plan and prioritize the work based on the instructions received SB6. plan to utilise time and equipment's effectively SB7. organize all process/ equipment manuals so as to access information easily SB8. support the manager in scheduling tasks for helper(s)
	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to: SB9. understand customer requirements and their priority and respond as per their needs
	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to: SB10. support manager in solving problems by detailing out problems SB11. discuss the possible solutions with the manager for problem solving
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB12. apply domain information about maintenance processes and technical knowledge about tools and equipment

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	<p><b>Critical Thinking</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB13. use common sense and make judgments on day to day basis</p> <p>SB14. use reasoning skills to identify and resolve basic problems</p> <p>SB15. use intuition to detect any potential problems which could arise during operations</p> <p>SB16. use acquired knowledge of the process for identifying and handling issues</p>
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**Manage quality in food processing units**

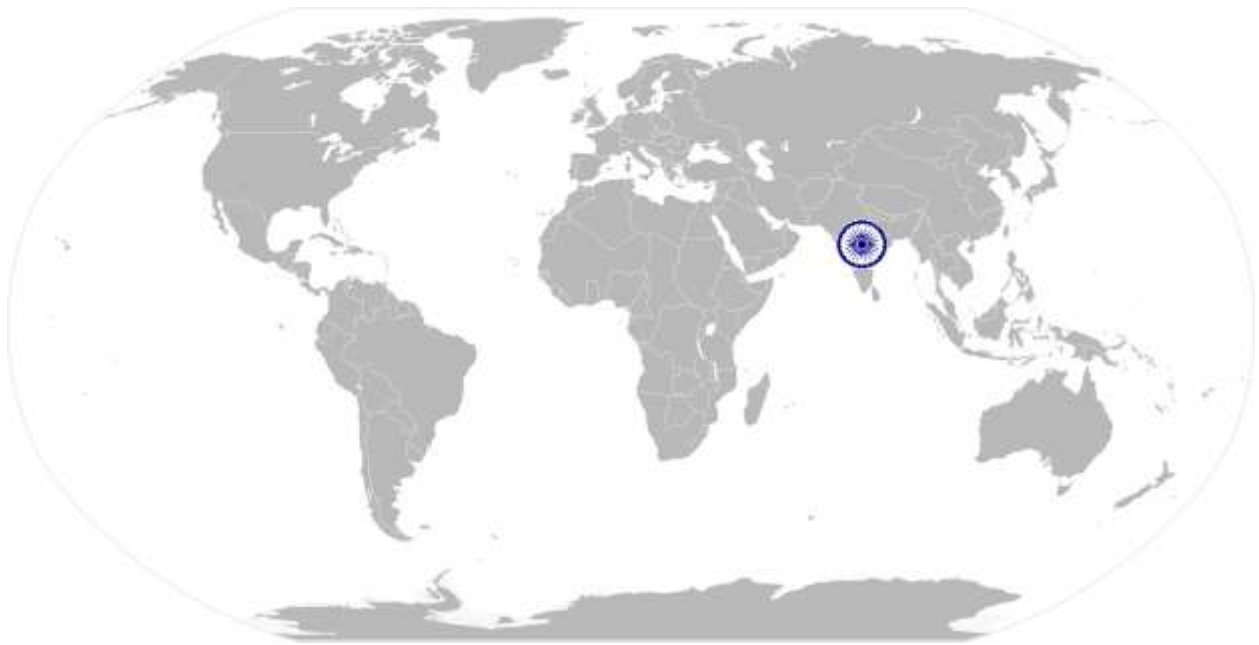
## NOS Version Control

NOS Code	FIC/N7022		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	26/11/2015
Industry Sub-sector	Fruit and Vegetable, Food Grain Milling (Including Oilseeds), Dairy Products, Meat and Poultry, Fish & Sea Food, Bread and bakery, Alcoholic beverages, Aerated water/soft drinks, Soya food, Packaged Foods	Last reviewed on	23/02/2016
Occupation	Quality assurance	Next review date	30/03/2019

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# National Occupational Standard



## Overview

This OS unit is on managing audit and implementing health and safety system in food processing units

**FIC/N7023**
**Manage audit and implement health and safety system**

## National Occupational Standard

Unit Code	FIC/N7023
Unit Title (Task)	Manage audit and implement health and safety system in food processing units
Description	This OS unit is about managing audit and implementing health and safety system in food processing units
Scope	This unit/task covers the following: <ul style="list-style-type: none"> <li>• Manage and conduct quality audits (for food processing unit)</li> <li>• Implement health and safety system (for food processing unit)</li> </ul>
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
<b>Manage and conduct quality audits (for food processing unit)</b>	To be competent, the user/individual must be able to: <ul style="list-style-type: none"> <li>PC1. establish to the quality team the importance of documentation, provide training on documentation system, and ensure all quality documents are maintained systematically</li> <li>PC2. ensure all relevant records and documents are complete, up-to-date and accessible</li> <li>PC3. ensure corrective actions agreed in previous audits have been implemented, and recommendations have been considered and acted upon</li> <li>PC4. manage third party audit by providing the auditor with access to all relevant information, records and documentation</li> <li>PC5. discuss with the auditor the results of the audit and agree appropriate corrective actions to any non-conformances identified and the date by which the actions would be completed</li> <li>PC6. ensure agreed corrective actions are carried out by agreed dates</li> <li>PC7. carry out quality audits across cross functions in the organisation, at suppliers, distributors and market to ensure quality standards are maintained throughout the system</li> <li>PC8. perform audits by establishing clearly the scope of the audit, the responsibilities of the auditees, the quality procedures that apply to their work, previous audit history and expectations to maintain quality, encourage to co-operate fully, and carry out audit to reveal any deviations from relevant quality procedures</li> <li>PC9. share with the auditees the results of the audit and agree appropriate corrective actions for any non-conformances and the date by which the actions should be carried out, and check if corrective actions have been carried out by agreed dates</li> <li>PC10. identify and analyze any problems related to process and quality procedures, report findings and recommendations to management for immediate action</li> <li>PC11. maintain complete records of quality audits for management review and future reference</li> </ul>
<b>Implement health and safety system (for food processing)</b>	To be competent, the user/individual must be able to: <ul style="list-style-type: none"> <li>PC12. establish organization's responsibilities for health and safety regulations and ensure there is a written health and safety policy applicable for all employees</li> </ul>

**FIC/N7023**
**Manage audit and implement health and safety system**

unit)	<p>PC13. ensure health and safety policy and procedures are clearly communicated to all employees of the organisation</p> <p>PC14. ensure health and safety to be a priority while planning organisation standards</p> <p>PC15. implement system for identifying hazards and assessing risks in processing food products, and set procedures to control and prevent them</p> <p>PC16. implement system for gmp, haccp, fifo/fefo, product recall etc</p> <p>PC17. organize training to the employees on food safety, hygiene and sanitation for effective implementation of the systems</p> <p>PC18. implement food and safety procedures in all areas of function to ensure food safety and hygiene system is followed from procurement of raw material, production of product, packaging, storage, distribution and until the product reaching the consumer</p> <p>PC19. ensure health and safety policy is practiced across the organisation, effectively monitored, reviewed and revised at regular intervals to meet the changes in national and international regulations</p> <p>PC20. ensure systems are in place for effective monitoring, measuring and reporting the performance of health and safety system</p> <p>PC21. conduct unannounced audits in all functions of the organisation to ensure health and safety procedures are being followed</p>
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: <ul style="list-style-type: none"> <li>KA1. organisaiton policies and goals</li> <li>KA2. quality management system</li> <li>KA3. quality mark accreditations of the organisations</li> <li>KA4. audit procedures</li> <li>KA5. audit management</li> <li>KA6. food regualtory policies and procedures related to products produced in the organisaiton</li> <li>KA7. documentation and records management system</li> <li>KA8. health and safety policy</li> <li>KA9. food safety system like FSSAI</li> </ul>
<b>B. Technical Knowledge</b>	The user/individual on the job needs to know and understand: <ul style="list-style-type: none"> <li>KB1. methods of ensuring records and documentation are complete and up-to-date</li> <li>KB2. industry requirements for quality management and auditing</li> <li>KB3. various audit methods and techniques</li> <li>KB4. methods of preparation for audit</li> <li>KB5. methods of carrying out quality system audits to meet and maintain quality standards</li> <li>KB6. methods to carry out audit with available documents and identifying any discrepancies</li> <li>KB7. methods and procedures to decide and suggest appropriate corrective actions to each discrepancy</li> <li>KB8. methods and procedures to identify any discrepancies in system, possible risks to organization and employees</li> </ul>

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**Manage audit and implement health and safety system**

	KB9. methods to identify and analyze inherent problems with processes and quality procedures KB10. procedure to prepare and present audit reports KB11. regulations, guidelines and codes of practice related to health and safety, food safety, hygiene and sanitation (as per fssai) KB12. environmental standards KB13. methods to implement health and safety in food processing unit KB14. industry standards like gmp, haccp and product recall process KB15. types of hazards such as physical, chemical and biological hazards and methods to measures, control and prevent them KB16. methods to establish systems for monitoring, measuring and reporting on health and safety KB17. audit procedures to ensure food safety, hygiene and sanitation in the organization
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	The user/ individual on the job needs to know and understand how to: SA1. note the information communicated SA2. note the raw materials used for production and the finished products produced SA3. note the readings of the process parameters and provide necessary information to fill the process chart SA4. note down observations (if any) related to the process SA5. write information documents to internal departments/ internal teams SA6. note down the data for online ERP or as per applicability in the organization
	<b>Reading Skills</b>
	The user/individual on the job needs to know and understand how to: SA7. read and interpret the process required for producing various types of products SA8. read and interpret and process flowchart for all products produced SA9. read equipment manuals and process documents to understand the equipments operation and process requirement SA10. read internal information documents sent by internal teams
	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/individual on the job needs to know and understand how to: SA11. discuss task lists, schedules and activities SA12. effectively communicate with team members SA13. question in order to understand the nature of the problem and to clarify queries SA14. attentively listen and comprehend the information given by the speaker SA15. communicate clearly on the issues being faced
<b>B. Professional Skills</b>	<b>Decision Making</b>
	The user/individual on the job needs to know and understand how to: SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue SB2. handle issues in case the manager is not available (as per the authority matrix)



**FIC/N7023**
**Manage audit and implement health and safety system**

	defined by the organization)
	<b>Plan and Organize</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB3. plan and organize the work order and jobs received</p> <p>SB4. organize raw materials and packaging materials required for all products</p> <p>SB5. plan and prioritize the work based on the instructions received</p> <p>SB6. plan to utilise time and equipment's effectively</p> <p>SB7. organize all process/ equipment manuals so as to access information easily</p> <p>SB8. support the manager in scheduling tasks for helper(s)</p>
	<b>Customer Centricity</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB9. understand customer requirements and their priority and respond as per their needs</p>
	<b>Problem Solving</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB10. support manager in solving problems by detailing out problems</p> <p>SB11. discuss the possible solutions with the manager for problem solving</p>
	<b>Analytical Thinking</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB12. apply domain information about maintenance processes and technical knowledge about tools and equipment</p>
	<b>Critical Thinking</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB13. use common sense and make judgments on day to day basis</p> <p>SB14. use reasoning skills to identify and resolve basic problems</p> <p>SB15. use intuition to detect any potential problems which could arise during operations</p> <p>SB16. use acquired knowledge of the process for identifying and handling issues</p>

**FIC/N7023**
**Manage audit and implement health and safety system**

## NOS Version Control

NOS Code	FIC/N7023		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	26/11/2015
Industry Sub-sector	Fruit and Vegetable, Food Grain Milling (Including Oilseeds), Dairy Products, Meat and Poultry, Fish & Sea Food, Bread and bakery, Alcoholic beverages, Aerated water/soft drinks	Last reviewed on	23/02/2016
Occupation	Quality Assurance	Next review date	30/03/2019

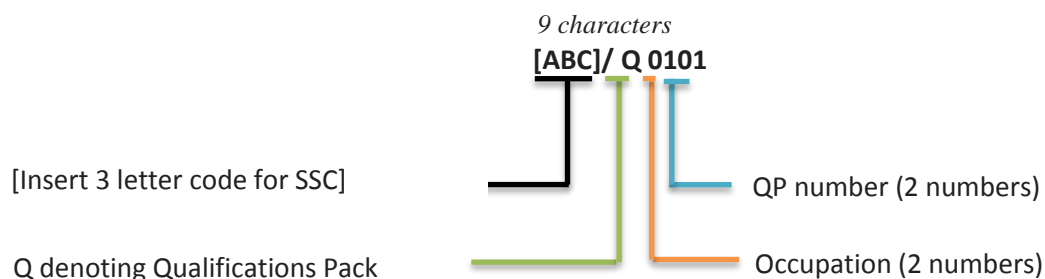
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## Qualifications Pack for Quality Assurance Manager

### Annexure

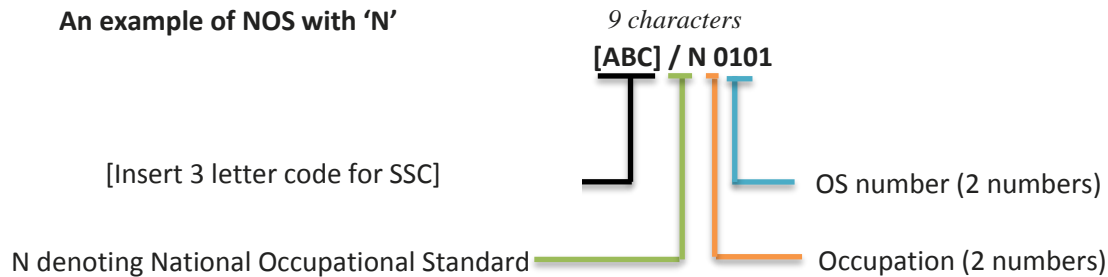
#### Nomenclature for QP and NOS

##### Qualifications Pack



##### Occupational Standard

##### An example of NOS with 'N'



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## Qualifications Pack for Quality Assurance Manager

The following acronyms/codes have been used in the nomenclature above:

Sub-sector	Range of Occupation numbers
Fruit and Vegetable	01 – 09
Food Grain Milling (including Oilseeds)	10 - 19
Dairy products	20 - 30
Meat and Poultry	30 – 40
Fish and Sea Food	40 - 49
Bread and Bakery	50 - 59
Alcoholic Beverages	60 - 69
Aerated water/ soft drinks	
Quality Analysis (involving physical and chemical lab analysis)	76 – 79
Packaging, Refrigeration and Procurement	70 – 75
Soya Food	80 – 84
Packaged Foods	85 - 90
Miscellaneous	90 - 95

Sequence	Description	Example
Three letters	Industry name	FIC
Slash	/	/
Next letter	Whether QP or NOS	Q or N
Next two numbers	Occupation code	01
Next two numbers	OS number	01

## Assessment Criteria

### CRITERIA FOR ASSESSMENT OF TRAINEES

**Job Role** Quality Assurance Manager

**Qualification Pack** FIC/Q7007

**Sector Skill Council** Food Processing

#### Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC
3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below)
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria
5. To pass the Qualification Pack, every trainee should score a minimum of 70% in aggregate
6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack

Assessment outcomes	Assessment criteria for outcomes	Marks Allocation			
		Total Marks	Out Of	Theory	Skills Practical
<b>1.FIC/N7021 ( Lead quality function in food processing units)</b>	PC1. develop operational plans for the quality department that is consistent with the objectives and goals of organisation	<b>100</b>	5	2	3
	PC2. develop operational plan that is flexible and complements quality from incoming materials, production of products, outgoing finished products, storage and distribution, and until the products reach the consumer		5	2	3
	PC3. develop operational plan for managing environmental issues		5	2	3
	PC4. set demanding but achievable objectives and targets for quality function and assign responsibilities to all employees of quality team		5	1	4
	PC5. implement plan, evaluate periodically, analyze and recommend changes		5	1	4

### Assessment Criteria

	PC6. monitor and control the operational plan to achieve its overall objectives	5	2	3
	PC7. design new work processes, procedures, systems, structures and roles for the changes implemented in the organisation, quality system, and legal regulations	5	2	3
	PC8. review and ensure implemented changes are effective and meets the requirements of the organisation	5	2	3
	PC9. communicate clearly and enthusiastically the organisation vision and values, make employees understand and commit their energy and expertise to achieve organisation goals	5	2	3
	PC10. understand the organisation and employees, develop a leadership style and apply them appropriately to achieve department targets and organisation goals	5	2	3
	PC11. communicate with employees regularly and effectively, help them identify their strengths, support to overcome their weakness, listen to their grievances and provide appropriate solutions, and win their trust and support	5	2	3
	PC12. motivate and support employees to achieve their work and development objectives, and provide recognition when they are successful	5	2	3
	PC13. encourage employees to take responsibilities, to take own decisions within agreed boundaries, to take lead in their own areas of expertise for their development	5	2	3
	PC14. initiate personnel actions, such as promotions, transfers, discharges or disciplinary measures	5	2	3
	PC15. lead quality department and team successfully through difficulties and challenges	5	2	3
	PC16. consult with employees of quality department and evaluate the past, present and future trends and prepare realistic budget for functioning of quality department	4	1	3

### Assessment Criteria

	and for achieving quality in the organisation and producing quality products				
	PC17. submit the proposed budget to the management for approval, discuss and, if required, negotiate the proposed budget to secure required fund		4	1	3
	PC18. propose revision of the budget, in case of any unforeseen development, discuss with the management to agree with the revisions		4	1	3
	PC19. identify and delegate budget control responsibilities to the team with clearly defined activities, establish systems to monitor and evaluate actual expenditure against budget		4	1	3
	PC20. identify the causes of any significant variances in budget control, discuss with team and ensure prompt corrective action is taken		3	1	2
	PC21. encourage team to think and identify ways of reducing expenditure, analyze and pursue the suggested ideas		3	1	2
	PC22. review the financial performance of quality department periodically and identify improvements for the future		3	1	2
			<b>100</b>	<b>35</b>	<b>65</b>
<b>2. FIC/N7022 (Manage quality in food processing units)</b>	PC1. establish objective/road map and budget for quality function		2	0.5	1.5
	PC2. communicate and share the company quality philosophy to key personnel in the organisation		3	1	2
	PC3. analyze quality performance and measure against internal and external standards		3	1	2
	PC4. prepare monthly summaries of quality issues for presentation to the senior management team		3	2	1
	PC5. keep senior management informed of significant developments in quality assurance activities		2	0.5	1.5
	PC6. support organization's various key decision making processes like cost		3	1	2

## Assessment Criteria

	reviews and its approval, identification, review and approvals of efficient contract manufactures etc
PC7.	support organisation profit making strategies by providing cost effective solution like developing new suppliers, ingredients, new method of packaging and identifying cost reduction opportunities in existing materials
PC8.	implement food quality and safety regulatory requirements like fssai
PC9.	implement procedure, standards and specifications to meet quality goals of the organisation
PC10.	develop and review standards on environmental requirements, health and safety policies
PC11.	interact with marketing and sales departments to understand client requirements and expectations, analyze if they are met through present quality system and improve the existing system, if required
PC12.	monitor performance of the quality management system, produce data and report on performance, analyze statistical data to determine present standards, if required, make suggestions for changes and improvements and methods to implement them
PC13.	direct and coordinate company's quality program like implementation of iso, haccp systems and procedures
PC14.	prepare employees for a quality audit process for obtaining accreditation, certifications to a standard or a mark of quality
PC15.	establish, review and evaluate key performance indicators
PC16.	support new projects for validation, liaison with government agencies to ensure statutory and regulatory compliances

3	2	1
3	2	1
3	1	2
3	1	2
3	1	2
3	1	2
3	1	2
3	1	2
3	1	2
3	1	2

### Assessment Criteria

	PC17. support r&d, marketing, packaging team in new concept development, review of formulation and applicable product/package regulatory requirements	3	1	2
	PC18. analyze ways to reduce waste and increase efficiency	3	1	2
	PC19. develop and implement effective consumer/customer communication and feedback system to ensure the communication down the line, and minimizing the customer complaints	3	1	2
	PC20. compile quality control reports, create statistical process control metrics, manage non-conformity discrepancy reports, and recommend continuous improvement activities	3	1	2
	PC21. ensure food products produced meet the organisation standards, national and international regulations	3	1	2
	PC22. ensure routine sampling, testing and inspection of raw materials, packing materials, production on-line samples, and finished products to achieve product quality	2	0.5	1.5
	PC23. ensure appropriate calibration of testing equipments	2	0.5	1.5
	PC24. ensure all legal licenses are renewed and up-to-date	2	0.5	1.5
	PC25. carry out audits to identify areas of weakness within organization system, document audit findings and recommend ways to improve them	3	1	2
	PC26. manage audits by third-party	3	1	2
	PC27. analyze and understand consumer complaints on product, identify reasons, and implement control and preventive measure	3	1	2
	PC28. carry out assessments on cross functions, share findings with respective department managers, advise and guide them on	3	1	2

### Assessment Criteria

	implementing quality procedures in their areas of function			
	PC29. monitor performance by gathering relevant data and producing statistical reports	2	0.5	1.5
	PC30. oversee production processes to ensure production of products with consistent quality standards established by the organisation and government	3	1	2
	PC31. monitor production processes, process layouts, process sequences to obtain quality products through processes	3	1	2
	PC32. direct personnel, workers engaged in inspection and testing activities to ensure continuous control over raw materials, production process, packaging, finished products, facilities, storage, distribution and sale	3	1	2
	PC33. encourage employees of quality department to take personal responsibility for achieving quality standards and to address or report critical issues	2	0.5	1.5
	PC34. monitor and rate performance of employees in quality department, identify skill gap and areas of improvement and recommend and nominate in suitable training program	3	1	2
	PC35. organize training and awareness programs and ensure employees are up-to-date on quality systems and requirements	2	0.5	1.5
	PC36. provide or organize training on organisation standards, legal regulations on food (fssai), testing procedures, production, effect of process parameters on production process and product quality, basic microbiology, health and safety, hygiene practices, good manufacturing practices (gmp) etc.	3	1	2
		<b>100</b>	<b>35</b>	<b>65</b>

### Assessment Criteria

<b>3. FIC/N7023 (Manage audit and implement health and safety system)</b>	PC1. establish to the quality team the importance of documentation, provide training on documentation system, and ensure all quality documents are maintained systematically		5	1	4
	PC2. ensure all relevant records and documents are complete, up-to-date and accessible		4	1	3
	PC3. ensure corrective actions agreed in previous audits have been implemented, and recommendations have been considered and acted upon		4	2	2
	PC4. manage third party audit by providing the auditor with access to all relevant information, records and documentation		5	2	3
	PC5. discuss with the auditor the results of the audit and agree appropriate corrective actions to any non-conformances identified and the date by which the actions would be completed		5	1	4
	PC6. ensure agreed corrective actions are carried out by agreed dates		4	1	3
	PC7. carry out quality audits across cross functions in the organisation, at suppliers, distributors and market to ensure quality standards are maintained throughout the system		5	2	3
	PC8. perform audits by establishing clearly the scope of the audit, the responsibilities of the auditees, the quality procedures that apply to their work, previous audit history and expectations to maintain quality, encourage to co-operate		5	2	3



### Assessment Criteria

	fully, and carry out audit to reveal any deviations from relevant quality procedures				
	PC9. share with the auditees the results of the audit and agree appropriate corrective actions for any non-conformances and the date by which the actions should be carried out, and check if corrective actions have been carried out by agreed dates		4	1	3
	PC10. identify and analyze any problems related to process and quality procedures, report findings and recommendations to management for immediate action		5	2	3
	PC11. maintain complete records of quality audits for management review and future reference		4	1	3
	PC12. establish organization's responsibilities for health and safety regulations and ensure there is a written health and safety policy applicable for all employees		5	2	3
	PC13. ensure health and safety policy and procedures are clearly communicated to all employees of the organisation		5	2	3
	PC14. ensure health and safety to be a priority while planning organisation standards		5	2	3
	PC15. implement system for identifying hazards and assessing risks in processing food products, and set procedures to control and prevent them		5	2	3

### Assessment Criteria

	PC16. implement system for gmp, haccp, fifo/fefo, product recall etc	5	2	3
	PC17. organize training to the employees on food safety, hygiene and sanitation for effective implementation of the systems	5	2	3
	PC18. implement food and safety procedures in all areas of function to ensure food safety and hygiene system is followed from procurement of raw material, production of product, packaging, storage, distribution and until the product reaching the consumer	5	2	3
	PC19. ensure health and safety policy is practiced across the organisation, effectively monitored, reviewed and revised at regular intervals to meet the changes in national and international regulations	5	2	3
	PC20. ensure systems are in place for effective monitoring, measuring and reporting the performance of health and safety system	5	1	4
	PC21. conduct unannounced audits in all functions of the organisation to ensure health and safety procedures are being followed	5	2	3
		<b>100</b>	<b>35</b>	<b>65</b>

# *Semester V*

### CORE IX - FOOD MICROBIOLOGY

SUB. CODE:15BFSNC09  
MAX.MARKS: 100

HOURS T+P = C  
3+0= 3

#### Objectives

- To gain knowledge of the role of micro-organism in health, disease and food processing unit.
- To understand the role of microbes in relation to food spoilage and food borne disease.

S.No.	Topics/Modules	Key Learning Outcomes	Duration in Hrs
1.	<b>Introduction and scope of food microbiology</b>	<ul style="list-style-type: none"><li>• Brief history of food microbiology</li><li>• Introduction to important microorganisms in food</li><li>• General characteristics of bacteria, fungi, virus, protozoa and algae</li><li>• Cultivation of microorganisms – Nutritional requirements, types of media used and method of isolation</li></ul>	<b>8</b>
2.	<b>Spoilage and microbiology of food</b>	<ul style="list-style-type: none"><li>• Food spoilage – types and sources</li><li>• Water activity and food spoilage</li><li>• Contamination of<ul style="list-style-type: none"><li>A) cereal and cereal products</li><li>B) sugar and sugar products</li><li>C) vegetables and fruits</li><li>D) meat and meat products</li><li>E) fish, egg and poultry</li><li>F) milk and milk products</li><li>G) canned foods</li></ul></li></ul>	<b>12</b>
3.	<b>Food fermentation</b>	<ul style="list-style-type: none"><li>• Fermentation –definition and types</li><li>• Microorganisms used in food fermentations</li><li>• Dairy fermentation -starter cultures and their types, concept of probiotics</li><li>• Fermented foods-types, methods of manufacture for vinegar, sauerkraut, tempeh, miso, soya sauce ,beer, wine and traditional Indian foods</li></ul>	<b>8</b>
4.	<b>Food borne diseases</b>	<ul style="list-style-type: none"><li>• Types – food borne infections and intoxications</li></ul>	<b>6</b>
5.	<b>Control of microorganisms</b>	<ul style="list-style-type: none"><li>• Fundamentals of control of microorganisms in food – Extrinsic and intrinsic factors affecting growth and survival of microorganisms, use of high and low temperature, dehydration, freezing, freeze drying, irradiation and preservatives in food</li></ul>	<b>6</b>
6.	<b>Destruction of</b>	<ul style="list-style-type: none"><li>• Sterilisation and disinfection – methods,</li></ul>	<b>6</b>

	microorganisms	Common disinfectants used in home and at industries, Tests to identify the effectiveness of sterilization and disinfection.	
7.	Indices of sanitary quality	<ul style="list-style-type: none"> <li>• Indices of food, milk and water sanitary quality</li> <li>• Microbiological criteria of foods, water and milk testing</li> <li>• Sampling of air, water, dust, soil, food and food handlers to study the various sources of transmission of microorganism in food</li> </ul>	8
<b>Total Duration</b>			<b>54</b>

### References:

1. Frazier W C., (2002): Food Microbiology, Mc Graw Hill Book Co., 6th edition, N.Delhi.
2. Pelezar, M.I and Reid, R.D, (1993): Microbiology, 5th edition, McGraw Hill Book Company, New York.
3. Jay, James, M (2000): Modern Food Microbiology, 2nd edition, CBS Publisher.
4. Adams, M.R. and Moses M.G. (1995): Food Microbiology. 1st edition, New Age International (P) Ltd.
5. Joshua A K., (2000): Microbiology, Popular Book Depot, Chennai
6. Ananthanarayanan R and Panicker C K J., Textbook of Microbiology, Orient Longman, Chennai

### **CORE X - FOOD PACKAGING TECHNOLOGY**

**SUB.CODE:15BFSNC10**  
**MAX.MARKS: 100**

**HOURS T+P =C**  
**3+0 = 3**

#### **Objectives**

- To gain knowledge on packaging material used in food packaging.
- To understand the different types and method of food package.

<b>S.No.</b>	<b>Topics/Modules</b>	<b>Key Learning Outcomes</b>	<b>Duration in Hrs</b>
1.	<b>Introduction and scope of food packaging</b>	<ul style="list-style-type: none"><li>• Definition, importance and role of food packaging</li><li>• Principles in the development of safe and protective packing</li><li>• Factors determining the packaging requirements of various foods</li><li>• Classification of packaging</li></ul>	<b>6</b>
2.	Packaging materials	<ul style="list-style-type: none"><li>• Properties and application of primary packaging materials<ul style="list-style-type: none"><li>a. Paperboards, metals, plastics, wood, plywood, glass, flexible packaging materials</li><li>b. Labels, caps and closures and wads, adhesives, inks and lacquers, cushioning materials, reinforcements etc.</li></ul></li></ul>	<b>8</b>
3.	Packaging systems and methods for food products	Vaccum packaging, gas flush packaging, CAP & MAP, aseptic and retort packaging, Bag-in-Box packaging, artificial and intelligent packaging	<b>10</b>
4.	Food packaging design	<ul style="list-style-type: none"><li>• Package design for fresh horticultural produce and animal foods, dry and moisture sensitive foods, frozen foods, fats and oils, thermally processed foods and beverages.</li><li>• Food marketing and role of packaging</li></ul>	<b>6</b>
5.	Testing and evaluation of packaging material	Thickness, tensile strength, puncture resistance, bursting strength, seal strength, water vapor permeability, CO <sub>2</sub> permeability, oxygen permeability, grease resistance	<b>8</b>
6.	Testing and evaluation of packaged foods	Compatibility and shelf life studies, evaluation of transport worthiness of filled packages	<b>6</b>
7.	Packaging laws and regulations	<ul style="list-style-type: none"><li>• FDA, PFA, Packaging Commodity Rules, Weight and Measures Act, Packaging and Labelling Rules and Regulations of FSSAI</li><li>• Coding and marking including bar coding</li></ul>	<b>10</b>

		<ul style="list-style-type: none"> <li>• Environmental &amp; Eco issues and waste disposal</li> </ul>	
<b>Total Duration</b>			<b>54</b>

### References:

1. Robertson GL, Food Packaging – Principles and Practice, CRC Press Taylor and Francis Group, 2012.
2. Paine FA and Paine HY, A Handbook of Food Packaging, Blackie Academic and Professional, 1992.
3. Coles R, McDowell D, Kirwan MJ Food Packaging Technology. Blackwell, 2003.
4. De S, Outlines of Dairy Technology, Oxford Publishers, 1980
5. Jenkins WA and Harrington JP, Packaging Foods with Plastics, Technomic Publishing Company Inc., USA, 1991
6. Richard Coles and Mark Kirwan, “Food and Beverage Packaging Technology”, Second Edition, A John Wiley & Sons, Ltd., Publication, 2011.
7. Dr.B.Kumar and Dr.S.Natarajan and Dr.M.Govindarajan, “Fundamentals of Packaging”, Published by PHI Learning Pvt Ltd, Jan. 2009

### **CORE XI- FOOD MICROBIOLOGY PRACTICAL**

**SUB.CODE: 15BFSNC11**  
**MAX.MARKS: 100**

**HOURS T+P=C**  
**0+3=2**

#### **Objective**

- To familiarize the students with procedures of microbial culturing, aseptic technique, staining, identification of microorganisms and the conditions necessary for microbial growth.

<b>S.No.</b>	<b>Module</b>	<b>Key Learning Outcomes</b>	<b>Duration in Hrs</b>
1.	General	Standard operating procedures for microbial laboratory	6
2.	Morphology of microorganisms	Examine the morphology of microorganism present in the given food sample by i. Simple staining technique ii. Negative staining technique iii. Gram staining technique	9
3.	Media	Preparation of culture media for the growth of microorganisms	6
4.	Microbial load	Enumerate the microbial load of given food samples by i. Spread plate method ii. Pour plate method iii. Streak plate method	9
5.	Characterization of microorganisms	Biochemical characterization of microorganisms	9
6.	Safety and Hygiene	Enumerate the microbial load of food processing equipments and vessels	6
7.	Indicator microorganisms	Assessment of indicator microorganisms present in the given food sample	9
<b>Total Duration</b>			<b>54</b>

#### **References:**

1. Garbutt, John, (1997): Modern food microbiology, Arnold, London.
2. FSSAI manual on the methods of microbiological testing.
3. Frazier W C., (2002): Food Microbiology, McGraw Hill Book Co., 6th edition, N.Delhi.
4. Peleazar, M.I and Reid, R.D, (1993): Microbiology, 5th edition, McGraw Hill Book Company, New York.
5. Jay, James, M (2000): Modern Food Microbiology, 2nd edition, CBS Publisher.



## **CORE XII - FOOD QUALITY ANALYSIS PRACTICAL**

**SUB.CODE: 15BFSNC12**  
**MAX.MARKS: 100**

**HOURS: T+P=C**  
**1+2=2**

### **Objectives**

- To learn the estimation and testing techniques used in quality analysis of food items.

<b>S.No.</b>	<b>Topic/Module</b>	<b>Key Learning Outcomes</b>	<b>Duration in Hrs</b>
1.	General	Standard operating procedures for food analysis laboratory	3
2.	Cereals, Pseudo cereals, Millets and Pulses	i. Determination of moisture content ii. Determination of total ash content iii. Determination of acid insoluble ash content iv. Determination of crude fibre v. Examine the microscopic structure of different starches	18
3.	Fruits and Vegetables	i. Determination of titrable acidity	3
4.	Fleshy Foods and Egg	i. Determination of protein	3
5.	Fats & Oils, Nuts and Oilseeds	i. Determination of specific gravity and refractive index ii. Determination of melting point of fat iii. Determination of total fat content iv. Tests for oils	12
6.	Milk and Milk Products	i. Detection of components in milk	6
7.	Spices and Condiments Sugar and Jaggery	i. Test for adulterants	12
<b>Total Duration</b>			<b>54</b>

### **References:**

1. FSSAI manual of methods of analysis of foods – cereals and cereal products
2. FSSAI manual of methods of analysis of foods – fruit and vegetable products
3. FSSAI manual of methods of analysis of foods – milk and milk products
4. FSSAI manual of methods of analysis of foods – oils and fats
5. FSSAI manual of methods of analysis of foods – spices and condiments

### ELECTIVE III- FOOD FOR DISEASES

SUB.CODE: 15BFSNEL03  
MAX.MARKS: 100

HOURS: T+P=C  
2+1=2

#### Objective

- To familiarize the students with food items, nutraceutical and functional component of food specific for the prevention and control of various diseases.

S.No.	Topics/Modules	Key Learning Outcomes	Duration in Hrs
1.	<b>Introduction to nutraceuticals and functional food</b>	<ul style="list-style-type: none"><li>Definition, synonymous terms</li><li>Basis of claims for a compound as nutraceutical</li><li>Regulatory issues for nutraceuticals including CODEX</li></ul>	<b>6</b>
2.	Nutraceutical properties of nutrient component of food	<ul style="list-style-type: none"><li>Nutraceutical properties of<ul style="list-style-type: none"><li>a. polysaccharides</li><li>b. bioactive lipids</li><li>c. bioactive peptides</li><li>d. bioactive polyphenols and carotenoids</li><li>e. vitamins</li></ul></li></ul>	<b>10</b>
3.	Nutraceutical potential of food	<ul style="list-style-type: none"><li>Nutraceutical potential of<ul style="list-style-type: none"><li>a. Cereals, pulses, millets, pseudo cereals</li><li>b. Fruits and vegetables</li><li>c. Nuts and oilseeds</li><li>d. Milk</li><li>e. Meat, egg, fish and poultry</li><li>f. Spices and condiments</li><li>g. Seaweeds, tea and honey</li></ul></li></ul>	<b>10</b>
4.	Nutraceutical and functional food in diseases	<ul style="list-style-type: none"><li>Concept of angiogenesis and the role of nutraceuticals/functional foods</li><li>Nutraceuticals for cardiovascular diseases, gastrointestinal disorders, renal diseases, cancer, diabetes, cholesterol management, obesity, joint pain, immune enhancement, age-related macular degeneration, endurance performance and mood disorders</li></ul>	<b>14</b>
5.	Manufacturing of nutraceuticals	<ul style="list-style-type: none"><li>Manufacturing aspects of selected nutraceuticals such as lycopene, isoflavonoids, prebiotics and probiotics, glucosamine, phytosterols etc.</li><li>Formulation of functional foods containing nutraceuticals – stability and analytical issues, labelling issues.</li></ul>	<b>8</b>
6.	Testing and evaluation of nutraceuticals	<ul style="list-style-type: none"><li>Clinical testing of nutraceuticals and health foods</li><li>Interactions of prescription drugs and</li></ul>	<b>6</b>

		nutraceuticals <ul style="list-style-type: none"> <li>• Adverse effects and toxicity of nutraceuticals</li> <li>• Nutrigenomics and its relation to nutraceuticals</li> </ul>	
<b>Total Duration</b>			<b>54</b>

### References:

1. Brigelius-Flohé, J & Joost HG. 2006. *Nutritional Genomics: Impact on Health and Disease*. Wiley VCH.
2. Cupp J & Tracy TS. 2003. *Dietary Supplements: Toxicology and Clinical Pharmacology*. Humana Press.
3. Gibson GR & William CM. 2000. *Functional Foods - Concept to Product*.
4. Goldberg I. 1994. *Functional Foods: Designer Foods, Pharma Foods*.
5. Losso JN. 2007. *Angi-angiogenic Functional and Medicinal Foods*. CRC
6. Press. Manson P. 2001. *Dietary Supplements*. 2<sup>nd</sup> Ed. Pharmaceutical Press.
7. Campbell JE & Summers JL. 2004. *Dietary Supplement Labeling Compliance*.
8. Neeser JR & German BJ. 2004. *Bioprocesses and Biotechnology for Nutraceuticals*.
9. Chapman & Hall. Robert EC. 2006. *Handbook of Nutraceuticals and Functional Foods*. 2<sup>nd</sup> Ed.
10. Wildman. Shi J. (Ed.). 2006. *Functional Food Ingredients and Nutraceuticals: Processing Technologies*. CRC Press.
11. Webb GP. 2006. *Dietary Supplements and Functional Foods*. Blackwell Publ.
12. Dhiraj A. Vatter and Vatsalamaitin, *Functional foods, Nutraceutical and Natural products – concepts and applications*, DES tech publications, 2016.
13. Aluko and Rotimi E, *Functional foods and Nutraceuticals*, Springer publications, 2012.
14. Robert E.C. Wildman, *Handbook of Nutraceutical and Functional foods*, II edition, CRC press, 2006.
15. Brian Lockwood, *Nutraceutical*, II editions.

# *Semester VI*

**CORE XIII – FOOD INDUSTRIAL BY-PRODUCTS AND WASTE MANAGEMENT****SUB.CODE: 15BFSNC13**  
**MAX.MARKS: 100****HOURS: T+P=C**  
**3+0=3****Objectives**

- To impart knowledge about waste minimization, utilizing and developing various techniques to get best out of waste from various food industries.

S.No.	Topic/Module	Key Learning Outcomes	Duration in Hrs
1.	Food industry by-products and waste	Introduction Status in India Types of waste and by-products from food industries Composition and characterization Need for treatment and utilization Impact on environment	10
2.	Waste treatment methods	Membrane separation, advanced oxidation/reduction, electrolytic methods, up-flow anaerobic sludge blanket (UASB), aerobic and anaerobic methods, activated sludge treatment, sludge thickening, sludge conditioning, sludge dewatering, composting and incineration, land filling, vermicomposting.	12
3.	Utilization of fruits, vegetables and sugar by-products and waste	Types of waste in fruits and vegetable processing industries. Process for waste utilization from fruit and vegetable industries Fermentation for production of alcohol and vinegar, oil & flavoring components, pigments extraction and acid production from waste By products utilization of sugar industry	10
4.	Utilization of by-products from cereals, millets, pulses, oilseeds and tuber crops	Utilization of by products from wheat, rice, corn, dhal milling Utilization of husk, bran, cob, germ, broken and powder Oil processing industries – Introduction, De-oiled cake, animal feed, fertilizer, bio sorbents, waxes, soap stock, cocoa butter replacer. Tuber processing industries- Introduction, enzyme production, biogas, bakers yeast, bioethanol, animal feed, corn syrup, organic acids, nutraceuticals.	12
5.	Utilization of by-products from Animal products based industries	Dairy industry - Introduction- opportunities – whey, bio surfactants, bacteriocin. Meat, fish, poultry and egg processing industries- bio active peptide, protein extract, gelatin, heparin, pepsin, bio molecule from bone and blood, keratin from animal hair, bone meal, meat meal, chondroitin sulfate, squalene, fish oil, micro nutrients- vitamins and minerals, pigments.	10
		Total	54

## **References**

### **TEXT BOOKS:**

1. Chandrasekaran M., —Valorization of Food Processing By-Products||, CRC Press, 2013.
2. Vasso Oreopoulou and Winfried Russ, —Utilization of By-Products and Treatment of Waste in the Food Industry||, Springer Science Business Media, USA, 2007.

### **REFERENCE BOOKS:**

1. Keith Waldron, —Handbook of waste management and co-product recovery in food processing||, Wood head Publishing Ltd., England, 2007.
2. Green J.H. and Kramer A., —Food Processing Waste Management||, AVI Publishing Company, Malaysia,1981.
3. Nelson L. Nemerow and Franklin J. Agardy, —Strategies of Industrial and Hazardous Waste Management||, John Wiley and Sons, 1998.

## **CORE XIV – FOOD TRADE AND BUSINESS MANAGEMENT**

**SUB.CODE: 15BFSNC14**

**HOURS: T+P=C**

**MAX.MARKS: 100**

**3+0=3**

### **Objectives**

- To impart knowledge about entrepreneurship concepts, trade and business plan
- To make the students understand Business plan, Launching and Management of Small Business.

<b>S.No.</b>	<b>Topic/Module</b>	<b>Key Learning Outcomes</b>	<b>Duration in Hrs</b>
1.	Entrepreneurship Concepts	Concept and Functions of entrepreneurship, Need and Myths of entrepreneurship, process of entrepreneurship, types, competencies and ethics of entrepreneurship, Intrapreneurship, social entrepreneurship, foodpreneurship.	<b>06</b>
2.	Start-up and Business Plan	Objectives of a Business Plan, Business Planning Process, Opportunity Identification and Selection, Contents of a Business Plan, Execution of business plan, Feasibility analysis, Innovations leading to entrepreneurial ventures, components of business- industry, trade and commerce, technology licensing, intellectual property law, patents, trademarks and copyright.	<b>06</b>
3.	Concept of Market and Marketing Mix	Concept of market and its evolution, E-business and E-commerce, Market environment at micro and macro level, Techniques of market research and market survey, Market expansion, marketing mix	<b>06</b>
4.	Business Finance and Arithmetic	Cash register, unit of sale, unit cost and unit price, types of cost, income statement, cash flow projections, break-even analysis for a single product or service, taxes	<b>12</b>
5.	Resource mobilization	Planning effective resource mobilization, estimating financial requirements, estimate capital requirement, sources of finance, mentorship, size and capital based classification of business enterprises, sources of business information, ICT in business.	<b>08</b>
6.	Trade and Policies	India's Agricultural Trade Policy and Sustainable Development goals, Food Policy in India, Import and export procedures and guidelines in India	<b>08</b>
7.	Business Development Services	Business development service providers in India - DIC, MSME, NSIC, SIDCO, Financial Institutions and Banks.	<b>08</b>
		<b>Total</b>	<b>54</b>

### **References**

#### **TEXT BOOKS:**

1. CBSE publication, Class XI, Entrepreneurship, 3<sup>rd</sup> Edition, 2013.
2. S.S.Khanka, —Entrepreneurial Development, 4<sup>th</sup> Edition, S.Chand & Company Ltd., 2012.
3. Madhurima Lall and Shikha Sahai, —Entrepreneurship, 2<sup>nd</sup> Edition, Excel Books, New Delhi, 2008.

**REFERENCE BOOKS:**

1. Robert D Hisrich, Michael P Peters and Dean A Shepherd, —Entrepreneurship, Sixth Edition, Tata McGraw Hill, New Delhi, 2009.
2. Mary Coulter, —Entrepreneurship in Action, Second Edition, Prentice Hall of India, New Delhi, 2005.
3. Jain P.C., —Handbook for New Entrepreneurs, Oxford University Press, Oxford, 2003.
4. African Technology Policy Studies Network, Entrepreneurship Skills: Training Manual for Scientists, 2012.



## **CORE XV – NUTRITION ASSESSMENT AND DIET PLANNING**

**SUB.CODE: 15BFSNC15**

**MAX.MARKS:100**

**HOURS: T+P=C**

**1+3=2**

### **Objectives**

- To inculcate practical training on the Assessment of Nutritional parameters and basics of diet planning for specific conditions.

S.No.	Topic/Module	Key Learning Outcomes	Duration in Hrs
1.	Methods of Assessments	1. Anthropometric Assessments of Individuals	3
		2. Case study on Biochemical Assessments of Individuals	6
		3. 24 hr recall method	3
		4. Three days recall method	3
2.	Planning, preparation and calculation of diet for specific conditions	a) Normal diet	3
		b) Liquid diet	3
		c) Soft diet	3
		d) High and low caloric diet	3
		e) Bland diet for peptic ulcer	3
		f) Diet for Viral hepatitis and cirrhosis	3
		g) Diet for Diabetes mellitus	3
		h) Diet for Hypertension and Atherosclerosis	3
		i) Diet for Nephritis and Nephrotic syndrome	6
		k) Low and medium cost diets for P.E.M., Anemia & vitamin A deficiency	9
Total			54

### **References**

1. Complete Module on Meal Planning. Assessed on 03.06.2018.  
(<http://download.nos.org/srsec321newE/321-E-Lesson-5.pdf>)

<b>Course Name</b>	<b>IT Applications in Food Industry</b>	<b>Programme Name</b>	<b>B.Voc Food Science and Nutrition</b>
Course Code	15BFSNC16	Academic Year Introduced	2015 - 16
Type of Course	Practical	Semester	VI

#### **COURSE OBJECTIVES AND HOURS OF INSTRUCTION**

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Microsoft Office	To familiarize with the basics and functions of Microsoft office applications	18
Enterprise Resource Planning (ERP) software	To learn the Enterprise Resource Planning and employ it in Food industry	18
Automated software	To recognize the value of automated software in Food industry	18
Total Hours of Instruction		54

Tu-Tutorial, P-Practical, Te-Tests, To-Total Hours COURSE PLAN

Module/Experiment No.	Intended learning Chapters	Psychomotor domain activity
1.	Microsoft Word	To create a Microsoft Word Document and to learn the functions of Microsoft word document and access it .
2.	Microsoft Excel	To create a Microsoft Excel and to learn the functions of Microsoft Excel and access it
3.	Microsoft Power point Presentation	To create a Microsoft Power point presentation, to access and apply it
4.	Automated Software	To gain knowledge on the automation softwares through an industrial visit

#### **REFERENCES**

TEXTBOOKS	
1	Singh, R. P. (1996). Computer Applications in Food Technology: Use of Spreadsheets in Graphical, Statistical, And Process Analysis. Elsevier.
2	Teixeira, A. A., & Shoemaker, C. F. (2012). Computerized food processing operations. Springer Science & Business Media.
3	Sinha, P. K., & Sinha, P. (2016). Information Technology: Theory and Practice. PHI Learning Pvt. Ltd..
REFERENCE BOOKS	
1	Vlach, J. (1992). Basic Network Theory: With Computer Applications. New York: Van Nostrand Reinhold.
2	Gunasekaran, S. (1996). Computer vision technology for food quality assurance. Trends in Food Science & Technology, 7(8), 245-256.
3	Sinha, P. K., & Sinha, P. (2003). Computer Fundamentals. BPB Publications (sixth edition)
JOURNALS AND DOCUMENTS	
1	International Journal of Supply Chain Management, Exceling Tech Publishers
2	Trends in Food Science and Technology ,Elsevier
3	IFIP Advances in Information and Communication Technology ,Springer Nature

**ELECTIVE PAPER – NUTRITION AND PHYSICAL FITNESS****SUB.CODE: 15BFSNEL04****HOURS: L+T+P=C****MAX.MARK: 100****1+0+2=2****Course Objectives and Outcomes**

<b>Unit/Module Title</b>	<b>Objectives</b>	<b>Learning Outcomes</b>	<b>Hours of Instruction L+Tu+Te=To</b>
Human Physiology	To learn about the structure and functions of systems in a human body	Able to identify the individual functions of the systems	8+2+1=11
Therapeutic Nutrition	To categorize the disease conditions and plan diet	Able to modify the dietary needs based on their requirement	8+2+1=11
Assessment of Nutritional Status	To learn about the assessment techniques	Able to illustrate assessment methods	7+2+1=10
Importance of Physical Fitness	To relate activities based on their endurance, time etc.	Able to interpret activities that utilises energy in enormous amount	7+2+1=10
Nutrition in Sports and Fitness	To learn about the energy utilisation, RDA for sports	Able to prepare diet and counsel the athletes	7+2+3=12
<b>Total Hours of Instruction</b>			<b>54 (18*3)</b>

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

**Syllabus**

<b>Unit /Module No.</b>	<b>Unit/Module Title</b>	<b>Intended Learning Chapters</b>	
		<b>Knowledge Components</b>	<b>Analytical Components</b>
I	Human Physiology	Structure and function - Cell, Skeletal system, Blood and Circulatory system, Gastro-intestinal system, Excretory, Respiratory system, Endocrine system, Reproductive system, Immune system, Special senses	Identify the functions of the body system
II	Therapeutic Nutrition	Etiology, symptoms, and dietary management in diseases of the gastrointestinal tract, metabolic disorders, kidney diseases, diseases of cardio vascular system, diet for weight management, diet for allergic conditions	Plan and calculate the diets for disease conditions

III	Assessment of Nutritional Status	<ul style="list-style-type: none"> <li>a. Indirect methods – Demography, vital statistics, mortality and morbidity patterns, literacy rate, unemployment rate, socio-economic profile.</li> <li>b. Direct methods – Anthropometry, clinical assessment, biochemical estimations, diet survey.</li> </ul>	Assessment of Height, weight, skin fold thickness , Mid - Upper arm Circumference. Body Mass Index (BMI), Waist - Hip Ratio (WHR).
IV	Importance of Physical Fitness	<ul style="list-style-type: none"> <li>a. Importance and benefits of physical activity</li> <li>b. Physical Activity – frequency, intensity, time and type with examples</li> <li>c. Physical Activity Guidelines and physical activity pyramid</li> </ul>	Perform endurance activities and analyse the change in heart rate, blood pressure.
V	Nutrition in Sports and Fitness	<ul style="list-style-type: none"> <li>a. Physiology and biochemistry of exercise</li> <li>b. Muscle contraction, Energy sources for muscle use, ATP</li> <li>c. Nutritional assessment and counselling for athletes.</li> <li>d. Nutrition needs of male, female, younger and older athletes.</li> </ul>	Plan and calculate the diet for athletes based on their recommendations.

#### **Reference:**

#### **Reference Book:**

1. Wardlaw, Smith. Contemporary Nutrition: A Functional Approach. 2nd ed: 2012.Mc Graw Hill.
2. Williams Melvin. Nutrition for health, fitness and sports. 2004.Mc Graw Hill
3. Joshi AS. Nutrition and Dietetics 2010. Tata Mc Graw Hill.

#### **Journals and Documents**

1. NIN manual on Nutrition and Hydration guidelines for excellence in sports performance

## QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR FOOD PROCESSING

### What are Occupational Standards(OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

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3. Glossary of Key Terms.....[3]
4. OS Units.....[5]
5. Annexure: Nomenclature for QP and NOS...[27]
6. Assessment Criteria.....[29]

### Introduction

### Qualifications Pack – Production Manager

**SECTOR:** FOOD PROCESSING

**SUB-SECTOR:** FRUIT AND VEGETABLE, FOOD GRAIN MILLING (INCLUDING OILSEEDS), DAIRY PRODUCTS, MEAT AND POULTRY, FISH & SEA FOOD, BREAD AND BAKERY, ALCOHOLIC BEVERAGES, AERATED WATER/SOFT DRINKS, SOYA FOOD, PACKAGED SNACKS, PACKING AND REFRIGERATION

**OCCUPATION:** PROCESSING

**REFERENCE ID:** FIC/Q9003

**ALIGNED TO:** NCO-2004/1222.70

A Production Manager is responsible for production of food products and meeting quantity, quality and cost standards.

**Brief Job Description:** A Production Manager is responsible for production of food products through the process of production planning, coordinating and controlling production process to achieve quantity and quality products.

**Personal Attributes:** A Production Manager must have the ability to read, write, communicate, plan, organize and prioritize. S/he must possess mathematical organizational and analytical skills, ability to concentrate, physical stamina, mechanical aptitude and trouble shooting skills and have an understanding of food safety standards and requirements.

Job Details	Qualifications Pack Code	FIC/Q9003		
	Job Role	Production Manager		
	Credits (NSQF)	TBD	Version number	1.0
	Sector	Food Processing	Drafted on	26/11/2015
	Sub-sector	Fruit and vegetable, Food grain milling (including oilseeds), Dairy products, Meat and Poultry, Fish & Sea food, Bread and Bakery, Alcoholic Beverages, Aerated water/soft drinks, Soya food, Packaged snacks, Packing and refrigeration	Last reviewed on	30/03/2016
	Occupation	Processing	Next review date	30/03/2019
	NSQC clearance date	N/A		

Job Role	Production Manager
Role Description	A Production Manager is responsible for production of food products through the process of production planning, coordinating and controlling production process to achieve quantity and quality products, reviewing production process to minimize production cost and optimizing production.
NSQF level	7
Minimum Educational Qualifications	Bachelor's degree in engineering
Maximum Educational Qualifications	Not Applicable
Training (Suggested but not mandatory)	<ol style="list-style-type: none"> <li>1. ISO</li> <li>2. HACCP</li> <li>3. Six Sigma</li> <li>4. OHSAS</li> <li>5. Integrated Management System</li> <li>6. Food Safety Standards and Regulations (as per FSSAI)</li> </ol>
Minimum Job Entry Age	21 years
Experience	10-12 yrs in food processing unit
Applicable National Occupational Standards (NOS)	<p><b>Compulsory:</b></p> <ol style="list-style-type: none"> <li>1. <a href="#">FIC/N9014 Manage production process in food processing unit</a></li> <li>2. <a href="#">FIC/N9015 Manage production optimization and cost efficiency in food processing unit</a></li> <li>3. <a href="#">FIC/N9016 Manage documentation system and implement safety and environmental policies in food processing unit</a></li> </ol> <p><b>Optional:</b> N.A.</p>
Performance Criteria	As described in the relevant OS units

Definitions

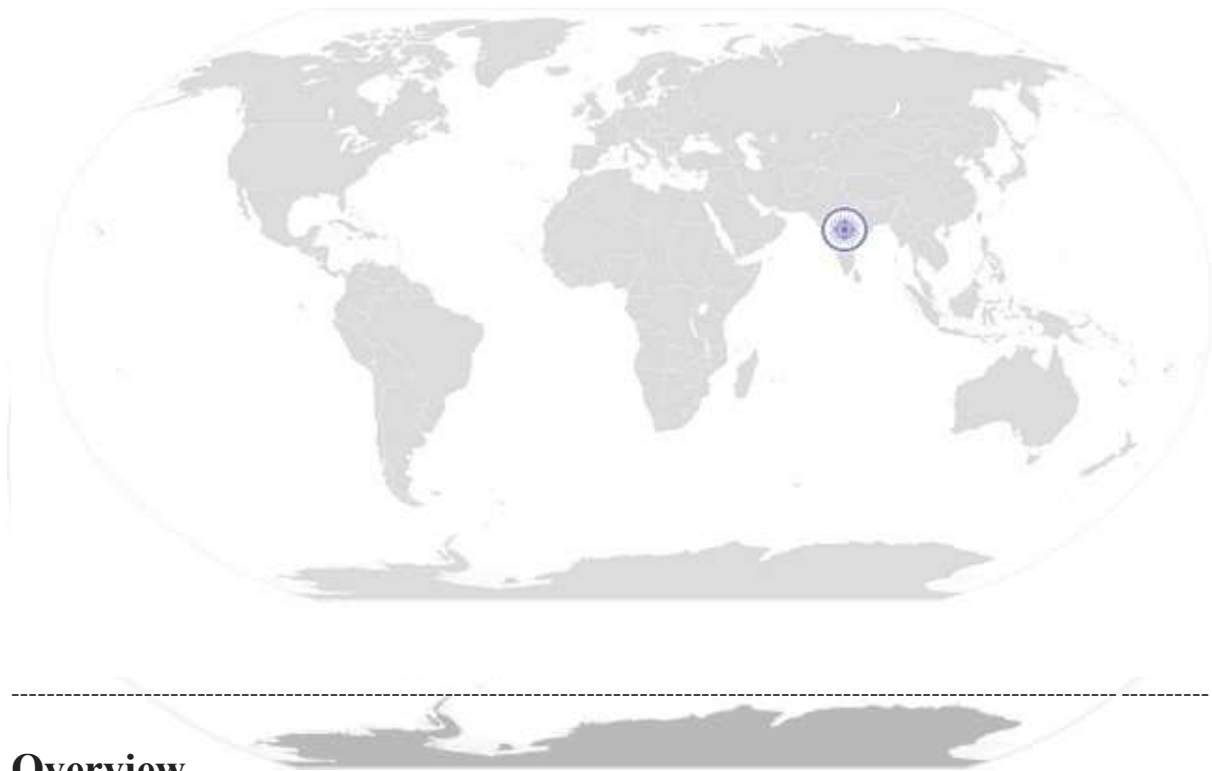
Keywords /Terms	Description
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through analysis and form the basis of OS.
Job Role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
OS	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
NOS	NOS are Occupational Standards which apply uniquely in the Indian context.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Qualifications Pack	Qualifications Pack comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A Qualifications Pack is assigned a unique qualification pack code.
Unit Code	Unit Code is a unique identifier for an Occupational Standard , which is denoted by an 'N'
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
Organizational Context	Organizational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills or Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.

Acronyms

Keywords /Terms	Description
CIP	Clean In Place
COP	Clean Out Of Place
ERP	Enterprise Resource Planning
FIFO	First In First Out
FEFO	First Expiry First Out
FSSAI	Food Safety and Standards Authority of India
GMP	Good Manufacturing Practice
GHP	Good Hygiene Practices
HACCP	Hazard Analysis and Critical Control Point
NOS	National Occupational Standard
NSQF	National Skill Qualification Framework
OS	Occupational Standard
PC	Performance Criteria
QP	Qualification Pack
SSC	Sector Skill Council
SOP	Standard Operating Procedure
QMS	Quality Management System



# National Occupational Standard



## Overview

This OS unit is about managing production process in food processing unit by providing leadership to production team, planning production, coordinating maintenance, managing production and new product trials.

**FIC/N9015**
**Manage production optimization and cost efficiency**

National Occupational Standard

<b>Unit Code</b>	<b>FIC/N9014</b>
<b>Unit Title (Task)</b>	<b>Manage production process in food processing unit</b>
<b>Description</b>	This OS unit is about managing production process in food processing units.
<b>Scope</b>	This unit/task covers the following: <ul style="list-style-type: none"> <li>• Provide leadership to production team</li> <li>• Schedule production</li> <li>• Co-ordinate maintenance</li> <li>• Manage production</li> <li>• Manage new product trials</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Provide leadership to production team</b>	PC1. communicate the organisation policies and goals clearly to the employees of production team, make them understand and commit their energy and expertise to achieve organisation goals PC2. achieve department targets and organisation goals by understanding the organisation and employees, developing a leadership style and applying them appropriately PC3. communicate with employees regularly and effectively, help them identify their strengths, provide support to overcome their weakness, listen to their grievances and provide appropriate solutions, and win their trust and support PC4. motivate and support employees to achieve their work and development objectives, and provide recognition when they are successful PC5. encourage employees to take responsibilities, to take own decisions within agreed boundaries, to take lead in their own areas of expertise for their development PC6. initiate personnel actions, such as promotions, transfers, discharges or disciplinary measures PC7. lead production department and team successfully through difficulties and challenges
<b>Schedule production</b>	PC8. review the sales forecast for the week/month (or) monthly production plan discussed with plant manager (or) customer requirement (as applicable) and identify production priorities to meet market requirement PC9. identify and confirm resource availability such as raw materials, packing materials, equipment availability and capacity, production capacity, manpower requirement and availability, stock level, storage capacity, transport capacity etc PC10. plan details of production in terms of output quantity and quality, cost, time

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**Manage production optimization and cost efficiency**

	<p>and manpower requirements</p> <p>PC11. analyze the consequences of failing to meet production/delivery timelines to meet the schedule, notify relevant authorities of any possibility that demand cannot be met within required timeframe</p> <p>PC12. develop production schedule to meet market demands/priorities and delivery timelines within budget and with available resources, consult production plan with inter department heads and production supervisor, instruct supervisor to allocate work to production team</p> <p>PC13. communicate the production schedule to cross function heads through communication system followed by the organisation such as e-mail or upload in the ERP system</p>
<b>Co-ordinate maintenance</b>	<p>PC14. identify and confirm equipment requirements to meet production target, share production schedule with equipment requirement to maintenance manager/supervisor for maintenance plan that aligns with production plan</p> <p>PC15. co-ordinate with maintenance manager/supervisor to understand materials, consumables and manpower requirement and availability for maintenance activities, for uninterrupted production</p> <p>PC16. understand equipment maintenance process and procedure and co-ordinate for maintenance activities during breakdown, emergency response, routine cleaning and servicing, etc.</p> <p>PC17. analyze equipment maintenance data to interpret equipment performance and arrive at production capability of each process equipment</p> <p>PC18. co-ordinate with maintenance team to ensure reliable equipment performance with minimal disruption to production, to minimize down time during equipment breakdowns, and to optimize equipment efficiency to achieve production target</p> <p>PC19. lead and build team spirit between production and maintenance personnel through effective communication to enhance equipment performance and to identify production improvement opportunities</p> <p>PC20. ensure maintenance procedures are followed meet food safety and environmental requirements</p>
<b>Mange Production</b>	<p>PC21. monitor production process for usage of raw materials, packaging materials, manpower, wastage against production plan and identify reason for variances against plan</p> <p>PC22. address the reason for variation in achieving production schedule, production target within allocated budget</p> <p>PC23. adjust production schedule in response to variables affecting achievement of production target</p> <p>PC24. monitor production output and cost, adjust processes and resources to minimize cost and to achieve quantity and quality product</p>

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	<p>PC25. reschedule production plan in case of urgent requirement or any unforeseen event, to minimize wastage and to utilize materials/utilities and resources efficiently, discuss and negotiate changes with inter department team on time for their support and team work</p> <p>PC26. review production schedule and process, consult /discuss with supervisor, team and cross function teams identify opportunities for improvement and develop recommendations for improvement on production process</p> <p>PC27. set polices, plans and procedures, and take initiative to implement the identified improvement opportunities to control cost and to achieve better yield and quality</p> <p>PC28. monitor, review and ensure production details are documented to meet the documentation requirements of the organisation, and to meet audit requirements like ISO, HACCP, etc.</p>
<b>Manage new product trials</b>	<p>PC29. understand objective of trial production, trial product processing method and specification, select production team for trial, discuss with cross function team like planning, QA, maintenance etc, clarify roles and responsibilities and level of authority to the team and cross function</p> <p>PC30. prepare technical production procedures considering all engineering and process parameters for new product trial, educate and train supervisors and operators on trial procedure</p> <p>PC31. identify and consider all possible hazards, prepare plan and procedures to prevent and control hazards, provide training to trial team to handle hazards</p> <p>PC32. prepare detailed trial production schedule to manage production process without overlapping/affecting with regular production, and considering availability of raw materials and packaging materials, machine availability and capability, man power availability and competency etc</p> <p>PC33. monitor trial production against plan to identify variances and factors that need to be adjusted to achieve product of required specification within the planned time</p> <p>PC34. document and evaluate trial production data and identify process/parameters to be modified/changed to achieve product of required specification</p> <p>PC35. prepare trial production report with recommendations on improvement opportunities, and share with cross function heads and relevant authorities for suggestion and consideration</p>
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. organisaition goals and policies</p> <p>KA2. business processes of the organisation</p>

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company / organization and its processes)	KA3. production management KA4. food regulatory system related to the process and products produced in the organisation KA5. resource management KA6. manpower modelling and handling KA7. code of business conduct
<b>B. Technical Knowledge</b>	The user/individual on the job needs to know and understand: KB1. risk analysis and risk management KB2. principles and methods of planning for regular and contingency situations KB3. methods to monitor and control operational plans to achieve objectives KB4. methods to communicate with people of varying nature and in different situations KB5. methods to identify and address difficulties and challenges KB6. production management and production process for products produced in the organisation KB7. process equipment design, capability, operation and maintenance KB8. process improvement tools and techniques KB9. methods to identify and assess current performance and identify improvement opportunities and proposals KB10. basic maintenance approaches and models KB11. methods to analyze process information KB12. statistical tools analyse process capability KB13. methods to measure effectiveness of production process and maintenance KB14. food regulatory systems like FSSAI KB15. GMP KB16. GHP KB17. HACCP KB18. QMS KB19. ISO KB20. OHSAS
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b> The user/ individual on the job needs to know and understand how to: SA1. note the information communicated SA2. note the raw materials used for production and the finished products produced SA3. note the readings of the process parameters and provide necessary information to fill the process chart SA4. note down observations (if any) related to the process SA5. write information documents to internal departments/ internal teams



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	SA6. note down the data for online ERP or as per applicability in the organization
	<b>Reading Skills</b>
	The user/individual on the job needs to know and understand how to:
	SA7. read and interpret the process required for producing various types of products
	SA8. read and interpret and process flowchart for all products produced
	SA9. read equipment manuals and process documents to understand the equipments operation and process requirement
	SA10. read internal information documents sent by internal teams
	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/individual on the job needs to know and understand how to:
	SA11. discuss task lists, schedules and activities
	SA12. effectively communicate with team members
	SA13. question in order to understand the nature of the problem and to clarify queries
	SA14. attentively listen and comprehend the information given by the speaker
	SA15. communicate clearly on the issues being faced
<b>B. Professional Skills</b>	<b>Decision Making</b>
	The user/individual on the job needs to know and understand how to:
	SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue
	SB2. handle issues in case the manager is not available (as per the authority matrix defined by the organization)
	<b>Plan and Organize</b>
	The user/individual on the job needs to know and understand how to:
	SB3. plan and organize the work order and jobs received
	SB4. organize raw materials and packaging materials required for all products
	SB5. plan and prioritize the work based on the instructions received
	SB6. plan to utilise time and equipment's effectively
	SB7. organize all process/ equipment manuals so as to access information easily
	SB8. support the manager in scheduling tasks for helper(s)
	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to:
	SB9. understand customer requirements and their priority and respond as per their needs
	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to:
	SB10. support manager in solving problems by detailing out problems
	SB11. discuss the possible solutions with the manager for problem solving
	<b>Analytical Thinking</b>

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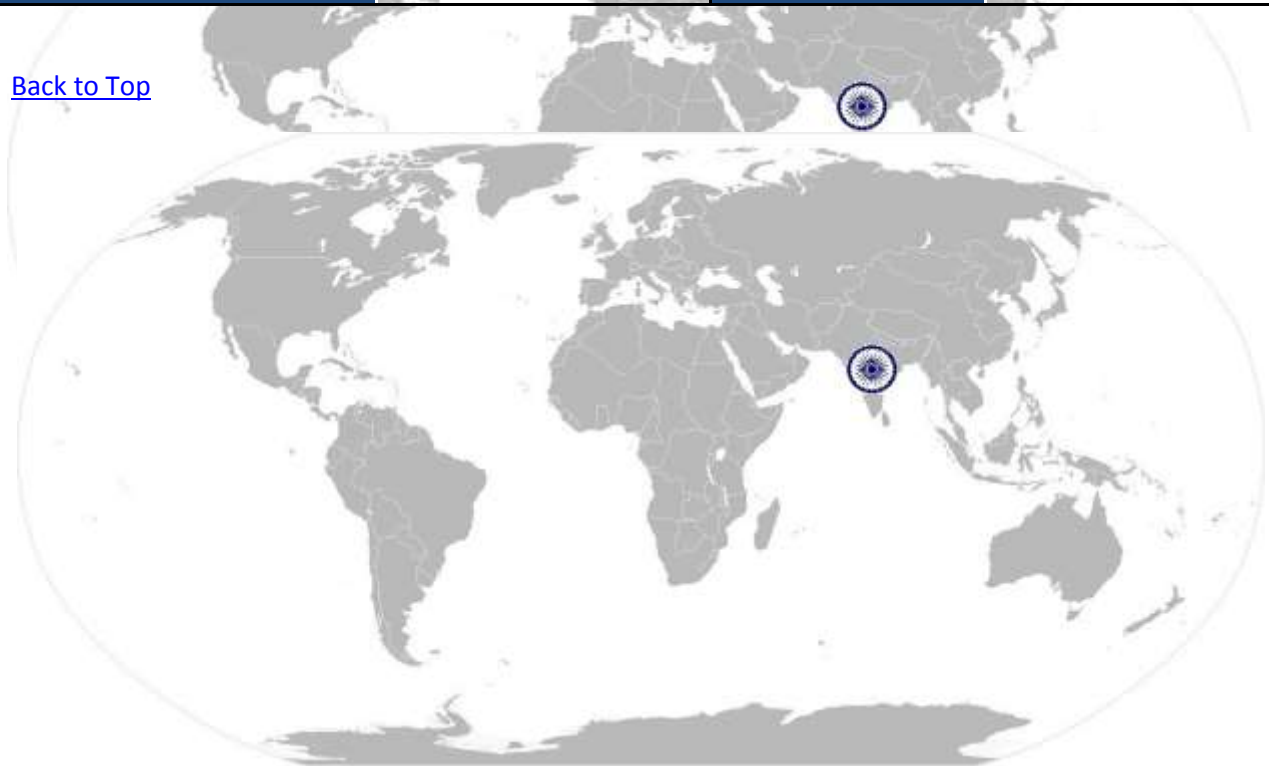
	The user/individual on the job needs to know and understand how to: SB12. apply domain information about maintenance processes and technical knowledge about tools and equipment
	<b>Critical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB13. use common sense and make judgments on day to day basis SB14. use reasoning skills to identify and resolve basic problems SB15. use intuition to detect any potential problems which could arise during operations SB16. use acquired knowledge of the process for identifying and handling issues



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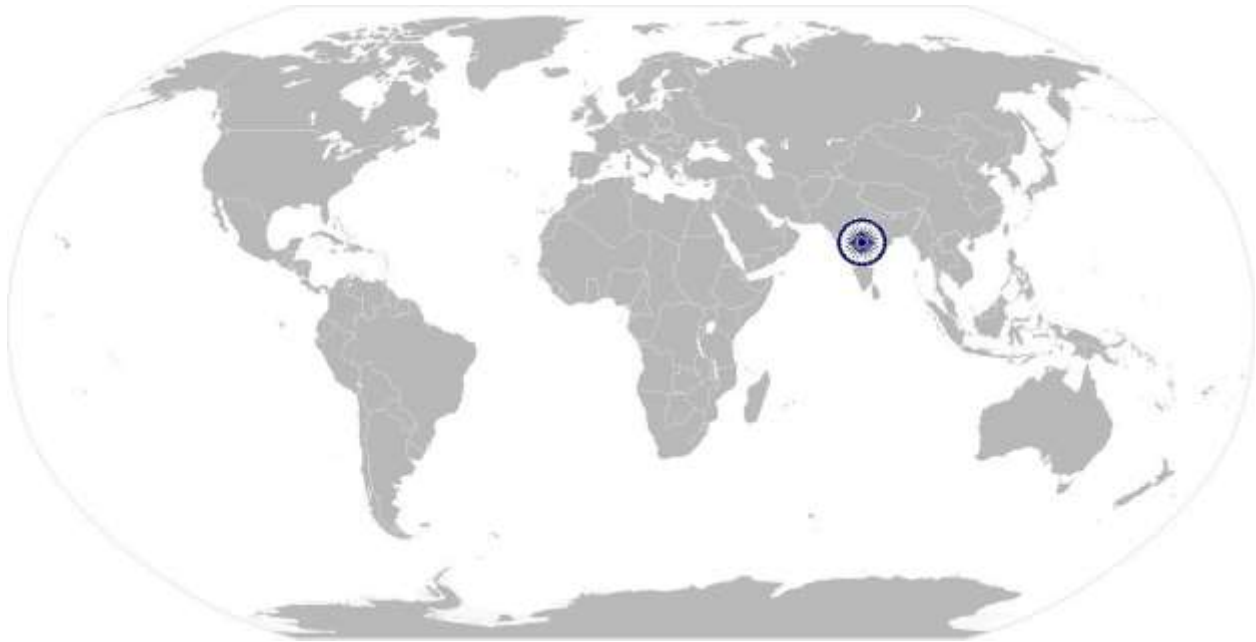
## NOS Version Control

NOS Code	FIC/N9014		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	26/11/2015
Industry Sub-sector	Fruit and vegetable, Food grain milling (including oilseeds), Dairy products, Meat and Poultry, Fish & Sea food, Bread and Bakery, Alcoholic Beverages, Aerated water/soft drinks, Soya food, Packaged snacks, Packing and refrigeration	Last reviewed on	30/03/2016
Occupation	Processing	Next review date	30/03/2019

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# National Occupational Standard



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## Overview

This OS unit is about managing production optimization and cost efficiency by managing utilities and energy, optimizing production, implementing changes in production process and managing production within budget during production process in food processing unit.

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**Manage production optimization and cost efficiency**

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Unit Code	FIC/N9015
Unit Title (Task)	Manage production optimization and cost efficiency in food
Description	This OS unit is about managing production optimization and cost efficiency, and managing production within budget in food processing unit
Scope	<ul style="list-style-type: none"> <li>Optimize production</li> <li>Manage utilities and energy for a production process</li> <li>Implement change in production process</li> <li>Manage production within budget</li> </ul>
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
<b>Optimize production</b>	<p>PC1. review production reports and analyze equipment performance, process capability, change over time, maintenance, consumables, power etc, to identify factors that affect performance of production and recommend improvement opportunities</p> <p>PC2. compile performance data on process and equipment to identify cause for lack of performance, evaluate opportunities to improve, identify cost saving options, propose changes in process, and implement proposal with proper approvals</p> <p>PC3. review production process with supervisor and machine operators to identify reasons for slowdown or stop of production process, provide recommendations to overcome efficiency issues, take feedback, develop plans for implementing recommended changes, monitor changes implemented, and review changes and improvement</p>
<b>Manage utilities and energy for a production process</b>	<p>PC4. calculate utilities and energy usage in production area and for production process, identify methods to minimize usage</p> <p>PC5. develop plans and procedures to minimize use of utilities and energy without affecting the production efficiency</p> <p>PC6. identify energy and utility losses or sources of waste, analyze reason, recommend methods to improve efficient energy/utility application, ensure recommendations are implemented, and monitor improvement</p> <p>PC7. identify areas where utilities and energy can be saved, and Identify methods to save energy like recycling energy and utilities such as steam, heat and water, following proper maintenance methods to avoid leaks and losses etc, and prepare efficient production schedule such that target is met with efficient utilization of energy and utility</p> <p>PC8. analyze usage pattern of energy and other utilities in production area and</p>

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	process against budget allocation, identify cost effective options for minimizing wastage, and implement changes
<b>Implement change in production process</b>	<p>PC9. identify system, production process that need to be changed, identify opportunities for implementing change in production process, analyze impact of change on product quality, impact on the team and present production process</p> <p>PC10. communicate with relevant authorities/superiors the need for change, results and benefits expected out of change</p> <p>PC11. design new processes, procedures, systems, structures with roles and responsibilities, key performance indicators, training needs, safety system, contingency plans, monitoring and reporting system to implement planned changes in production process</p> <p>PC12. provide training and support to implement changes, develop a strategy to help teams implement change</p> <p>PC13. monitor changes implemented in production process and ensure changes are effective and meet the organisation and regulatory requirements</p> <p>PC14. document and communicate the progress achieved through implemented change to the management and everyone involved, and make them understand and enjoy achievement</p> <p>PC15. recognize and reward employees and teams for implementing change in production system and achieving better efficiency</p>
<b>Manage production within budget</b>	<p>PC16. manage budget efficiently by managing production with available resource, by avoiding overtime and too many casual workers/helpers</p> <p>PC17. plan effectively to secure, confirm and allocate required manpower to meet production target within budget, monitor resource utilization, to achieve production target within existing resource</p> <p>PC18. identify situations where actual budget exceeds the approved budget, investigate reason for variance and take appropriate corrective action to keep budget under control</p> <p>PC19. identify the impact on budget of production-related decisions like scheduling holidays, adjusting production volume, scheduling equipment maintenance etc, before scheduling production, and identify opportunities to improve performance against budget</p> <p>PC20. identify the causes for any significant variances in budget control, discuss with team and ensure prompt corrective action is taken to keep expenditure under control</p> <p>PC21. encourage team to think and identify ways of reducing expenditure, analyze and pursue the suggested ideas</p>

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**Manage production optimization and cost efficiency**

<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: <ul style="list-style-type: none"> <li>KA1. organisaiton policies and goals</li> <li>KA2. principles and processes involved in business</li> <li>KA3. organization strategy, policies, proecedures and standards</li> <li>KA4. financial and accounting procedures of the organisation</li> <li>KA5. budget management</li> <li>KA6. code of business conduct</li> <li>KA7. manpower modelling and handling</li> </ul>
<b>B. Technical Knowledge</b>	The user/individual on the job needs to know and understand: <ul style="list-style-type: none"> <li>KB1. production management and production process for products produced in the organisation</li> <li>KB2. process equipment design, capability, operation and maintenance</li> <li>KB3. process improvement tools and techniques</li> <li>KB4. methods to identify and assess current performance and identify improvement opportunities and proposals</li> <li>KB5. methods to analyze process information</li> <li>KB6. statistical tools to analyse process capability</li> <li>KB7. methods to calculate energy usage and methods save energy</li> <li>KB8. analyzing process, procedures, policies and structure that need to be changed</li> <li>KB9. reason for implementing changes, risks and benefits expected out of changes planned and implemented</li> <li>KB10. methods to assess the benefits and risks associated with change</li> <li>KB11. methods to influence change process in the management</li> <li>KB12. accounting models to manage budget</li> <li>KB13. budgetary systems, methods to monitor, control and evaluate performance against budgets</li> <li>KB14. food regulatory system like FSSAI</li> <li>KB15. GMP</li> <li>KB16. GHP</li> <li>KB17. HACCP</li> <li>KB18. QMS</li> <li>KB19. ISO</li> <li>KB20. OHSAS</li> </ul>
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b> The user/ individual on the job needs to know and understand how to: <ul style="list-style-type: none"> <li>SA1. note the information communicated</li> <li>SA2. note the raw materials used for production and the finished products produced</li> </ul>

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**Manage production optimization and cost efficiency**

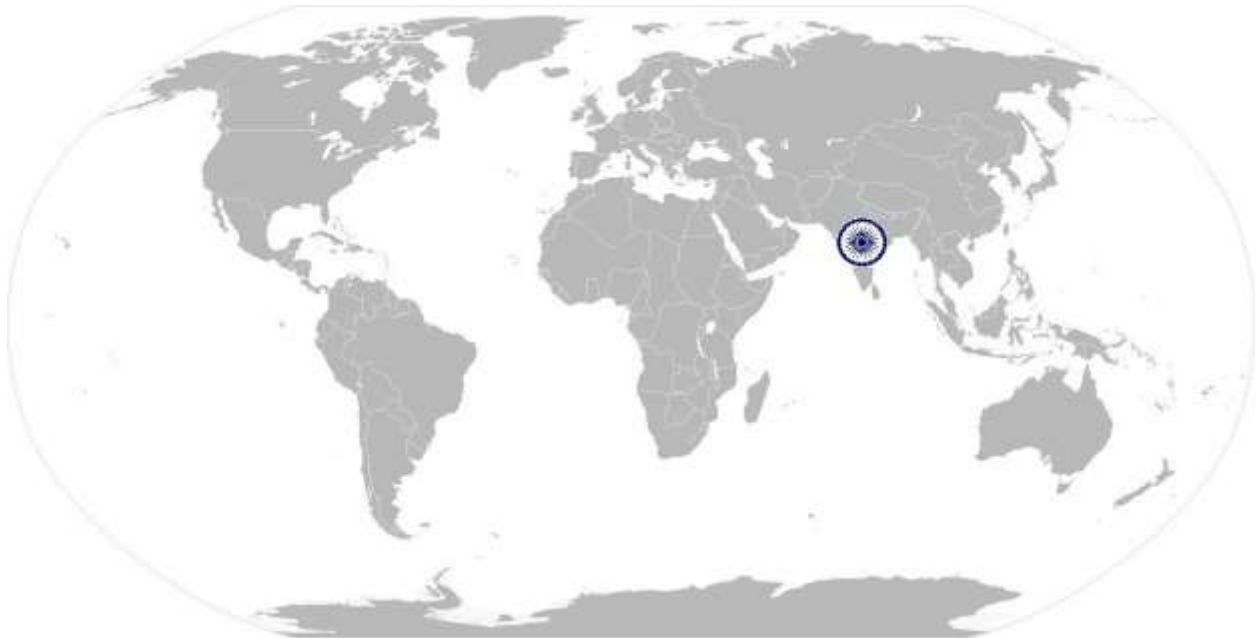
	SA3. note the readings of the process parameters and provide necessary information to fill the process chart SA4. note down observations (if any) related to the process SA5. write information documents to internal departments/ internal teams SA6. note down the data for online ERP or as per applicability in the organization
	<b>Reading Skills</b>
	The user/individual on the job needs to know and understand how to: SA7. read and interpret the process required for producing various types of products SA8. read and interpret and process flowchart for all products produced SA9. read equipment manuals and process documents to understand the equipments operation and process requirement SA10. read internal information documents sent by internal teams
	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/individual on the job needs to know and understand how to: SA11. discuss task lists, schedules and activities SA12. effectively communicate with team members SA13. question in order to understand the nature of the problem and to clarify queries SA14. attentively listen and comprehend the information given by the speaker SA15. communicate clearly on the issues being faced
<b>B. Professional Skills</b>	<b>Decision Making</b>
	The user/individual on the job needs to know and understand how to: SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue SB2. handle issues in case the manager is not available (as per the authority matrix defined by the organization)
	<b>Plan and Organize</b>
	The user/individual on the job needs to know and understand how to: SB3. plan and organize the work order and jobs received SB4. organize raw materials and packaging materials required for all products SB5. plan and prioritize the work based on the instructions received SB6. plan to utilise time and equipment's effectively SB7. organize all process/ equipment manuals so as to access information easily SB8. support the manager in scheduling tasks for helper(s)
	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to: SB9. understand customer requirements and their priority and respond as per their needs
	<b>Problem Solving</b>



FIC/N9015

## Manage production optimization and cost efficiency

	The user/individual on the job needs to know and understand how to: SB10. support manager in solving problems by detailing out problems SB11. discuss the possible solutions with the manager for problem solving
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB12. apply domain information about maintenance processes and technical knowledge about tools and equipment
	<b>Critical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB13. use common sense and make judgments on day to day basis SB14. use reasoning skills to identify and resolve basic problems SB15. use intuition to detect any potential problems which could arise during operations SB16. use acquired knowledge of the process for identifying and handling issues



**FIC/N9015**
**Manage production optimization and cost efficiency**

## NOS Version Control

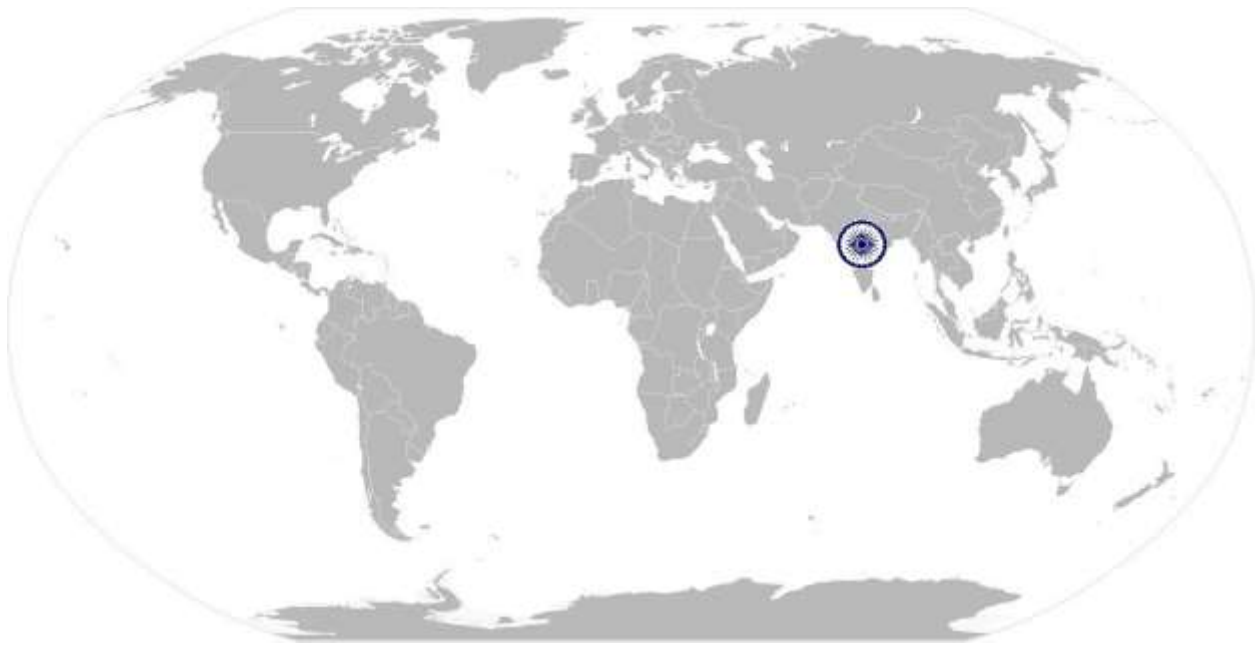
NOS Code	FIC/N9015		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	26/11/2015
Industry Sub-sector	Fruit and vegetable, Food grain milling (including oilseeds), Dairy products, Meat and Poultry, Fish & Sea food, Bread and Bakery, Alcoholic Beverages, Aerated water/soft drinks, Soya food, Packaged snacks, Packing and refrigeration	Last reviewed on	30/03/2016
Occupation	Processing	Next review date	30/03/2019

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FIC/N9016

Manage documentation system and implement safety and  
environmental policies

# National Occupational Standard



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## Overview

This OS unit is on managing documentation and implementing safety environmental policies in food processing units



**FIC/N9016**

**Manage documentation system and implement safety and environmental policies**

National Occupational Standard

<b>Unit Code</b>	<b>FIC/N9016</b>
<b>Unit Title (Task)</b>	<b>Manage documentation system and implement safety and environmental policies in food processing unit</b>
<b>Description</b>	This OS unit is about managing documentation and implementing safety environmental policies in production process in food processing units
<b>Scope</b>	<ul style="list-style-type: none"> <li>Implement and monitor documentation system in production process</li> <li>Implement and monitor safety and environmental management policies and procedures</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Implement and monitor documentation system in production process</b>	<p>PC1. establish to production team the importance of documentation, provide training on documentation system, and ensure all documents are maintained systematically</p> <p>PC2. ensure all relevant records and documents are complete, up-to-date and accessible for audits on production process</p> <p>PC3. during audit provide the auditor with access to all relevant information, records and documents</p> <p>PC4. ensure corrective actions recommended and implemented are documented to assure production process is carried in accordance with organisation and regulatory standards</p> <p>PC5. establish methods to track production information from documented and maintained records</p>
<b>Implement and monitor safety and environmental management policies and procedures</b>	<p>PC6. establish to production team importance of safety and environment requirements related to food processing unit, communicate information about safety and environmental policies and related procedures to the team</p> <p>PC7. co-ordinate with quality team to prepare policies and sops on safety and environment requirements related to production function, and ensure those procedure are followed in production area and during production process</p> <p>PC8. ensure safe work procedures are followed in production area and during production process</p> <p>PC9. ensure policies and standard operating procedures on safety and environment requirements are accessible to all employees of production team, and are followed to meet the regulatory requirements</p> <p>PC10. identify safety and environmental hazards relevant to production processes, implement system to handle risks</p> <p>PC11. provide or organize training through relevant authorities on safety and environmental management system, to understand methods to control and</p>

FIC/N9016

## Manage documentation system and implement safety and environmental policies

	<p>prevent hazards</p> <p>PC12. conduct inspections in work place on use of protective clothing and accessories, and to ensure safety system is followed during production process</p> <p>PC13. conduct audits and review records on safety and environmental system to monitor if control systems are followed by production team, and address non-compliance following organisation standards</p> <p>PC14. implement system on waste management in production area and process, monitor and confirm waste collection, treatment, recycling or disposal is carried out meeting industry requirements and environmental regulations</p> <p>PC15. respond to environmental management hazard identification and incidents in an appropriate and timely way</p> <p>PC16. review practice and procedures followed on safety, conduct risk assessments, identify non-compliance, and provide recommendations to address gaps and non-conformances</p> <p>PC17. review environmental records documents maintained, analyze data to evaluate effectiveness of the environmental management system and identify areas for improvement, plan and implement improvements to meet regulatory requirements</p>
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. organisaiton policies and goals</p> <p>KA2. documentation and records management system</p> <p>KA3. quality management system</p> <p>KA4. enviroment management system</p> <p>KA5. quality mark accreditations of the organisations</p> <p>KA6. audit procedures and audit requirements</p> <p>KA7. health and safety policy</p> <p>KA8. food safety system like FSSAI</p>
<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. importance and methods of ensuring records and documentation are complete and up-to-date</p> <p>KB2. methods of carrying out audits to meet and maintain industry standards and regulatory requirements</p> <p>KB3. methods to carry out audit with available documents and identifying any discrepancies</p> <p>KB4. methods and procedures to identify any discrepancies in system, possible risks to organization and employees</p> <p>KB5. methods to identify and analyze inherent problems with processes and procedures followed</p>

**FIC/N9016**

**Manage documentation system and implement safety and environmental policies**

	<p>KB6. regulations, guidelines and codes of practice related to health and safety, food safety, hygiene and sanitation (as per FSSAI)</p> <p>KB7. environmental standards</p> <p>KB8. methods to implement health and safety in food processing unit</p> <p>KB9. industry standards like GMP, GHP, HACCP</p> <p>KB10. types of hazards such as physical, chemical and biological hazards and methods to measures, control and prevent them</p> <p>KB11. methods to establish systems for monitoring, measuring and reporting on health and safety</p> <p>KB12. audit procedures to ensure food safety, hygiene and sanitation in the organization</p> <p>KB13. food regulatory system like FSSAI</p> <p>KB14. occupational Health and Safety Management Systems (OHSAS)</p>
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. write project reports</p> <p>SA2. write reports on production process, production efficiency</p> <p>SA3. write clear and concise report to management on functions of production process and proposals</p> <p>SA4. write information documents to internal department managers</p>
	<b>Reading Skills</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA5. read technical documents related to production process of the organization</p> <p>SA6. read and interpret equipment designs</p> <p>SA7. read legal and safety, environmental and regulatory documents pertaining to the organization</p> <p>SA8. read and understand internal information documents sent by cross function managers</p>
	<b>Oral Communication (Listening and Speaking skills)</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA9. communicate the organisation vision and values, policy and goals with enthusiasm and commitment to inspire the production team</p> <p>SA10. communicate clearly to the team on department goals/targets, and the needs and methods of planning and prioritizing</p> <p>SA11. communicate transparently and honestly on the intention and agenda to win the confidence of the employees</p> <p>SA12. demonstrate respect while communicating to the employees and while listening to others problems</p> <p>SA13. communicate confidently while sharing ideas and voicing difference of</p>

**FIC/N9016**

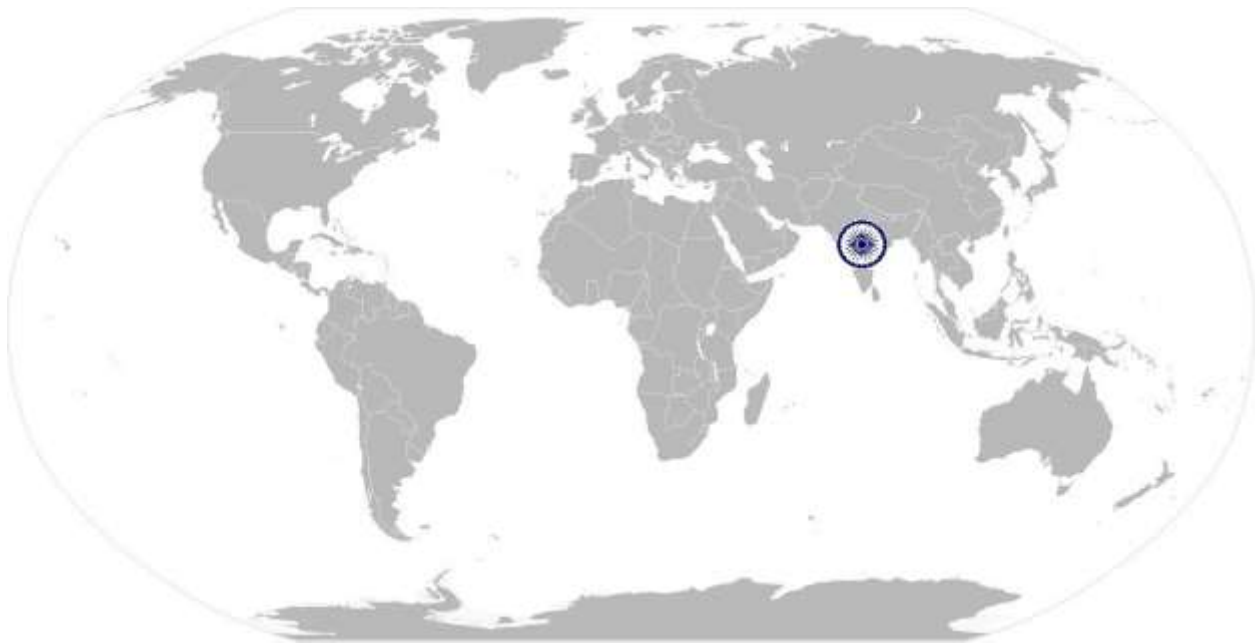
**Manage documentation system and implement safety and environmental policies**

	<p>opinion</p> <p>SA14. listen to issues related to the department, motivate people and provide ideas to resolve issues</p> <p>SA15. motivate and encourage team to provide feedback and constructive ideas</p> <p>SA16. respond to questions, provide feedback and encourage employees to come out with solution for problems and support new ideas</p> <p>SA17. listen attentively to the employees problems related to organisation, production process, department or conflicts between employees and resolve issues</p>
<b>B. Professional Skills</b>	<p><b>Planning and Organizing</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. plan operational model for implementing production management system in the organisation</p> <p>SB2. understand goals, objectives of the organisation and plan resources, allot responsibilities to complete on time and lead towards success</p> <p>SB3. plan realistic goals for employees to achieve production target of the organisation</p> <p>SB4. delegate authority, assign responsibilities, and provide direction to the achieve organisation and department goals</p> <p>SB5. plan, organize and lead team to work towards achieving department and organisation goals</p> <p><b>Judgment and Critical Thinking</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB6. use reasoning skills to make judgements on issues related to production process and management</p> <p>SB7. make judgements considering the constraints, values and polices of the organisation</p> <p>SB8. use acquired knowledge and experience to analyze, evaluate, compare, discuss, make judgements, infer and arrive at solutions to solve problems</p> <p><b>Take initiatives</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB9. take initiatives to provide training on prodcuton management to all employees of organisation</p> <p>SB10. take initiatives for promotions, growth and transfer of employees</p> <p>SB11. take initiatives to identify areas and ways to implement cost effective measures in the organisation</p> <p><b>Problem Solving and Decision making</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. make clear, consistent, transparent decisions</p> <p>SB2. show integrity, fairness and consistency in decision-making</p>

**FIC/N9016**

**Manage documentation system and implement safety and environmental policies**

	<p>SB3. identify nature of problems, apply balanced approach to problems and decide on solutions</p> <p>SB4. combine, evaluate and reason with information and data to make decisions and solve problems</p> <p>SB5. distinguish relevant from irrelevant information and make timely decisions</p> <p>SB6. use logical reasoning to make decisions on relative importance of information and choosing the best solution</p>
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**FIC/N9016**

**Manage documentation system and implement safety and environmental policies**

## **NOS Version Control**

NOS Code	FIC/N9016		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	26/11/2015
Industry Sub-sector	Fruit and vegetable, Food grain milling (including oilseeds), Dairy products, Meat and Poultry, Fish & Sea food, Bread and Bakery, Alcoholic Beverages, Aerated water/soft drinks, Soya food, Packaged snacks, Packing and refrigeration	Last reviewed on	30/03/2016
Occupation	Processing	Next review date	30/03/2019

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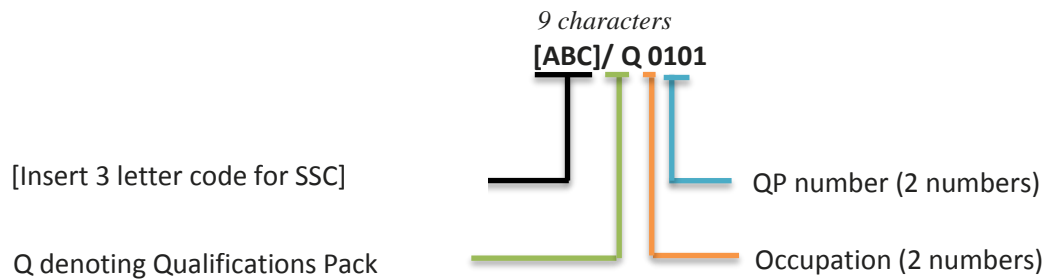


## Qualifications Pack for Production Manager

### Annexure

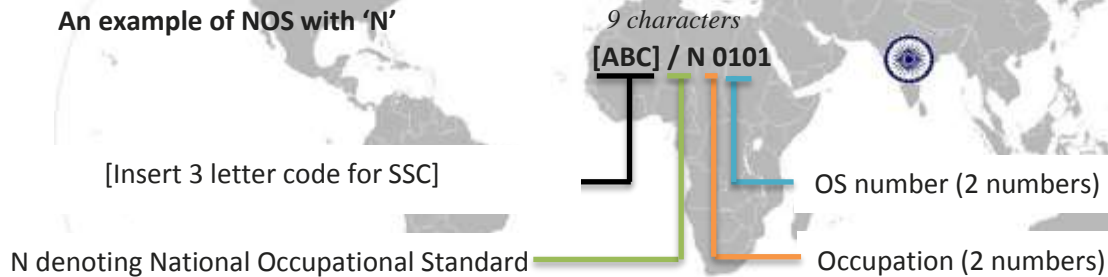
#### Nomenclature for QP and NOS

##### Qualifications Pack



##### Occupational Standard

###### An example of NOS with 'N'



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## Qualifications Pack for Production Manager

The following acronyms/codes have been used in the nomenclature above:

Sub-sector	Range of Occupation numbers
Fruit and Vegetable	01 – 09
Food Grain Milling (including Oilseeds)	10 - 19
Dairy products	20 - 30
Meat and Poultry	30 – 40
Fish and Sea Food	40 - 49
Bread and Bakery	50 - 59
Alcoholic Beverages	60 - 69
Aerated water/ soft drinks	
Quality Analysis (involving physical and chemical lab analysis)	76 – 79
Packaging, Refrigeration and Procurement	70 – 75
Soya Food	80 – 84
Packaged Foods	85 - 90
Miscellaneous	90 - 95

Sequence	Description	Example
Three letters	Industry name	FIC
Slash	/	/
Next letter	Whether QP or NOS	Q or N
Next two numbers	Occupation code	01
Next two numbers	OS number	01



## Assessment Criteria

### CRITERIA FOR ASSESSMENT OF TRAINEES

**Job Role** Production Manager

**Qualification Pack** FIC/Q9003

**Sector Skill Council** Food Processing

#### Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC
3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below)
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria
5. To pass the Qualification Pack, every trainee should score a minimum of 70% in every NOS
6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack

Assessment outcomes	Assessment criteria for outcomes	Marks Allocation			
		Total Marks	Out Of	Theory	Skills Practical
<b>1. FIC/N9014 (Manage production process in food processing unit)</b>	PC1. Communicate clearly the organisation policies and goals to the employees of production team, make them understand and commit their energy and expertise to achieve organisation goals	<b>100</b>	2.5	1	1.5
	PC2. Achieve department targets and organisation goals by understanding the organisation and employees, developing a leadership style and applying them appropriately		2.5	1	1.5
	PC3. Communicate with employees regularly and effectively, help them identify their strengths, provide support to overcome their weakness, listen to their grievances and provide appropriate solutions, and win		3	1	2

### Assessment Criteria

	their trust and support				
	PC4. Motivate and support employees to achieve their work and development objectives, and provide recognition when they are successful		2.5	1	1.5
	PC5. Encourage employees to take responsibilities, to take own decisions within agreed boundaries, to take lead in their own areas of expertise for their development		2.5	1	1.5
	PC6. Initiate personnel actions, such as promotions, transfers, discharges or disciplinary measures		3	1	2
	PC7. Lead production department and team successfully through difficulties and challenges		3	1	2
	PC8. Review the sales forecast for the week/month (or) monthly production plan discussed with plant manager (or) customer requirement (as applicable) and identify production priorities to meet market requirement		3	1	2
	PC9. Identify and confirm resource availability like raw materials, packing materials, equipment availability and capacity, production capacity, manpower requirement and availability, stock level, storage capacity, transport capacity etc		3	1	2
	PC10. Plan details of production in terms of output quantity and quality, cost, time and manpower requirements		3	1	2
	PC11. Analyze the consequences of failing to meet production/delivery timelines to meet the schedule, notifying relevant authorities of any possibility that demand cannot be met within required timeframe		3	1	2
	PC12. Develop production schedule to meet market demands/priorities and delivery timelines within budget and with available resources, consult production		3	1	2

### Assessment Criteria

	plan with inter department heads and production supervisor, instruct supervisor to allocate work to production team				
	PC13. Communicate the production schedule to cross function heads through communication system followed by the organisation like e-mail or upload in the erp system		2.5	1	1.5
	PC14. Identify and confirm equipment requirements to meet production target, share production schedule with equipment requirement to maintenance manager/supervisor for maintenance plan that aligns with production plan		2.5	1	1.5
	PC15. Co-ordinate with maintenance manager/supervisor to understand materials, consumables and manpower requirement and availability for maintenance activities, for uninterrupted production		3	1	2
	PC16. Understand equipment maintenance process and procedure and co-ordinate for maintenance activities during breakdown, emergency response, routine cleaning and servicing etc		2.5	1	1.5
	PC17. Analyze equipment maintenance data to interpret equipment performance and arrive at production capability of each process equipment		3	1	2
	PC18. Co-ordinate with maintenance team to ensure reliable equipment performance with minimal disruption to production, to minimize down time during equipment breakdowns, and to optimize equipment efficiency to achieve production target		3	1	2
	PC19. Lead and build team spirit between production and maintenance personnel through effective communication to enhance equipment performance and to identify production		2.5	1	1.5

### Assessment Criteria

	improvement opportunities				
	PC20. Ensure maintenance procedures followed meet food safety and environmental requirements		2.5	1	1.5
	PC21. Monitor production process for usage of raw materials, packaging materials, manpower, wastage against production plan and identify reason for variances against plan		3	1	2
	PC22. Address the reason for variation in achieving production schedule, production target within allocated budget		3	1	2
	PC23. Adjust production schedule in response to variables affecting achievement of production target		3	1	2
	PC24. Monitor production output and cost, adjust processes and resources to minimize cost and to achieve quantity and quality product		3	1	2
	PC25. Reschedule production plan in case of urgent requirement or any unforeseen event, to minimize wastage and to utilize materials/utilities and resources efficiently, discuss and negotiate changes with inter department team on time for their support and team work		3	1	2
	PC26. Review production schedule and process, consult /discuss with supervisor, team and cross function teams identify opportunities for improvement and develop recommendations for improvement on production process		3	1	2
	PC27. Set policies, plans and procedures, and take initiative to implement the identified improvement opportunities to control cost and to achieve better yield and quality		3	1	2

### Assessment Criteria

	PC28.	Monitor, review and ensure production details are documented to meet the documentation requirements of the organisation, and to meet audit requirements like iso, haccp etc	3	1	2
	PC29.	Understand objective of trial production, trial product processing method and specification, select production team for trial, discuss with cross function team like planning, qa, maintenance etc, clarify roles and responsibilities and level of authority to the team and cross function	3	1	2
	PC30.	Prepare technical production procedures considering all engineering and process parameters for new product trial, educate and train supervisors and operators on trial procedure	3	1	2
	PC31.	Identify and consider all possible hazards, prepare plan and procedures to prevent and control hazards, provide training to trial team to handle hazards	2.5	1	1.5
	PC32.	Prepare detailed trial production schedule to manage production process without overlapping/affecting with regular production, and considering availability of raw materials and packaging materials, machine availability and capability, man power availability and competency etc	3	1	2
	PC33.	Monitor trial production against plan to identify variances and factors that need to be adjusted to achieve product of required specification within the planned time	3	1	2
	PC34.	Document and evaluate trial production data and identify process/parameters to be modified/changed to achieve product of required specification	3	1	2

### Assessment Criteria

	PC35. Prepare trial production report with recommendations on improvement opportunities, and share with cross function heads and relevant authorities for suggestion and consideration		3	1	2
			<b>100</b>	<b>35</b>	<b>65</b>
<b>2. FIC/N9015( Manage production optimization and cost efficiency in food processing unit)</b>	PC1. Review production reports and analyze equipment performance, process capability, change over time, maintenance, consumables, power etc, to identify factors that affect performance of production and recommend improvement opportunities	<b>100</b>	5	1	4
	PC2. Compile performance data on process and equipment to identify cause for lack of performance, evaluate opportunities to improve, identify cost saving options, propose changes in process, and implement proposal with proper approvals		4	1	3
	PC3. Review production process with supervisor and machine operators to identify reasons for slowdown or stop of production process, provide recommendations to overcome efficiency issues, take feedback, develop plans for implementing recommended changes, monitor changes implemented, and review changes and improvement		5	2	3
	PC4. Calculate utilities and energy usage in production area and for production process, identify methods to minimize usage		5	2	3
	PC5. Develop plans and procedures to minimize use of utilities and energy without affecting the production efficiency		5	2	3
	PC6. Identify energy and utility losses or sources of waste, analyze reason, recommend methods to improve efficient energy/utility application, ensure recommendations are		5	2	3

### Assessment Criteria

	implemented, and monitor improvement				
	PC7. Identify areas where utilities and energy can be saved, and identify methods to save energy like recycling energy and utilities such as steam, heat and water, following proper maintenance methods to avoid leaks and losses etc, and prepare efficient production schedule such that target is met with efficient utilization of energy and utility		5	2	3
	PC8. Analyze usage pattern of energy and other utilities in production area and process against budget allocation, identify cost effective options for minimizing wastage, and implement changes		5	2	3
	PC9. Identify system, production process that need to be changed, identify opportunities for implementing change in production process, analyze impact of change on product quality, impact on the team and present production process		5	2	3
	PC10. Communicate with relevant authorities/superiors the need for change, results and benefits expected out of change		4	1	3
	PC11. Design new processes, procedures, systems, structures with roles and responsibilities, key performance indicators, training needs, safety system, contingency plans, monitoring and reporting system to implement planned changes in production process		5	2	3
	PC12. Provide training and support to implement changes, develop a strategy to help teams implement change		4	1	3
	PC13. Monitor changes implemented in production process and ensure changes are effective and meet the organisation and regulatory requirements		5	1	4

### Assessment Criteria

	PC14. Document and communicate the progress achieved through implemented change to the management and everyone involved, and make them understand and enjoy achievement		5	2	3
	PC15. Recognize and reward employees and teams for implementing change in production system and achieving better efficiency		4	1	3
	PC16. Manage budget efficiently by managing production with available resource, by avoiding overtime and too many casual workers/helpers		5	2	3
	PC17. Plan effectively to secure, confirm and allocate required manpower to meet production target within budget, monitor resource utilization, to achieve production target within existing resource		5	2	3
	PC18. Identify situations where actual budget exceeds the approved budget, investigate reason for variance and take appropriate corrective action to keep budget under control		5	2	3
	PC19. Identify the impact on budget of production-related decisions like scheduling holidays, adjusting production volume, scheduling equipment maintenance etc, before scheduling production, and identify opportunities to improve performance against budget		5	2	3
	PC20. Identify the causes for any significant variances in budget control, discuss with team and ensure prompt corrective action is taken to keep expenditure under control		5	2	3
	PC21. Encourage team to think and identify ways of reducing expenditure, analyze and pursue the suggested ideas		4	1	3
			<b>100</b>	<b>35</b>	<b>65</b>



### Assessment Criteria

<b>3. FIC/N9016 (Manage documentation system and implement safety and environmental policies in food processing unit)</b>	PC1.	Establish to production team the importance of documentation, provide training on documentation system, and ensure all documents are maintained systematically		6	2	4
	PC2.	Ensure all relevant records and documents are complete, up-to-date and accessible for audits on production process		6	2	4
	PC3.	During audit provide the auditor with access to all relevant information, records and documents		6	3	3
	PC4.	Ensure corrective actions recommended and implemented are documented to assure production process is carried in accordance with organisation and regulatory standards		6	2	4
	PC5.	Establish methods to track production information from documented and maintained records		5	2	3
	PC6.	Establish to production team importance of safety and environment requirements related to food processing unit, communicate information about safety and environmental policies and related procedures to the team		6	2	4
	PC7.	Co-ordinate with quality team to prepare policies and sops on safety and environment requirements related to production function, and ensure those procedure are followed in production area and during production process		6	2	4
	PC8.	Ensure safe work procedures are followed in production area and during production process		6	2	4

### Assessment Criteria

	PC9. Ensure policies and standard operating procedures on safety and environment requirements are accessible to all employees of production team, and are followed to meet the regulatory requirements		5	2	3
	PC10. Identify safety and environmental hazards relevant to production processes, implement system to handle risks		6	2	4
	PC11. Provide or organize training through relevant authorities on safety and environmental management system, to understand methods to control and prevent hazards		6	2	4
	PC12. Conduct inspections in work place on use of protective clothing and accessories, and to ensure safety system is followed during production process		6	2	4
	PC13. Conduct audits and review records on safety and environmental system to monitor if control systems are followed by production team, and address non-compliance following organisation standards		6	2	4
	PC14. Implement system on waste management in production area and process, monitor and confirm waste collection, treatment, recycling or disposal is carried out meeting industry requirements and environmental regulations		6	2	4
	PC15. Respond to environmental management hazard identification and incidents in an appropriate and timely way		6	2	4
	PC16. Review practice and procedures followed on safety, conduct risk assessments, identify non-		6	2	4

### Assessment Criteria

	compliance, and provide recommendations to address gaps and non-conformances				
	PC17. Review environmental records documents maintained, analyze data to evaluate effectiveness of the environmental management system and identify areas for improvement, plan and implement improvements to meet regulatory requirements		6	2	4
			<b>100</b>	<b>35</b>	<b>65</b>

# *Semester II*

## **PART I - TAMIL- II**

பொதுத்தமிழ் - இரண்டாம் பருவம்

**SUB.CODE: 15BFSNL02**  
**MAX.MARKS:100**

**HOURS T+P=C**  
**3+0=3**

**அலகு - 1**

அறுசுவைகளில் இனிப்பு - துடரிப்பழம் - பலாப்பழம் - வாழைப்பழம் - நாவல்பழம் - கரும்பின் சாறு - தேன் - உவர்ப்பு - எரிப்பு - கசப்பு - துவர்ப்பு - புளிப்பு - உணவுகளைப் படைக்கச் சுவைபயன்பட்டமை - சுவைப்பொருத்தம் - பொருந்தாச் சுவைகள் - சுவைமாறுபாடும் ஏற்பட்டகாலங்களும் - சுவைகளின் பட்டியல்.

**அலகு - 2**

ஐம்பூதவகை - நீர்வகைக் குணங்கள் - மழைநீர் - ஆலங்கட்டிமழைநீர் - பனிநீர் - தண்ணீர் - ஆற்றுநீர் - கங்கை, யமுனை, கோதாவரி, துங்கபுத்திரை, நர்மதா, சிந்து, சித்திரா, காவிரி, தாம்பிரபரணி பச்சையாற்று போன்றநதிகளின் தன்மை

**அலகு - 3**

குளத்துநீர் - தாமரைக் குளத்துநீர் - அல்லிக் குளத்துநீர் - ஏரிநீர் - சுனை நீர் - கிணற்றுநீர் - ஊற்றுநீர் - பாறைநீர் - சுக்கான் பாறைநீர் - கரும்பாறைநீர் - அருவிநீர் - காட்டுப்பகுதிநீர் - சிவந்தநீர் - கறுத்தநீர் - வயல் நீர் - நண்டுக்குழிநீர் - பாசிநீர் - நீராகாரநீர் - காடி நீர் - உப்புநீர் - சமுத்திரநீர் - நாவல் நீர் - வாழைநீர் - கருங்காலிநீர் - இலவுநீர் - இளநீர்வகைகளும் பயன்களும்

**அலகு - 4**

வெந்நீர்வகையும் குணமும் - பால் வகையும் குணமும் தயிர்வகை - மோர்வகை - வெண்ணெய் வகை - நெய் வகை - சாணவகை - பாகின் வகை - மதுரவகை - வெல்லத்தின் வகை - சர்க்கரைவகை - கற்கண்டின் வகை - மதுவின் வகை - தேனின் வகையும் மருத்துவப் பயனும்.

**அலகு - 5**

உணவுயுத்தம் - உணவுவிதிகள் - விவசாயத்தில் பன்னாட்டுநிறுவனங்கள் - பயணியின் உணவு - தமிழர்கள் என்னசாப்பிட்டார்கள் - உணவுப் பொய்கள் - திணைவகையின் பயன்பாடு.

**பார்வை நூல்கள்**

1. தமிழர்உணவு - சே.நமசிவாயம்
3. உணவுயுத்தம் - எஸ். இராமகிருஷ்ணன்

## **PART II - FUNCTIONAL ENGLISH – II PRACTICAL**

**SUB.CODE: 15BFSNE02**  
**MAX.MARK: 25+75=100**

**HOURS: T+P=C**  
**2+2=3**

### **Course Objective:**

*To enable the students*

1. To work in challenging environment
2. To handle the objection easily.
3. To develop them self to face the difficulties in the society
4. To speak good English in the society.

### **Learning Outcomes**

*After undergoing this course the student will be able to:*

1. Posses vocabulary required for the current situations
2. Read and comprehend business letters.
3. Deals with technical sheets accurately.
4. Develop their personality and manners
5. Handel their objections perfectly.

### **Unit-1**

1. Phonics, idioms and phrases.
2. Ability to check policy documents scanning a pamphlet etc.
3. Grammar- direct and indirect speech and sentence pattern.

### **Unit-2**

1. Dialogue writing, answering the questions, exposure to report checklists, job advertisements, introducing themselves etc.
2. Developing LSRW Skills- Listening, Speaking Reading and Writing skills

### **Unit-3**

1. Taking Responsibilities ,Speaking practises and organising events.
2. Check e-mails and reply to them.

### **Unit-4**

1. Listening activities.

2. Collaboration with teams through effective communications and responding to the commands.

## **Unit-5**

1. Writing letters- Official and non- official letters.
2. Report writing.
3. Draft writing.
4. Hints- developments etc.

## **CORE PAPER**

### **FOOD PROCESSING - I**

**(Technology of cereals, legumes, Oilseeds and Spices)**

**SUB.CODE: 15BFSNC02**

**HOURS: T+P=C**

**MAX.MARK: 100**

**3+0=3**

#### **Objectives:**

1. To learn about Principle and Techniques in Food processing of cereals, legumes, Oilseeds and Spices.

#### **Unit I**

Introduction- Historical evaluation of food processing technology – Principles in food processing- Thermal Processing – Classification and Principles- Thermal death time- Thermal Process calculation.

#### **Unit II**

Cereal technology: Rice Parboiling –Milling techniques- by Products of rice milling – Wheat milling – by products of wheat milling – Millet milling – uses of milled millets- product development - Salt processing – stages of salt processing.

#### **Unit III**

Pre-treatments of pulses and legumes - Pulses technology: Soaking – fermentation – Germination – changes during soaking and germination of Pulses and Legumes –Milling of Pulses - by products of pulses, Toxic Constituents of Pulses.

#### **Unit IV**

Manufacturing of Breakfast cereals – Extruded Products puffed and flaked Cereals – Puffed and flaked millets – Recipes of breakfast cereals, Extruded products –noodles, Pasta, etc.

#### **Unit V**

Oilseeds – Milling – Extraction of oil and its processing –Processing of Oil cakes and its uses – processing of nuts spices technology –Extraction of essential oils and oleoresins manufacturing of condiments and masala powders.

#### **Suggested Readings**

1. Blanshard J.M.V., Frazier, P.J. and Galliard, T. Ed. 1986. Chemistry and Physics of Baking. Royal Society of Chemistry, London.



2. Chakraverty, A. 1988. Postharvest Technology of Cereals, Pulses and oilseeds. Oxford and IBH, New Delhi.
3. Durbey, S.C. 1979. Basic Baking: Science and Craft. Gujarat Agricultural University, Anand (Gujrat).
4. Kent, N.L. 1983. Technology of Cereals. 3rd Edn. Pergamon Press, Oxford, UK.
5. Mathews, R.H. Ed. 1989. Legumes: Chemistry, Technology and Human Nutrition. Marcel Dekker, New York.
6. Pomeranz, Y. Ed. 1978. Wheat: Chemistry and Technology. Am. Assoc. of Cereal Chemist. St. Paul, minnesota.
7. Pomeranz, Y. 1987. Modern Cereal Science and Technology. VCH Pub., New York.
8. Salunkhe, D.K., Kadam, S.S. and Austin A. Ed. 1986. Quality of Wheat and Wheat Products. Metropolitan Book Co., New Delhi.

**ALLIED PAPER II - FOOD SCIENCE & CHEMISTRY PRACTICAL**

**SUB.CODE: 15BFSNA02**  
**MAX.MARKS: 100**

**HOURS T+P=C**  
**0+3=3**

**Objectives**

To enable the students

- To learn identify the types, assessment of household purchasing trend and quality analysis of basic five food groups.

S.No	Topic/Module	Duration (in Hours)	Key Learning Outcomes
1	Cereals, Pseudo cereals, Millets and Pulses	9:00	a. Identification of the types b. Assessment of household purchasing trend and diversity c. Physical property I. Bulk density II. Tapped density III. True density IV. Porosity d. Functional Properties i. Moisture ii. Water Absorption capacity iii. Oil absorption capacity iv. Swelling power e. Quality analysis of raw materials under storage I. Physical examination for infestation II. Storage condition assessment Temperature & RH
2	Fruits and Vegetables	9:00	a. Assessment of household diversity in consumption of fruits and vegetables b. Identification of the types of fruits and vegetables c. Maturity Index determination d. Physical selection criteria for fresh fruits and vegetables e. Quality checking of raw materials 1. Physical Examination 2. Moisture content 3. Texture analysis 4. TSS 5. pH 6. Titrable acidity

3	Nuts & Oilseeds	9:00	<ul style="list-style-type: none"> <li>a. Assessment of household diversity in consumption of Nuts &amp; oilseeds</li> <li>b. Quality checking of raw materials               <ul style="list-style-type: none"> <li>1. Physical Verification</li> <li>2. Moisture content</li> <li>3. Oil content</li> <li>4. Determination of peroxide value</li> </ul> </li> </ul>
4	Spices & Condiments	9:00	<ul style="list-style-type: none"> <li>a. Assessment of household diversity in consumption of Spices and Condiments</li> <li>b. Quality checking of raw materials               <ul style="list-style-type: none"> <li>1. Moisture content</li> <li>2. Volatile Oil estimation in Spices</li> </ul> </li> <li>c. Physical Verification Appearance, Colour and flavour</li> </ul>
5	Milk & Egg	9:00	<ul style="list-style-type: none"> <li>a. Domestic determination of Milk</li> <li>b. Assessment of household diversity in consumption of milk and egg</li> <li>c. MBRT assessment in Milk</li> <li>d. Adulteration test in Milk</li> <li>e. Egg Quality evaluation</li> <li>f. Sensory Quality evaluation of Milk</li> </ul>
6	Fleshy Foods	9:00	<ul style="list-style-type: none"> <li>a. Assessment of household diversity in consumption of fleshy foods</li> <li>b. Identification of types of Meat</li> <li>c. Proximate Composition assessment               <ul style="list-style-type: none"> <li>1. Moisture</li> <li>2. Protein</li> <li>3. Fat</li> </ul> </li> <li>d. Sensory Quality evaluation of fleshy foods               <ul style="list-style-type: none"> <li>1. Appearance</li> <li>2. Flavour</li> <li>3. Colour</li> <li>4. Texture</li> </ul> </li> </ul>
<b>Total duration</b>		<b>54:00</b>	

**References:**

1. [www.fao.org](http://www.fao.org)
2. The food chemistry laboratory: a manual for experimental foods, dietetics and food scientist (2017) 2nd edition, Connie M.Weaver and James R Daniel
3. Food science laboratory manual (1998) Karen S. Jamesen, Purdue university

**VALUE EDUCATION II**  
**ENVIRONMENTAL STUDIES**

**SUB.CODE: 15BFSNV02**

**MAX.MARK: 100**

**HOURS: T+P=C**

**2+0=1**

**Objectives:**

1. To study about Environmental Science.

**Unit 1**

The Multidisciplinary Nature of Environmental Studies: Definition, scope and importance Need for public awareness

**Unit 2**

Natural Resources Renewable and Non-renewable Resources:  $\Sigma$  Natural resources and associated problems - Role of an individual in conservation of natural resources - Equitable use of resources for sustainable lifestyles.

**Unit 3**

Ecosystems: Concept of an ecosystem - Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

**Unit 4**

Biodiversity and Its Conservation: Introduction, definition: genetic, species and ecosystem diversity. Bio geographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India

**Unit 5**

Environmental Pollution: Definition - Causes, effects and control measures of (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards

Ref: file:///C:/Users/Admin/Downloads/UGCsyllabusforEnvironmentalStudies.pdf

## QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR FOOD PROCESSING

### What are Occupational Standards(OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

#### Contact Us:

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4. OS units.....Page 5
5. Assessment Criteria.....Page 33

## Introduction

### Qualifications Pack – Plant Baker

**SECTOR:** FOOD PROCESSING

**SUB-SECTOR:** BREAD AND BAKERY

**OCCUPATION:** PROCESSING

**REFERENCE ID:** FIC/5001

**ALIGNED TO:** NCO-2004/7412.10

A Plant Baker produces/ supervises the production of baked products (breads, biscuits, cakes, etc.)

**Brief Job Description:** A Plant Baker produces/ supervises the production of baked products (breads, biscuits, cakes, etc.) in industrial units by weighing, mixing, kneading, fermenting, shaping, rolling/sheeting, cutting, moulding, baking, cooling, etc. using various industrial equipments.

**Personal Attributes:** A Plant Baker must have the ability to plan, organize, prioritize, calculate and handle pressure. S/he must possess reading, writing and communication skills. In addition, the individual must have stamina to be able to stand for long hours, have personal and professional hygiene and an understanding of food safety standards and requirements.

Job Details

Qualifications Pack Code	FIC/Q5001		
Job Role	Plant Baker		
Credits (NSQF)	TBD	Version number	1.0
Sector	Food Processing	Drafted on	23/06/2015
Sub-sector	Bread and bakery	Last reviewed on	03/07/2015
Occupation	Processing	Next review date	02/07/2016

Job Role	Plant Baker
Role Description	A Plant Baker produces/ supervises the production of baked products (breads, biscuits, cakes, etc.) in industrial units.
NSQF level	5
Minimum Educational Qualifications	Preferably Class 12
Maximum Educational Qualifications	Not Applicable
Training (Suggested but not mandatory)	1. Baking process for all baked products 2. Food standards for baked products 3. Operation and basic maintenance of various baking machineries and equipment 4. GMP 5. HACCP 6. QMS 7. Computer basics and ERP system followed by the organization 8. Training in food Safety Standards and Regulations (as per FSSAI) (Mandatory)
Experience	NA
Applicable National Occupational Standards (NOS)	<b>Compulsory:</b> <a href="#">1. FIC/N5001 Prepare and maintain work area and process machineries for producing baked products in industrial units</a> <a href="#">2. FIC/N5002 Prepare for production of baked products in industrial units</a> <a href="#">3. FIC/N5003 Produce baked products in industrial units</a> <a href="#">4. FIC/N5004 Complete documentation and record keeping related to production of baked products in industrial units</a> <a href="#">5. FIC/N9001 Food safety, hygiene and sanitation for processing food products</a> <b>Optional:</b> Not Applicable
Performance Criteria	As described in the relevant OS units

Definitions

Keywords /Terms	Description
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through analysis and form the basis of OS.
Job Role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
OS	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
NOS	NOS are Occupational Standards which apply uniquely in the Indian context.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Qualifications Pack	Qualifications Pack comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A Qualifications Pack is assigned a unique qualification pack code.
Unit Code	Unit Code is a unique identifier for an Occupational Standard , which is denoted by an 'N'
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
Organizational Context	Organizational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills or Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.

Acronyms

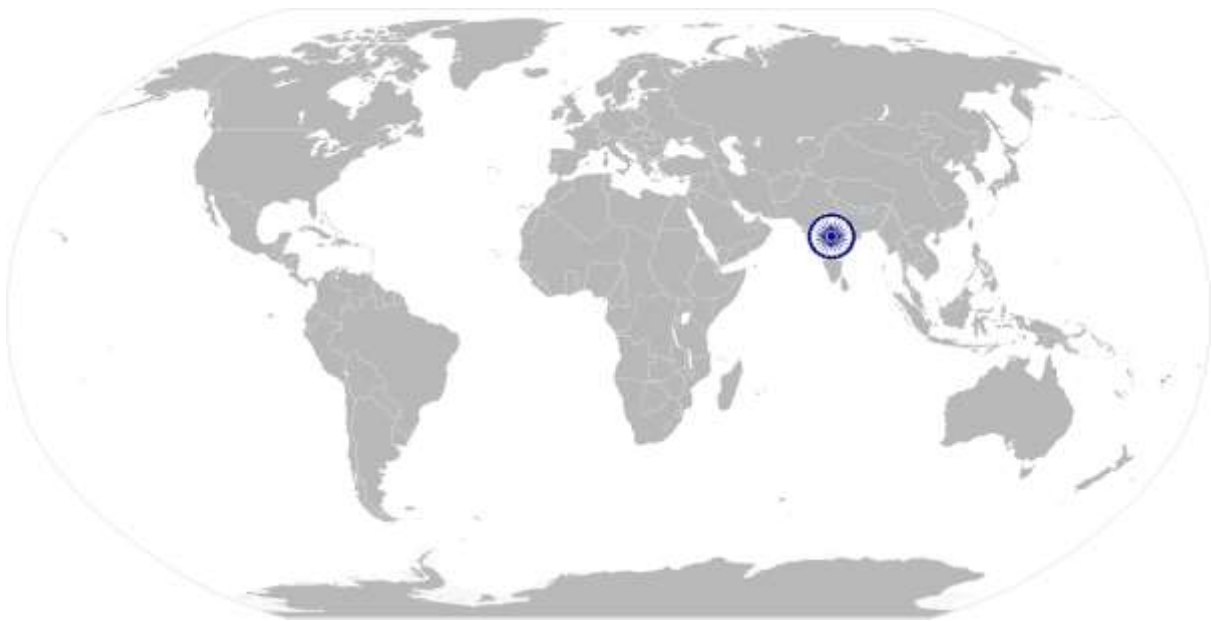
Keywords /Terms	Description
CIP	Clean In Place
COP	Clean Out Of Place
ERP	Enterprise Resource Planning
FIFO	First In First Out
FEFO	First Expiry First Out
FSSAI	Food Safety and Standards Authority of India
GMP	Good Manufacturing Practice
GHP	Good Hygiene Practices
HACCP	Hazard Analysis and Critical Control Point
NOS	National Occupational Standard
NSQF	National Skill Qualification Framework
NVEQF	National Vocational Educational Qualification Framework
NVQF	National Vocational Qualification Framework
OS	Occupational Standard
PC	Performance Criteria
QP	Qualification Pack
SSC	Sector Skill Council
SOP	Standard Operating Procedure
SKU	Stock Keeping Unit
QMS	Quality Management System



**FIC/N5001     Prepare and maintain work area and process machineries for producing baked products in industrial units**

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# National Occupational Standard



## Overview

This OS unit is about preparing work area ensuring hygiene and safety, checking the performance and efficiency of process machineries and tools for producing baked products in industrial units, as per the specifications and standards of the organization

**FIC/N5001 Prepare and maintain work area and process machineries for producing baked products in industrial units**

National Occupational Standard

<b>Unit Code</b>	<b>FIC/N5001</b>
<b>Unit Title(Task)</b>	<b>Prepare and maintain work area and process machineries for producing baked products in industrial units</b>
<b>Description</b>	This unit is about preparing work area ensuring hygiene and safety, checking the performance and efficiency of process machineries and tools for producing baked products in industrial units, as per the specifications and standards of the organization.
<b>Scope</b>	This unit/task covers the following: <ul style="list-style-type: none"> <li>• Prepare and maintain work area ( for production of baked products in industrial units)</li> <li>• Prepare and maintain process machineries and tools ( for production of baked products in industrial units)</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Prepare and maintain work area ( for production of baked products in industrial units)</b>	PC1. clean and maintain the cleanliness of the work area using approved sanitizers and keep it free from dust, waste, flies and pests PC2. ensure that the work area is safe and hygienic for food processing PC3. dispose waste materials as per SOP and industry requirements
<b>Prepare and maintain process machineries and tools ( for production of baked products in industrial units)</b>	PC4. check the working and performance of all machineries and tools used for production such as weighing scales, mixer/ kneader, dough divider, dough rounder, dough moulder, sheeting machine, rotary cutter, dough depositor, baking oven, packaging machines, etc. PC5. clean the machineries and tools used with approved sanitizers following specifications and SOPs PC6. place the necessary tools required for the process PC7. attend minor repairs/ faults of machines, if required
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the organization and its processes)	The user/individual on the job needs to know and understand: <ul style="list-style-type: none"> <li>KA1. organization standards, storage standards and procedures followed in the organization</li> <li>KA2. types of food stored by the organization</li> <li>KA3. code of business conduct</li> <li>KA4. dress code to be followed</li> <li>KA5. job responsibilities/duties and standard operating procedures</li> <li>KA6. internal departments and its functions</li> <li>KA7. provision of wages, working hours as per organization policy</li> <li>KA8. food safety and hygiene standards followed</li> </ul>
<b>B. Technical Knowledge</b>	The user/individual on the job needs to know and understand: <ul style="list-style-type: none"> <li>KB1. types of chemicals, materials and equipment required for cleaning and maintenance</li> <li>KB2. cleaning process to disinfect equipment/ tools</li> <li>KB3. supplier/manufacturers instructions related to cleaning and maintenance</li> </ul>

**FIC/N5001 Prepare and maintain work area and process machineries for producing baked products in industrial units**

	<p>KB4. knowledge on Food Safety Standards and Regulations (as per FSSAI)</p> <p>KB5. knowledge on legal regulations pertaining to work place such as health and safety, recommended dosage for use of sanitizers, control of substances hazardous to health, handling/storage/ disposal/ cautions for use of sanitizers and disinfectants, fire precautions/ occurrences, hygiene practice, disposal of waste, environmental protection, etc.</p>
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<p><b>Writing Skills</b></p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. note the information communicated by the supervisor</p> <p>SA2. note the details of food stored, storage parameters and provide necessary information to fill the storage chart</p> <p>SA3. note the details of the refrigeration system and components, maintenance and service reports</p> <p>SA4. note down observations (if any) related to the storage</p> <p>SA5. write information documents to internal departments/ internal teams</p> <p>SA6. note down the data for erp or as required by the organization</p>
	<p><b>Reading Skills</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA7. read and interpret design, drawings and construction of the storage facility</p> <p>SA8. read and interpret the storage methods and conditions for storing all types of food</p> <p>SA9. read and interpret storage parameters for storing various food</p> <p>SA10. read equipment manuals and storage documents to understand the equipments operation and storage requirement</p> <p>SA11. read internal information documents sent by internal teams</p>
	<p><b>Oral Communication (Listening and Speaking skills)</b></p> <p>The user/individual on the job needs to know and understand how to :</p> <p>SA12. discuss task lists, schedules and activities with the supervisor</p> <p>SA13. effectively communicate with the team members</p> <p>SA14. question the supervisor in order to understand the nature of the problem and to clarify queries</p> <p>SA15. attentively listen and comprehend the information given by the speaker</p> <p>SA16. communicate clearly with the supervisor and cross department team on the issues faced during storage process</p>
	<p><b>Decision Making</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue</p> <p>SB2. handle issues in case the supervisor is not available (as per the authority matrix defined by the organization)</p>
<b>B. Professional Skills</b>	<p><b>Plan and Organize</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB3. plan and organize the work order and jobs received from the supervisor</p>

**FIC/N5001 Prepare and maintain work area and process machineries for producing baked products in industrial units**

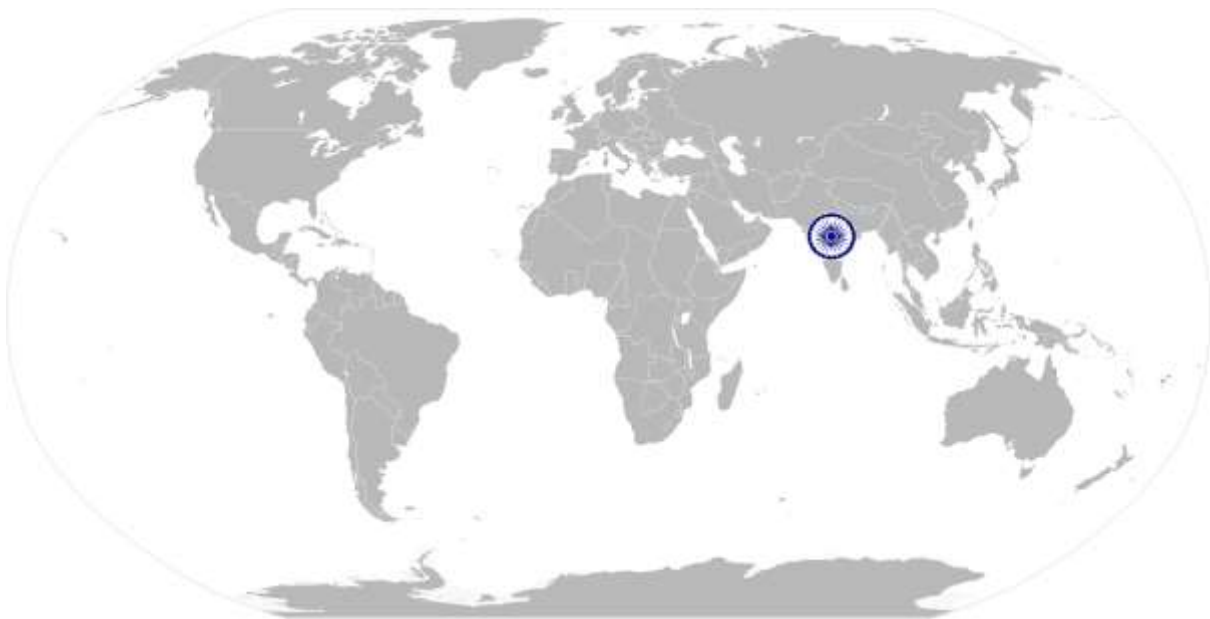
	<p>SB4. organize raw materials and packaging materials required for all products following the instruction provided by the supervisor</p> <p>SB5. plan and prioritize the work based on the instructions received from the supervisor</p> <p>SB6. plan to utilise time and equipment's effectively</p> <p>SB7. organize all process/ equipment manuals so as to access information easily</p> <p>SB8. support the supervisor in scheduling tasks for helper(s)</p>
	<b>Customer Centricity</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB9. understand customer requirements and their priority and respond as per their needs</p>
	<b>Problem Solving</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB10. support supervisor in solving problems by detailing out problems</p> <p>SB11. discuss the possible solutions with the supervisor for problem solving</p>
	<b>Analytical Thinking</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB12. apply domain information about maintenance Processes and technical knowledge about tools and equipment</p>
	<b>Critical Thinking</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB13. use common sense and make judgments on day to day basis</p> <p>SB14. use reasoning skills to identify and resolve basic problems</p> <p>SB15. use intuition to detect any potential problems which could arise during operations</p> <p>SB16. use acquired knowledge of the process for identifying and handling issues</p>

**FIC/N5001 Prepare and maintain work area and process machineries for producing baked products in industrial units**

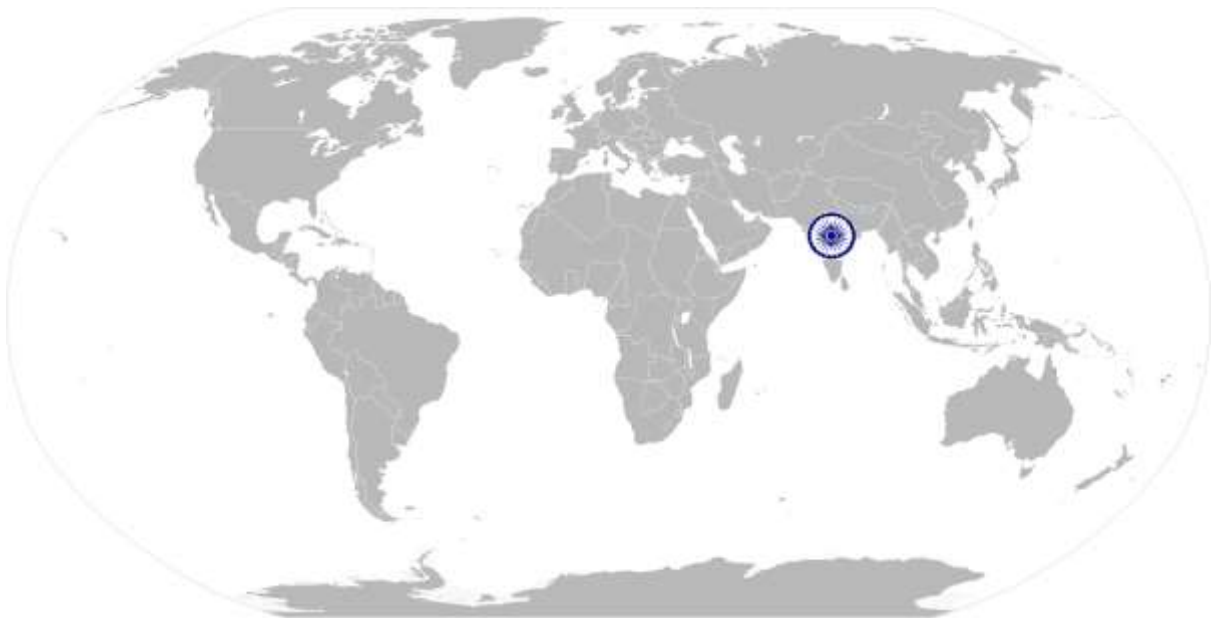
**NOS Version Control**

NOS Code	FIC/N5001		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	23/06/2015
Industry Sub-sector	Bread and Bakery	Last reviewed on	03/07/2015
Occupation	Processing	Next review date	02/07/2016

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# National Occupational Standard



## Overview

This OS unit is about preparation of raw materials and machineries for production of various baked products in industrial units



<b>Unit Code</b>	<b>FIC/N5002</b>
<b>Unit Title(Task)</b>	<b>Prepare for production of baked products in industrial units</b>
<b>Description</b>	This unit is about preparation of raw materials and machineries for production of various baked products in industrial units.
<b>Scope</b>	<p>The scope of this role will include:</p> <ul style="list-style-type: none"> <li>• Prepare raw materials for production ( for baked products in industrial units)</li> <li>• Prepare machineries for production ( for baked products in industrial units)</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Prepare raw materials for production ( for baked products in industrial units)</b>	<p>PC1. read and understand the production order from the supervisor</p> <p>PC2. refer to the process chart/ product flow chart/formulation chart for the product(s) to be produced</p> <p>PC3. organize raw materials and ingredients required for production of products in the work order</p> <p>PC4. check the quality documents from supplier/internal lab for each raw materials and ingredient required for products to be produced, for its conformance to organization standards</p> <p>PC5. check the quality of raw materials and ingredients through physical parameters such as appearance, colour, aroma texture, etc.</p>
<b>Prepare machineries for production ( for baked products in industrial units)</b>	<p>PC6. check and ensure the cleaning and maintenance of the machineries required for production</p> <p>PC7. calibrate equipments such as weighing scale following methods defined by the organization</p> <p>PC8. change dies, moulds, blades and other parts of machineries, if required</p> <p>PC9. start each machine and check and ensure its working and performance</p> <p>PC10. make minor adjustments or repairs (if required)</p> <p>PC11. keep tools accessible to attend repairs/faults in case of breakdown</p> <p>PC12. allot responsibilities/ work to the assistants and helpers</p>
<b>Knowledge and Understanding (K)</b>	
<b>B. Organizational Context</b> (Knowledge of the organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. organization standards, process standards and procedures followed in the organization</p> <p>KA2. types of products produced by the organization</p> <p>KA3. code of business conduct</p> <p>KA4. dress code to be followed</p> <p>KA5. job responsibilities/duties and standard operating procedures</p> <p>KA6. internal processes such as procurement, store management, inventory management, quality management and key contact points for query resolution</p> <p>KA7. provision of wages, working hours as per organization policy</p> <p>KA8. food safety and hygiene standards followed</p>
<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. technology and methods for production of various types of baked products</p> <p>KB2. types of raw materials and ingredients used in various baked products</p> <p>KB3. methods for baking various types of baked products</p>

	<p>KB4. types of machineries used for baking various products and machineries used in the organization</p> <p>KB5. maintenance of baking machineries and equipment</p> <p>KB6. supplier/manufacturer instructions related to machineries</p> <p>KB7. basic mathematics</p> <p>KB8. calculation of raw material for required quantity of finished product</p> <p>KB9. quality parameters and quality assessment based on physical parameters</p> <p>KB10. food safety and hygiene</p> <p>KB11. knowledge on Food Safety Standards and Regulations (as per FSSAI)</p> <p>KB12. GMP</p> <p>KB13. HACCP</p>
<b>Skills (S)</b>	
<b>Core Skills/ Generic Skills</b>	<p><b>Writing Skills</b></p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. note the information communicated by the supervisor</p> <p>SA2. note the raw materials used for production and the finished products produced</p> <p>SA3. note the readings of the process parameters and provide necessary information to fill the process chart</p> <p>SA4. note down observations (if any) related to the process</p> <p>SA5. write information documents to internal departments/ internal teams</p> <p>SA6. note down the data for erp or as required by the organization</p>
	<p><b>Reading Skills</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA7. read and interpret the process required for producing various types of products</p> <p>SA8. read and interpret and process flowchart for all products produced</p> <p>SA9. read equipment manuals and process documents to understand the equipment operation and process requirement</p> <p>SA10. read internal information documents sent by internal teams</p>
	<p><b>Oral Communication (Listening and Speaking skills)</b></p> <p>The user/individual on the job needs to know and understand how to :</p> <p>SA11. discuss task lists, schedules and activities with the supervisor</p> <p>SA12. effectively communicate with the team members</p> <p>SA13. question the supervisor in order to understand the nature of the problem and to clarify queries</p> <p>SA14. attentively listen and comprehend the information given by the speaker</p> <p>SA15. communicate clearly with the supervisor and cross department team on the issues faced</p>
	<p><b>B. Professional Skills</b></p> <p><b>Decision Making</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue</p> <p>SB2. handle issues in case the supervisor is not available (as per the authority matrix defined by the organization)</p>
	<p><b>Plan and Organize</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB3. plan and organize the work order and jobs received from the supervisor</p>

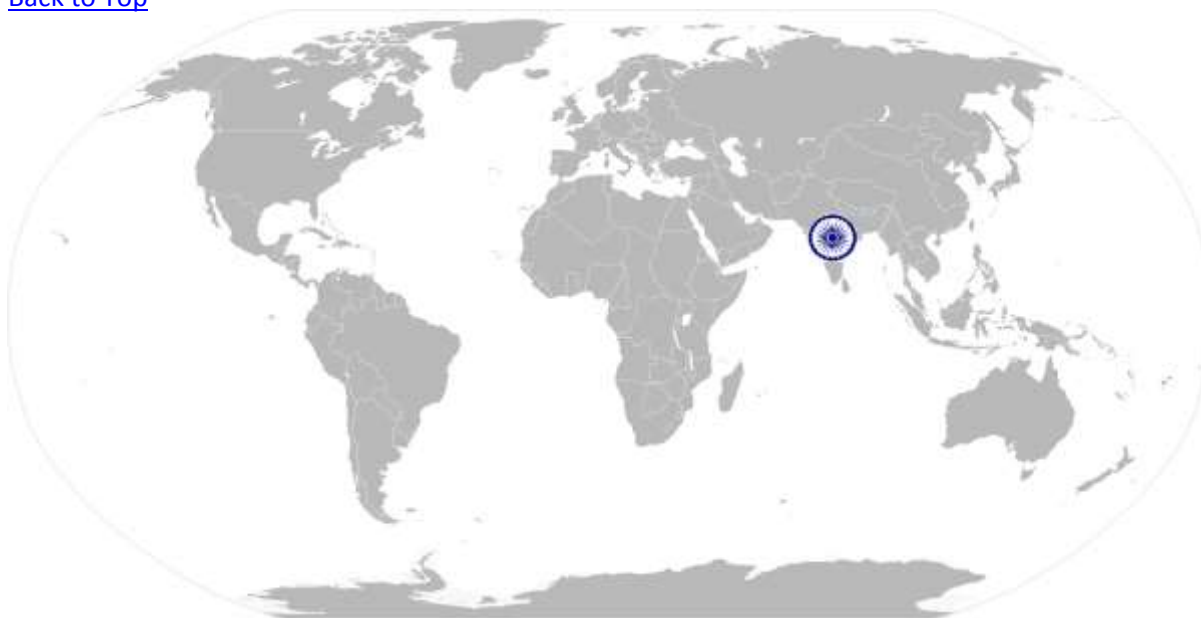


	SB4. organize raw materials and packaging materials required for all products following the instruction provided by the supervisor
	SB5. plan and prioritize the work based on the instructions received from the supervisor
	SB6. plan to utilise time and equipment's effectively
	SB7. organize all process/ equipment manuals so as to access information easily
	SB8. support the supervisor in scheduling tasks for helper(s)
	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to:
	SB9. understand customer requirements and their priority and respond as per their needs
	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to:
	SB10. support supervisor in solving problems by detailing out problems
	SB11. discuss the possible solutions with the supervisor for problem solving
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to:
	SB12. apply domain information about maintenance Processes and technical knowledge about tools and equipment
	<b>Critical Thinking</b>
	The user/individual on the job needs to know and understand how to:
	SB13. use common sense and make judgments on day to day basis
	SB14. use reasoning skills to identify and resolve basic problems
	SB15. use intuition to detect any potential problems which could arise during operations
	SB16. use acquired knowledge of the process for identifying and handling issues

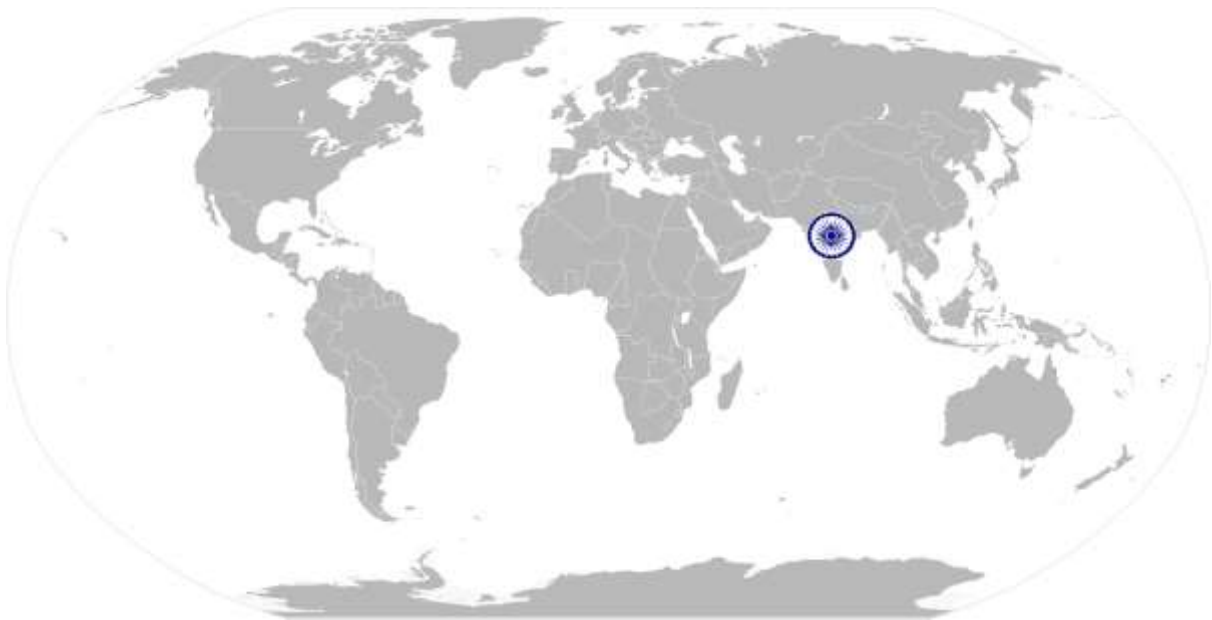
## **NOS Version Control**

NOS Code	FIC/N5002		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	23/06/2015
Industry Sub-sector	Bread and Bakery	Last reviewed on	03/07/2015
Occupation	Processing	Next review date	02/07/2016

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# National Occupational Standard



## Overview

This OS unit is about supervising and controlling the production of various baked products in industries using continuous processing machineries or automated machineries, as per the specifications and standards of the organization.

**FIC/N5003**

**Produce baked products in industrial units**

National Occupational Standard

Unit Code	FIC/N5003
Unit Title(Task)	Produce baked products in industrial units
Description	This unit is about supervising and controlling the production of various baked products in industries using continuous processing machineries or automated machineries, as per the specifications and SOP's.
Scope	<p>The scope of this role will include:</p> <ul style="list-style-type: none"> <li>• Weigh and mix ingredients</li> <li>• Fermentation, moulding and proofing dough( for bread)</li> <li>• Roll, shape and cut dough (for biscuits)</li> <li>• Mould cake batter</li> <li>• Bake and pack baked products</li> <li>• Post production cleaning and regular maintenance of equipments</li> </ul>
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
<b>Weigh and mix Ingredients</b>	<p>PC1. refer the production order and formulation for the product/SKU, and organize all the ingredients required for the product/batch</p> <p>PC2. check the quality of each ingredient through physical parameters such as appearance, colour, odour, texture etc. for its conformance to standards and specifications</p> <p>PC3. set and control metering devices that measure each ingredient as per the formulation, and check the scale indicators to confirm if the specified amount of ingredients have been added</p> <p>PC4. start flour sifter and pre-mixer to blend ingredients</p> <p>PC5. transfer all the ingredients together or sequentially into the mixing machine, and set the mixer speed, time and temperature depending on the mixing process, following the SOP</p> <p>PC6. start the mixing machine to knead/mix the ingredients and observe dials and recording instruments to verify dough temperature, viscosity of batter, speed and time of mixing</p> <p>PC7. check and feel the dough/batter to ascertain its consistency meets the standard, and unload dough/ batter in the trough/ hopper</p>
<b>Fermentation,moulding and proofing dough(for bread)</b>	<p>PC8. set and maintain temperature, humidity of fermentation chamber/room, transfer dough into fermentation chamber/room and allow to stand for specified time for fermentation</p> <p>PC9. check the fermented dough at regular intervals for required consistency</p> <p>PC10. transfer the fermented dough into the mixer for second stage mixing following the SOP, set the speed and time of the mixer and start to mix the fermented dough</p> <p>PC11. transfer the dough into the trough/ hopper and load the dough onto the dough divider and adjust controls to set speed of the divider and start divider blades that cut off specified weight of dough and drop onto the conveyor</p> <p>PC12. set and control the speed of the divider conveyor that pass the dough</p>

FIC/N5003	Produce baked products in industrial units
	<p>through the line that shapes the dough into balls, dust with flour and transport the shaped dough to the moulder conveyor without sticking</p> <p>PC13. weigh the dough balls at regular intervals to check its conformance to standards</p> <p>PC14. load or ensure loading (by helpers) of specified size baking moulds/ pans on the panning conveyor and ensure that speed of the moulder and conveyor are synchronised to allow smooth passage of dough</p> <p>PC15. allow the dough to pass through moulding line that fold and roll the dough to desired shape and allow the shaped dough to arrange in the baking moulds/ pans passing on the panning conveyor</p> <p>PC16. set and control the speed of the conveyor that take the moulded dough into the proofer and turn controls to set the temperature, relative humidity of the proofer following the SOP</p> <p>PC17. monitor the proofed dough passing out of the proofer to confirm it has rise to specified height</p>
<b>Roll, shape and cut dough (for biscuits)</b>	<p>PC18. load the dough trough containing dough, in the elevator and start the elevator to lift the dough trough and dump the dough in the dough feeder (if dough feeder is in the elevated position)</p> <p>PC19. set the controls of each roller of the laminator machine and start the machine to produce continuous sheet of dough</p> <p>PC20. set the controls of rotary cutter machine to cut the sheet of dough to desired size, shape and design and set the controls of the separating machine to separate the cut dough and control scrap return</p> <p>PC21. observe operation of laminator, rotary cutter and separating machine, and remove malformed biscuit shapes and control scrap return</p> <p>PC22. load topping materials like salt, sugar, choco chips etc in sprinkler machine following the SOP for the product/SKU and set the controls of the machines to sprinkle measured quantity of topping material over the cut dough</p>
<b>Mould cake batter</b>	<p>PC23. prepare the baking pans by placing the paper liners in the moulds of the baking pans</p> <p>PC24. adjust controls of the batter depositor machine to fill measured quantity of batter into the moulds of baking pans</p> <p>PC25. start the conveyor and control speed such that the moulds of the baking pans are positioned below the filling nozzle of the batter depositor machine</p> <p>PC26. start machine to pump measured quantity of batter into the moulds of the baking pans</p> <p>PC27. fill the topping materials such as fruits, nuts, chocolate chips, etc. in the topping machine following the SOP for the product/SKU and start the topping machine to deposit measured quantity of topping materials on the batter in the baking pans</p> <p>PC28. check the weight of the filled moulds at regular intervals to ensure its conformance to standards</p>
<b>Bake and pack baked products</b>	<p>PC29. set the oven parameters such as baking temperature, baking time, speed of the panning conveyor etc., and monitor and control the dough/batter filled baking pans entering the oven (tunnel oven)</p> <p>PC30. observe baking of products through the observation window of the tunnel oven and monitor the oven parameters during the entire baking process</p> <p>PC31. observe the product coming out the oven for its quality through physical parameters such as colour, aroma, texture etc. to detect burning /over</p>



FIC/N5003 Produce baked products in industrial units	
	<p>baking/under baking and accordingly control oven parameters to achieve finished product of uniform quality, and remove the non-conforming products from the conveyor</p> <p>PC32. check the quality of the finished products (bread, biscuit and cake) through physical parameters such as colour, size, appearance, texture, aroma, etc. and compare against standard</p> <p>PC33. control the vacuum system that remove the baked product from the baking moulds/ pans through suction</p> <p>PC34. set, control and maintain speed of the cooling conveyor and fans to cool the finished products and ensure the products are cooled to the required temperature</p> <p>PC35. check the weight of finished product periodically and ensure its conformance to standards</p> <p>PC36. adjust controls of the conveyor and slicer to allow the bread loaves/cakes to pass through slicer and ensure it is cut to required thickness</p> <p>PC37. adjust controls to allow the finished products to move to the automatic packaging machine</p> <p>PC38. sample the packed product and transfer to quality lab for analysis</p> <p>PC39. report discrepancies/concerns in each stage of production to department supervisor for immediate action</p>
<b>Post production cleaning and regular maintenance of equipments</b>	<p>PC40. clean the work area, machineries, equipment and tools using recommended cleaning agents and sanitizers</p> <p>PC41. attend minor repairs/faults of all machines (if any)</p> <p>PC42. ensure periodic (daily/weekly/monthly/quarterly/half yearly/annual) maintenance of all machines and equipment following the SOP or following suppliers instructions/manuals</p>
Knowledge and Understanding (K)	
<b>C. Organizational Context</b> (Knowledge of the organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. organization standards, process standards and procedures followed in the organization</p> <p>KA2. types of products produced by the organization</p> <p>KA3. code of business conduct</p> <p>KA4. dress code to be followed</p> <p>KA5. job responsibilities/duties and standard operating procedures</p> <p>KA6. internal processes such as procurement, store management, inventory management, quality management and key contact points for query resolution</p> <p>KA7. provision of wages, working hours as per organization policy</p> <p>KA8. food safety and hygiene standards followed</p>
<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. types of raw materials, ingredients and finishing materials required for making various baked products</p> <p>KB2. production process, process parameters and formulation of all types of baked products</p> <p>KB3. types of machineries used for baking various products and machineries used in the organization</p> <p>KB4. handling and maintenance of baking equipment</p> <p>KB5. hand-in machine safety</p>

**FIC/N5003**

**Produce baked products in industrial units**

	<p>KB6. process parameters and machine parameters for all products handled</p> <p>KB7. basic mathematics</p> <p>KB8. quality parameters, quality standards to be maintained and quality assessment based on physical parameters</p> <p>KB9. types of packaging materials for various type of products</p> <p>KB10. types of chemicals, materials, tools and equipment required for cleaning and maintenance</p> <p>KB11. clean-in-place and clean-out-of-place methods and procedures</p> <p>KB12. methods to clean and disinfect equipment, tools and work area</p> <p>KB13. food safety and hygiene</p> <p>KB14. knowledge on Food Safety Standards and Regulations (as per FSSAI)</p> <p>KB15. GMP</p> <p>KB16. HACCP</p>
<b>Skills (S)</b>	
<b>B. Core Skills/ Generic Skills</b>	<p><b>Writing Skills</b></p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. note the information communicated by the supervisor</p> <p>SA2. note the raw materials used for production and the finished products produced</p> <p>SA3. note the readings of the process parameters and provide necessary information to fill the process chart</p> <p>SA4. note down observations (if any) related to the process</p> <p>SA5. write information documents to internal departments/ internal teams</p> <p>SA6. note down the data for ERP or as required by the organization</p>
	<p><b>Reading Skills</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA7. read and interpret the process required for producing various types of products</p> <p>SA8. read and interpret and process flowchart for all products produced</p> <p>SA9. read equipment manuals and process documents to understand the equipment operation and process requirement</p> <p>SA10. read internal information documents sent by internal teams</p>
	<p><b>Oral Communication (Listening and Speaking skills)</b></p> <p>The user/individual on the job needs to know and understand how to :</p> <p>SA11. discuss task lists, schedules and activities with the supervisor</p> <p>SA12. effectively communicate with the team members</p> <p>SA13. question the supervisor in order to understand the nature of the problem and to clarify queries</p> <p>SA14. attentively listen and comprehend the information given by the speaker</p> <p>SA15. communicate clearly with the supervisor and cross department team on the issues faced</p>
	<p><b>Decision Making</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue</p> <p>SB2. handle issues in case the supervisor is not available (as per the authority matrix defined by the organization)</p>
<b>B. Professional Skills</b>	

**FIC/N5003**
**Produce baked products in industrial units**

	<b>Plan and Organize</b>
	The user/individual on the job needs to know and understand how to:
	SB3. plan and organize the work order and jobs received from the supervisor
	SB4. organize raw materials and packaging materials required for all products following the instruction provided by the supervisor
	SB5. plan and prioritize the work based on the instructions received from the supervisor
	SB6. plan to utilise time and equipment's effectively
	SB7. organize all process/ equipment manuals so as to access information easily
	SB8. support the supervisor in scheduling tasks for helper(s)
	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to:
	SB9. understand customer requirements and their priority and respond as per their needs
	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to:
	SB10. support supervisor in solving problems by detailing out problems
	SB11. discuss the possible solutions with the supervisor for problem solving
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to:
	SB12. apply domain information about maintenance Processes and technical knowledge about tools and equipment
	<b>Critical Thinking</b>
	The user/individual on the job needs to know and understand how to:
	SB13. use common sense and make judgments on day to day basis
	SB14. use reasoning skills to identify and resolve basic problems
	SB15. use intuition to detect any potential problems which could arise during operations
	SB16. use acquired knowledge of the process for identifying and handling issues



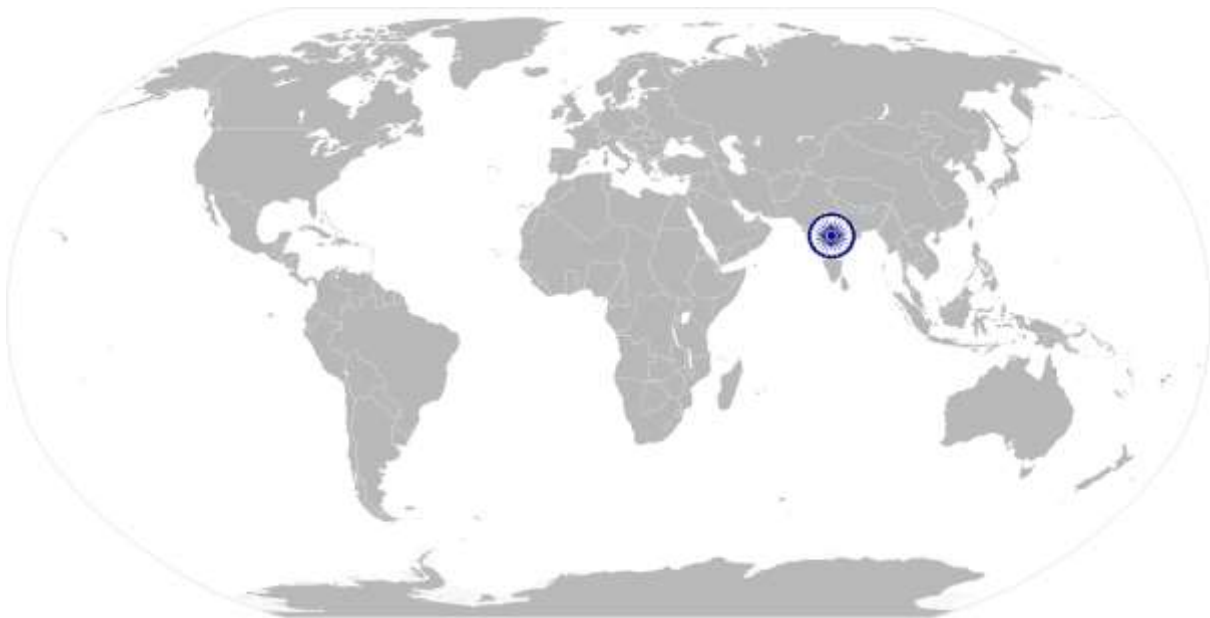
**FIC/N5003**

**Produce baked products in industrial units**

## **NOS Version Control**

NOS Code	FIC/N5003		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processsing	Drafted on	23/06/2015
Industry Sub-sector	Bread and Bakery	Last reviewed on	03/07/2015
Occupation	Processing	Next review date	02/07/2016

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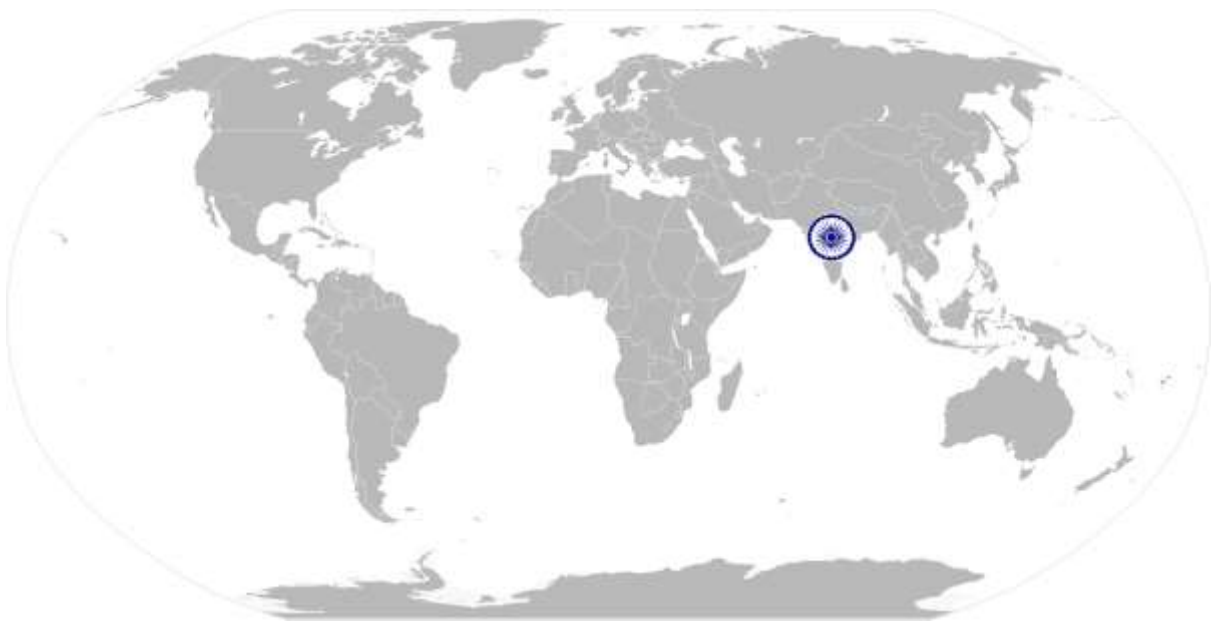


**FIC/N5004**

**Complete documentation and record keeping related to production of baked products in industrial units**

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# National Occupational Standard



## Overview

This OS unit is about documenting and maintaining records on raw materials, process and finished products for baked products in industrial units.

**FIC/N5004 Complete documentation and record keeping related to production of baked products in industrial units**

National Occupational Standard

<b>Unit Code</b>	<b>FIC/N5004</b>
<b>Unit Title(Task)</b>	<b>Complete documentation and record keeping related to production of baked products in industrial units</b>
<b>Description</b>	This unit is about documenting and maintaining records of raw materials, process and finished products for baked products in industrial units.
<b>Scope</b>	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> <li>Document and maintain records of raw materials ( for production of baked products in industrial units)</li> <li>Document and maintain record of production schedule and process parameters ( for production of baked products in industrial units)</li> <li>Document and maintain record of finished products ( for production of baked products in industrial units)</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Document and maintain record of raw material ( for production of baked products in industrial units)</b>	<p>PC1. document and maintain record of details of all raw materials used such as names of raw materials, supplier details, receiving date/ date of manufacture, expiry date, supplier quality document, quality parameters for all raw materials, internal quality analysis report, etc., as per organization standards</p> <p>PC2. maintain record of observations (if any) related to raw materials and packaging materials</p> <p>PC3. load the raw material details in computer or in the erp system followed by the organization for future reference</p> <p>PC4. verify the documents and track from finished product to raw materials, in case of quality concerns and during quality management system audits</p>
<b>Document and maintain record of production schedule and process parameters ( for production of baked products in industrial units)</b>	<p>PC5. document and maintain records of production details such as the product produced, production sequence, equipment and machinery details, efficiency and capacity utilization of equipment, etc.</p> <p>PC6. document and maintain records of process details such as type of raw material used, process parameters (temperature, time etc. as applicable) for the entire process in process chart or production log for all products produced</p> <p>PC7. document and maintain record of batch size, raw material used, yield after each stage of process, wastage, energy utilization and final products produced</p> <p>PC8. maintain record of observations or deviations (if any) related to production and process parameters</p> <p>PC9. load the production and process parameter details in computer or in the ERP system followed by the organization for future reference</p> <p>PC10. verify documents and track them from finished product to raw materials, in case of quality concerns, and during quality management system audits</p>
<b>Document and maintain records of the finished products(for</b>	<p>PC11. document and maintain records of the types of finished products produced</p> <p>PC12. document and maintain records of finished products details such as name of the product, batch number, time of packing, date of manufacture, date of expiry, other label details, primary and secondary packaging materials for all</p>

**FIC/N5004 Complete documentation and record keeping related to production of baked products in industrial units**

<b>production of baked products in industrial units)</b>	<p>finished products, storage conditions, etc., as per organization standards</p> <p>PC13. maintain record of observations or deviations (if any) related to finished products</p> <p>PC14. load the finished product details in computer or in the ERP system followed by the organization for future reference</p> <p>PC15. verify the documents and track them from finished product to raw materials, in case of quality concerns, and during quality management system audits</p>
<b>Knowledge and Understanding (K)</b>	
<b>D. Organizational Context</b> (Knowledge of the organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. organization standards, process standards and procedures followed in the organization</p> <p>KA2. types of products produced by the organization</p> <p>KA3. code of business conduct</p> <p>KA4. dress code to be followed</p> <p>KA5. job responsibilities/duties and standard operating procedures</p> <p>KA6. internal processes such as procurement, store management, inventory management, quality management and key contact points for query resolution</p> <p>KA7. provision of wages, working hours as per organization policy</p> <p>KA8. food safety and hygiene standards followed</p>
<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. documentation system followed in the organization such as production chart, process chart and finished goods chart</p> <p>KB2. details of raw materials and finished products to be recorded</p> <p>KB3. details of production plan and process parameters to be recorded</p> <p>KB4. methods to record and maintain record of observations (if any) related to raw materials, process and finished products</p> <p>KB5. method to track back the record from finished product to raw material</p> <p>KB6. knowledge on Food Safety Standards and Regulations (as per FSSAI)</p> <p>KB7. enter details in ERP system followed by the organization</p>
<b>Skills (S)</b>	
<b>C. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. note the information communicated by the supervisor</p> <p>SA2. note the raw materials used for production and the finished products produced</p> <p>SA3. note the readings of the process parameters and provide necessary information to fill the process chart</p> <p>SA4. note down observations (if any) related to the process</p> <p>SA5. write information documents to internal departments/ internal teams</p> <p>SA6. note down the data for ERP or as required by the organization</p>
	<b>Reading Skills</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA7. read and interpret the process required for producing various types of products</p>

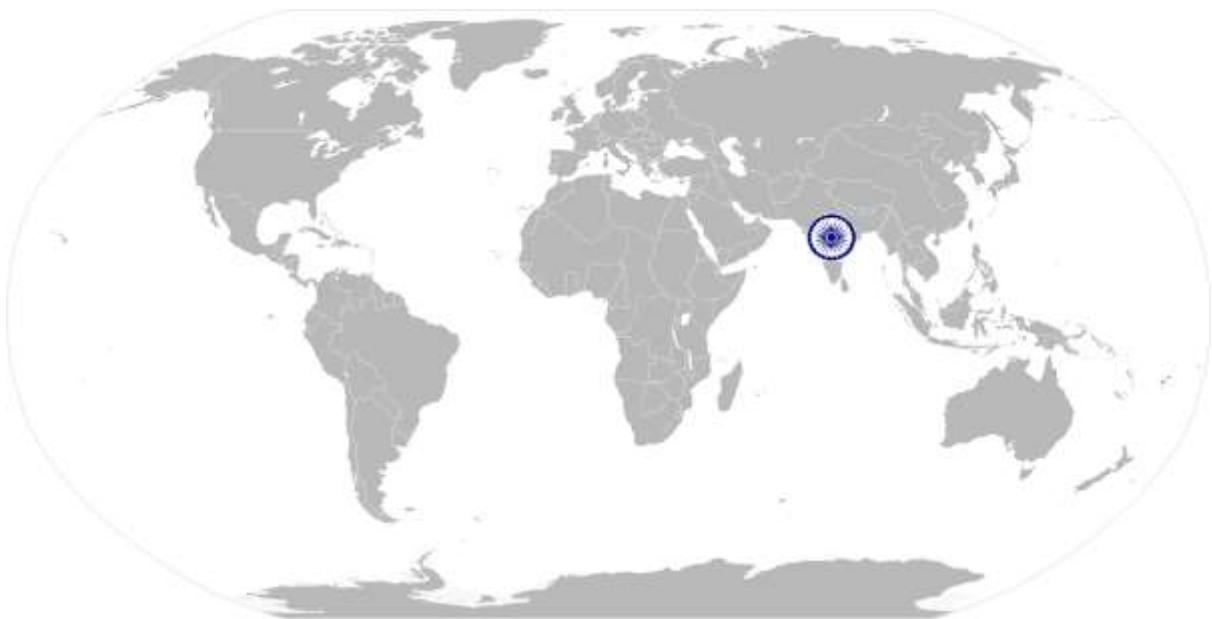
**FIC/N5004**

**Complete documentation and record keeping related to production of baked products in industrial units**

	<p>SA8. read and interpret and process flowchart for all products produced</p> <p>SA9. read equipment manuals and process documents to understand the equipment operation and process requirement</p> <p>SA10. read internal information documents sent by internal teams</p>
	<p><b>Oral Communication (Listening and Speaking skills)</b></p> <p>The user/individual on the job needs to know and understand how to :</p> <p>SA11. discuss task lists, schedules and activities with the supervisor</p> <p>SA12. effectively communicate with the team members</p> <p>SA13. question the supervisor in order to understand the nature of the problem and to clarify queries</p> <p>SA14. attentively listen and comprehend the information given by the speaker</p> <p>SA15. communicate clearly with the supervisor and cross department team on the issues faced</p>
<b>B. Professional Skills</b>	<p><b>Decision Making</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue</p> <p>SB2. handle issues in case the supervisor is not available (as per the authority matrix defined by the organization)</p>
	<p><b>Plan and Organize</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB3. plan and organize the work order and jobs received from the supervisor</p> <p>SB4. organize raw materials and packaging materials required for all products following the instruction provided by the supervisor</p> <p>SB5. plan and prioritize the work based on the instructions received from the supervisor</p> <p>SB6. plan to utilise time and equipment's effectively</p> <p>SB7. organize all process/ equipment manuals so as to access information easily</p> <p>SB8. support the supervisor in scheduling tasks for helper(s)</p>
	<p><b>Customer Centricity</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB9. understand customer requirements and their priority and respond as per their needs</p>
	<p><b>Problem Solving</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB10. support supervisor in solving problems by detailing out problems</p> <p>SB11. discuss the possible solutions with the supervisor for problem solving</p>
	<p><b>Analytical Thinking</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB12. apply domain information about maintenance Processes and technical knowledge about tools and equipment</p>
	<p><b>Critical Thinking</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB13. use common sense and make judgments on day to day basis</p> <p>SB14. use reasoning skills to identify and resolve basic problems</p> <p>SB15. use intuition to detect any potential problems which could arise during</p>

**FIC/N5004      Complete documentation and record keeping related to production of baked products in industrial units**

	operations SB16. use acquired knowledge of the process for identifying and handling issues
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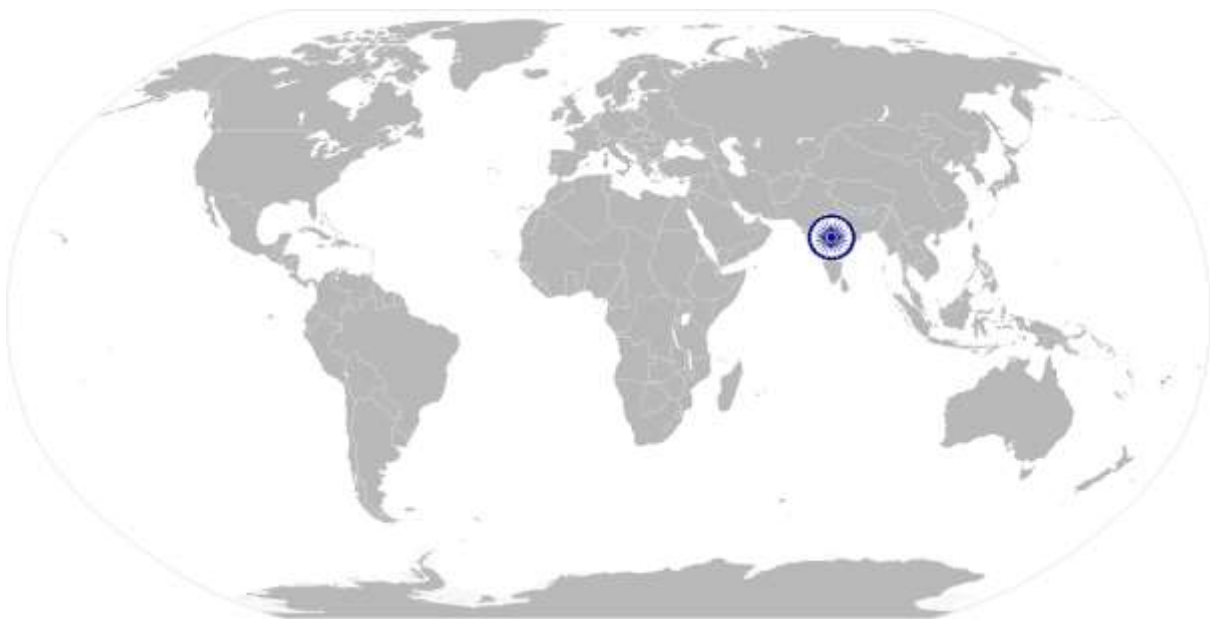


**FIC/N5004**      **Complete documentation and record keeping related to production of baked products in industrial units**

## **NOS Version Control**

NOS Code	FIC/N5004		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	23/06/2015
Industry Sub-sector	Bread and Bakery	Last reviewed on	03/07/2015
Occupation	Processing	Next review date	02/07/2016

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# National Occupational Standard



## Overview

This OS unit is about maintaining food safety, hygiene and sanitation in work area and processing unit for processing food products



FIC/N9001

Food safety, hygiene and sanitation for processing food products

National Occupational Standard

Unit Code	FIC/N9001
Unit Title(Task)	Food safety, hygiene and sanitation for processing food products
Description	This unit is about maintaining food safety, hygiene and sanitation in work area and processing unit for processing food products
Scope	<p>The scope of this role will include:</p> <ul style="list-style-type: none"> <li>Perform safety and sanitation related functions (for processing food products)</li> <li>Apply food safety practices (for processing food products)</li> </ul>
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Perform safety and sanitation related functions (for processing food products)	<p>PC1. comply with food safety and hygiene procedures followed in the organization</p> <p>PC2. ensure personal hygiene by use of gloves, hairnets, masks, ear plugs, goggles, shoes, etc.</p> <p>PC3. ensure hygienic production of food by inspecting raw materials, ingredients, finished products, etc. for compliance to physical, chemical and microbiological parameters</p> <p>PC4. pack products in appropriate packaging materials, label and store them in designated area, free from pests, flies and infestations</p> <p>PC5. clean, maintain and monitor food processing equipment periodically, using it only for the specified purpose</p> <p>PC6. use safety equipment such as fire extinguisher, first aid kit and eye-wash station when required</p> <p>PC7. follow housekeeping practices by having designated area for materials/tools</p> <p>PC8. follow industry standards like GMP and HACCP and product recall process</p> <p>PC9. attend training on hazard management to understand types of hazards such as physical, chemical and biological hazards and measures to control and prevent them</p> <p>PC10. identify, document and report problems such as rodents and pests to management</p> <p>PC11. conduct workplace checklist audits before and after work to ensure safety and hygiene</p> <p>PC12. document and maintain raw material, packaging material, process and finished products for the credibility and effectiveness of the food safety control system</p>
Apply food safety practices (for processing food products)	<p>PC13. determine the quality of food using criteria such as aroma, appearance, taste and best before date, and take immediate measures to prevent spoilage</p> <p>PC14. store raw materials, finished products, allergens separately to prevent cross-contamination</p> <p>PC15. label raw materials and finished products and store them in designated storage areas according to safe food practices</p> <p>PC16. follow stock rotation based on FEFO/ FIFO</p>
Knowledge and Understanding (K)	

**FIC/N9001**

**Food safety, hygiene and sanitation for processing food products**

<b>E. Organizational Context</b> (Knowledge of the organization and its processes)	The user/individual on the job needs to know and understand: KA1. organization standards, process standards and procedures followed in the organization KA2. types of products produced by the organization KA3. code of business conduct KA4. dress code to be followed KA5. job responsibilities/duties and standard operating procedures KA6. internal processes such as procurement, store management, inventory management, quality management and key contact points for query resolution KA7. provision of wages, working hours as per organization policy KA8. food safety and hygiene standards followed
<b>B. Technical Knowledge</b>	The user/individual on the job needs to know and understand: KB1. possible physical, chemical and biological hazards and methods of prevention of various hazards KB2. personal hygiene requirement KB3. different types of sanitizers used for process area, equipment and the procedure to use them KB4. knowledge on Food Safety Standards and Regulations (as per FSSAI) KB5. quality parameters and quality assessment based on physical parameters, basic food microbiology KB6. labelling/marketing requirements for raw materials, finished goods, stored materials, packaging materials and their designated storage area KB7. cleaning and sanitation of equipment and work area KB8. CIP and COP methods and procedures KB9. storage norms for raw materials, packaging material and finished products KB10. stock rotation of ingredients and finished products based on FEFO/FIFO KB11. method of maintaining safety check lists for all machineries KB12. GHP KB13. GMP KB14. HACCP
<b>Skills (S)</b>	
<b>D. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	The user/ individual on the job needs to know and understand how to: SA1. note the information communicated by the supervisor SA2. note the raw materials used for production and the finished products produced SA3. note the readings of the process parameters and provide necessary information to fill the process chart SA4. note down observations (if any) related to the process SA5. write information documents to internal departments/ internal teams SA6. note down the data for erp or as required by the organization
	<b>Reading Skills</b>
	The user/individual on the job needs to know and understand how to: SA7. read and interpret the process required for producing various types of products SA8. read and interpret and process flowchart for all products produced SA9. read equipment manuals and process documents to understand the equipment operation and process requirement

**FIC/N9001**

**Food safety, hygiene and sanitation for processing food products**

	SA10.read internal information documents sent by internal teams
	<b>Oral Communication (Listening and Speaking skills)</b>
	<p>The user/individual on the job needs to know and understand how to :</p> <p>SA11.discuss task lists, schedules and activities with the supervisor</p> <p>SA12.effectively communicate with the team members</p> <p>SA13.question the supervisor in order to understand the nature of the problem and to clarify queries</p> <p>SA14.attentively listen and comprehend the information given by the speaker</p> <p>SA15.communicate clearly with the supervisor and cross department team on the issues faced</p>
<b>B. Professional Skills</b>	<b>Decision Making</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue</p> <p>SB2. handle issues in case the supervisor is not available (as per the authority matrix defined by the organization)</p>
	<b>Plan and Organize</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB3. plan and organize the work order and jobs received from the supervisor</p> <p>SB4. organize raw materials and packaging materials required for all products following the instruction provided by the supervisor</p> <p>SB5. plan and prioritize the work based on the instructions received from the supervisor</p> <p>SB6. plan to utilise time and equipment's effectively</p> <p>SB7. organize all process/ equipment manuals so as to access information easily</p> <p>SB8. support the supervisor in scheduling tasks for helper(s)</p>
	<b>Customer Centricity</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB9. understand customer requirements and their priority and respond as per their needs</p>
	<b>Problem Solving</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB10. support supervisor in solving problems by detailing out problems</p> <p>SB11. discuss the possible solutions with the supervisor for problem solving</p>
	<b>Analytical Thinking</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB12. apply domain information about maintenance processes and technical knowledge about tools and equipment</p>
	<b>Critical Thinking</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB13. use common sense and make judgments on day to day basis</p> <p>SB14. use reasoning skills to identify and resolve basic problems</p> <p>SB15. use intuition to detect any potential problems which could arise during operations</p> <p>SB16. use acquired knowledge of the process for identifying and handling issues</p>

**FIC/N9001**

**Food safety, hygiene and sanitation for processing food products**

## **NOS Version Control**

<b>NOS Code</b>	<b>FIC/N9001</b>		
<b>Credits (NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
<b>Industry</b>	<b>Food Processing</b>	<b>Drafted on</b>	<b>23/06/2015</b>
<b>Industry Sub-sector</b>	<b>Bread and bakery</b>	<b>Last reviewed on</b>	<b>03/07/2015</b>
<b>Occupation</b>	<b>Processing</b>	<b>Next review date</b>	<b>02/07/2016</b>

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## Assessment Criteria

### CRITERIA FOR ASSESSMENT OF TRAINEES

**Job Role** Plant Baker

**Qualification Pack** FIC/Q5001

**Sector Skill Council** Food Processing

#### Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC
3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below)
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria
5. To pass the Qualification Pack, every trainee should score a minimum of 50% in every NOS and overall 50% pass percentage in every QP
6. To pass the Qualification Pack, every trainee should score a minimum of 33% in Theory and 50% in Practical
7. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack

		Marks Allocation			
		Total Marks	Out Of	Theory	Skills Practical
<b>1. FIC/N5001 (Prepare and maintain work area and process machineries for producing baked products in industrial units)</b>	PC1. Clean and maintain the cleanliness of the work area using approved sanitizers and keep it free from dust, waste, flies and pests	<b>100</b>	25	10	15
	PC2. Ensure that the work area is safe and hygienic for food processing		10	3	7
	PC3. Dispose waste materials as per standard operating procedures and industry requirements		15	5	10
	PC4. Check the working and performance of all machineries and tools used for production such as weighing scales, mixer/ kneader, dough divider, dough rounder, dough moulder, sheeting machine, rotary cutter, dough depositor, baking oven, packaging machines, etc.		15	5	10
	PC5. Clean the machineries and tools used with approved sanitizers following specifications and SOPs		15	5	10

### Assessment Criteria

	PC6. Place the necessary tools required for the process		5	2	3
	PC7. Attend minor repairs/ faults of machines, if required		15	5	10
			<b>100</b>	<b>35</b>	<b>65</b>
<b>2. FIC/N5002 (Prepare for production of baked products in industrial units)</b>	PC1. Read and understand the production order from the supervisor	<b>100</b>	10	4	6
	PC2. Refer to the process chart/ product flow chart/formulation chart for the product(s) to be produced		10	4	6
	PC3. Organize raw materials and ingredients required for production of products in the work order		10	4	6
	PC4. Check the quality documents from supplier/internal lab for each raw materials and ingredient required for products to be produced, for its conformance to organization standards		10	4	6
	PC5. Check the quality of raw materials and ingredients through physical parameters such as appearance, colour, aroma texture, etc.		10	3	7
	PC6. Check and ensure the cleaning and maintenance of the machineries required for production		8	3	5
	PC7. Calibrate equipments such as weighing scale following methods defined by the organization		8	3	5
	PC8. Change dies, moulds, blades and other parts of machineries, if required		8	2	6
	PC9. Start each machine and check and ensure its working and performance		8	2	6
	PC10. Make minor adjustments or repairs (if required)		8	2	6
	PC11. Keep tools accessible to attend repairs/faults in case of breakdown		5	2	3
	PC12. Allot responsibilities/ work to the assistants and helpers		5	2	3
			<b>100</b>	<b>35</b>	<b>65</b>



### Assessment Criteria

<b>3. FIC/N5003 (Produce baked products in industrial units)</b>	PC1.	Refer to the production order and formulation for the product/SKU, and organize all the ingredients required for the product/batch	<b>100</b>	2	0.5	1.5
	PC2.	Check the quality of each ingredient through physical parameters such as appearance, colour, aroma, texture etc. for its conformance to SOP (Standard Operating Procedure)		3	1	2
	PC3.	Set and control metering devices that measure each ingredient as per the formulation, and check the scale indicators to confirm if the specified amount of ingredients have been added		2	0.5	1.5
	PC4.	Start flour sifter and pre-mixer to blend ingredients		3	1	2
	PC5.	Transfer all the ingredients together or sequentially into the mixing machine, and set the mixer speed, time and temperature depending on the mixing process, following the SOP		2	0.5	1.5
	PC6.	Start the mixing machine to knead/mix the ingredients and observe dials and recording instruments to verify dough temperature, viscosity of batter, speed and time of mixing		2	0.5	1.5
	PC7.	Check and feel the dough/batter to ascertain its consistency meets the standard, and unload dough/ batter in the trough/ hopper		3	1	2
	PC8.	Set and maintain temperature, humidity of fermentation chamber/room, transfer dough into fermentation chamber/room and allow to stand for specified time for fermentation		2	0.5	1.5
	PC9.	Check the fermented dough at regular intervals for required consistency		2	0.5	1.5
	PC10.	Transfer the fermented dough into the mixer for second stage mixing following the SOP, set the speed and time of the mixer and start to mix the fermented dough		2	1	1

### Assessment Criteria

	PC11. Transfer the dough into the trough/hopper and load the dough onto the dough divider and adjust controls to set speed of the divider and start divider blades that cut off specified weight of dough and drop onto the conveyor		2	1	1
	PC12. Set and control the speed of the divider conveyor that pass the dough through the line that shapes the dough into balls, dust with flour and transport the shaped dough to the moulder conveyor without sticking		2	1	1
	PC13. Weigh the dough balls at regular intervals to check its conformance to standards		2	1	1
	PC14. Load or ensure loading (by helpers) of specified size baking moulds/ pans on the panning conveyor and ensure that speed of the moulder and conveyor are synchronised to allow smooth passage of dough		2	0.5	1.5
	PC15. Allow the dough to pass through moulding line that fold and roll the dough to desired shape and allow the shaped dough to arrange in the baking moulds/ pans passing on the panning conveyor		2	1	1
	PC16. Set and control the speed of the conveyor that take the moulded dough into the proofer and turn controls to set the temperature, relative humidity of the proofer following the SOP		2	1	1
	PC17. Monitor the proofed dough passing out of the proofer to confirm it has rise to specified height		2	1	1
	PC18. Load the dough trough containing dough, in the elevator and start the elevator to lift the dough trough and dump the dough in the dough feeder (if dough feeder is in the elevated position)		2	1	1
	PC19. Set the controls of each roller of the laminator machine and start the machine to produce continuous sheet of dough		2	1	1



### Assessment Criteria

	PC20. set the controls of rotary cutter machine to cut the sheet of dough to desired size, shape and design and set the controls of the separating machine to separate the cut dough and control scrap return		5	2	3
	PC21. Observe operation of laminator, rotary cutter and separating machine, and remove malformed biscuit shapes and control scrap return		3	1	2
	PC22. Load topping materials like salt, sugar, choco chips etc in sprinkler machine following the SOP for the product/SKU and set the controls of the machines to sprinkle measured quantity of topping material over the cut dough		2	0.5	1.5
	PC23. Prepare the baking pans by placing the paper liners in the moulds of the baking pans		2	0.5	1.5
	PC24. Adjust controls of the batter depositor machine to fill measured quantity of batter into the moulds of baking pans		2	0.5	1.5
	PC25. Start the conveyor and control speed such that the moulds of the baking pans are positioned below the filling nozzle of the batter depositor machine		2	0.5	1.5
	PC26. Start machine to pump measured quantity of batter into the moulds of the baking pans		2	0.5	1.5
	PC27. Fill the topping materials such as fruits, nuts, chocolate chips, etc. in the topping machine following the SOP for the product/SKU and start the topping machine to deposit measured quantity of topping materials on the batter in the baking pans		3	1	2
	PC28. Check the weight of the filled moulds at regular intervals to ensure its conformance to standards		5	2	3
	PC29. Set the oven parameters such as baking temperature, baking time, speed of the panning conveyor etc., and monitor and control the dough/batter filled baking pans		5	2	3

### Assessment Criteria

	entering the oven (tunnel oven)				
	PC30. Observe baking of products through the observation window of the tunnel oven and monitor the oven parameters during the entire baking process		3	1	2
	PC31. Observe the product coming out the oven for its quality through physical parameters such as colour, aroma, texture etc. to detect burning /over baking/under baking and accordingly control oven parameters to achieve finished product of uniform quality, and remove the non-conforming products from the conveyor		2	0.5	1.5
	PC32. Check the quality of the finished products (bread, biscuit and cake) through physical parameters such as colour, size, appearance, texture, aroma, etc. and compare against standard		2	0.5	1.5
	PC33. Control the vacuum system that remove the baked product from the baking moulds/ pans through suction		2	0.5	1.5
	PC34. Set, control and maintain speed of the cooling conveyor and fans to cool the finished products and ensure the products are cooled to the required temperature		2	1	1
	PC35. Check the weight of finished product periodically and ensure its conformance to standards		2	1	1
	PC36. Adjust controls of the conveyor and slicer to allow the bread loaves/cakes to pass through slicer and ensure it is cut to required thickness		2	1	1
	PC37. Adjust controls to allow the finished products to move to the automatic packaging machine		2	0.5	1.5
	PC38. Sample the packed product and transfer to quality lab for analysis		2	0.5	1.5
	PC39. Report discrepancies/concerns in each stage of production to department supervisor for immediate action		3	1	2

### Assessment Criteria

	PC40. Clean the work area, machineries, equipment and tools using recommended cleaning agents and sanitizers		2	0.5	1.5
	PC41. Attend minor repairs/faults of all machines (if any)		2	0.5	1.5
	PC42. Ensure periodic (daily/weekly/monthly/quarterly/half yearly/annual) maintenance of all machines and equipment following the SOP or following suppliers instructions/manual		2	0.5	1.5
			<b>100</b>	<b>35</b>	<b>65</b>
<b>4. FIC/N5004 ( Complete documentation and record keeping related to production of baked products in industrial units)</b>	PC1. Document and maintain record of details of all raw materials used such as names of raw materials, supplier details, receiving date/ date of manufacture, expiry date, supplier quality document, quality parameters for all raw materials, internal quality analysis report, etc., as per organization standards	<b>100</b>	10	6	4
	PC2. Maintain record of observations (if any) related to raw materials and packaging materials		5	3	2
	PC3. Load the raw material details in computer or in the ERP system followed by the organization for future reference		5	3	2
	PC4. Verify the documents and track from finished product to raw materials, in case of quality concerns and during quality management system audits		5	3	2
	PC5. Document and maintain records of production details such as the product produced, production sequence, equipment and machinery details, efficiency and capacity utilization of equipment, etc.		10	6	4
	PC6. Document and maintain records of process details such as type of raw material used, process parameters (temperature, time etc. as applicable) for the entire process in process chart or production log for all products produced		15	9	6
	PC7. Document and maintain record of batch size, raw material used, yield		10	6	4

### Assessment Criteria

	after each stage of process, wastage, energy utilization and final products produced			
	PC8. Maintain record of observations or deviations (if any) related to production and process parameters		5	3 2
	PC9. Load the production and process parameter details in computer or in the ERP system followed by the organization for future reference		5	3 2
	PC10. Verify documents and track them from finished product to raw materials, in case of quality concerns, and during quality management system audits		5	3 2
	PC11. Document and maintain records of the types of finished products produced		5	3 2
	PC12. Document and maintain records of finished products details such as name of the product, batch number, time of packing, date of manufacture, date of expiry, other label details, primary and secondary packaging materials for all finished products, storage conditions, etc., as per organization standards		5	3 2
	PC13. Maintain record of observations or deviations (if any) related to finished products		5	3 2
	PC14. Load the finished product details in computer or in the ERP system followed by the organization for future reference		5	3 2
	PC15. Verify the documents and track them from finished product to raw materials, in case of quality concerns, and during quality management system audits		5	3 2
			<b>100</b>	<b>60 40</b>
<b>5. FIC/N9001 (Food safety hygiene and sanitation for processing food products)</b>	PC1. Comply with food safety and hygiene procedures followed in the organization		5	2 3
	PC2. Ensure personal hygiene by using of gloves, hairnets, masks, ear plugs, goggles, shoes, etc.		6	1 5

### Assessment Criteria

PC3. Ensure hygienic production of food by inspecting raw materials, ingredients, finished products, etc. for compliance to physical, chemical and microbiological parameters
PC4. Pack products in appropriate packaging materials, label and store them in designated area, free from pests, flies and infestations
PC5. Clean maintain and monitor food processing equipment periodically, using it only for specified purpose
PC6. Use safety equipment such as fire extinguisher, first aid kit and eye-wash station when required
PC7. Follow housekeeping practices by having designated area for materials/tools
PC8. Follow industry standards like GMP and HACCP and product recall process
PC9. Attend training on hazard management to understand types of hazards such as physical, chemical and biological hazards and measures to control and prevent them
PC10. Identify, document and report problems such as rodents and pests to management
PC11. Conduct workplace checklist audits before and after work to ensure safety and hygiene
PC12. Document and maintain raw material, packaging material, process and finished products for the credibility and effectiveness of the food safety control system
PC13. Determine the quality of food using criteria such as aroma, appearance, taste and best before date, and take immediate measures to prevent spoilage
PC14. Store raw materials, finished products, allergens separately to prevent cross-contamination
PC15. Label raw materials and finished products and store them in

100

5	2	3
10	4	6
5	2	3
10	4	6
5	2	3
10	4	6
5	1	4
5	1	4
5	1	4
4	1	3
5	2	3
5	2	3
5	2	3

### Assessment Criteria

	designated storage areas according to safe food practices				
	PC16. Follow stock rotation based on FEFO / FIFO		10	4	6
			<b>100</b>	<b>35</b>	<b>65</b>

# *Semester III*

**CORE III - FOOD PROCESSING II**  
**Technology of Fruits and Vegetables, Sugar and Salt)**

**SUB.CODE: 15BFSNC03**

**MAX.MARK: 100**

**HOURS: T+P=C**

**3+0=3**

**Objectives:**

- To know about different practices used in post harvest management of fruits and vegetables; manufacturing process of sugar and salt.

S. No.	Topics/Modules	Key Learning Outcomes	Duration in Hrs
1.	Fruits and Vegetables	a) Water activity and fruit spoilage, minimally processed fruits and vegetables, intermediate moisture fruits and vegetables – principle, methods and products.	5
		b) Preservation by use of high temperature- pasteurization, sterilization, canning – principles, steps involved and advantages, defects in canning and spoilage of canned foods.	5
		c) Preservation by use of low temperature - refrigeration – principles, refrigerants, changes in refrigerated food, factors affecting the quality of refrigerated products, spoilage of refrigerated products and maintenance of refrigerator.	5
		d) Preservation by use of very low temperature- freezing – principle and steps in freezing, methods and types of freezing, advantages and disadvantages, frozen products.	5
		e) Preservation by drying and dehydration – difference between drying and dehydration, preparation of food for drying, methods of drying, types of drier, methods of dehydration, dried and dehydrated products.	5
		f) Preservation by sugar – principle of gel formation, method of preparation, FSSAI, AGMARK, and ISO standards for Jam, Jelly, marmalade, candy, preserve, unfermented fruit beverages – squash, RTS beverages, cordial, syrup, fruit juice concentrate.	5
		g) Preservation by chemicals – principle, permitted chemical preservative in food processing, clarification of fruit Juices, application in value added fruits and vegetable products.	5
		h) Preservation by salts and acids – principle, pickle, sauce and ketch up.	4
2.	Sugar	a) Sugars- types and sources, methods of preparation of sugars, jaggery, khandsari, raw and refined sugar, principles of sugar cookery.	5
		b) Confectionery - history, types, classification, role of sugar in confectionery, role of chemical additives in confectionery.	3
		c) Preparation of caramel, toffee, candy, chewing gum,	2



		bubble gum and chocolates.	
3.	Salt	Types of salt, uses of salt – brine, preparation of brines, composition of brines used in canning, pickling and curing.	5
<b>Total Duration</b>			<b>54</b>

**References:**

1. Raina et.al. (2003). Basic Food Preparation-A complete Manual. 3rd Ed. Orient Longman Pvt. Ltd.
2. Manay, S. & Shadaksharaswami, M. (2004). Foods: Facts and Principles, New Age Publishers.
3. Beckett S.T. (2009). Industrial Chocolate Manufacture, Blackwell Publishing Ltd.
4. Minifie B.W. (1999). Chocolate, Cocoa and Confectionary, Aspen Publication.
5. Mohini Sethi, Eram Rao (2011) Food science- Experiments and applications, 2nd ed., CBS publishers & Distributors pvt ltd.
6. Girdharilal, Siddappa, G.S and Tandon, G.L. 1998. Preservation of fruits & Vegetables, ICAR, New Delhi
7. W B Cruse. (2004). Commercial Unit and Vegetable Products, W.V. Special Indian Edition, Pub: Agrobios India

**CORE IV - FOOD PROCESSING -III**  
(Technology of Milk, Egg and Fleshy Foods)

**SUB.CODE: 15BFSNC04**  
**MAX.MARK: 100**

**HOURS: T+P=C**  
**3+0=3**

**Objectives**

1. To enable the students to learn about processing and preservation technology of milk, egg, meat and poultry products

S. No.	Topics/Modules	Key Learning Outcomes	Duration in Hrs
1.	Milk	a. Raw Milk handling – Buying and collection of milk, cooling and transportation of milk, receiving, preheating, filtration, clarification, cooling and storage of raw milk.	3
		b. Milk processing – standardization, pasteurization vacuum pasteurization, homogenization, ultra filtration and reverse osmosis.	5
		c. Milk products – cream, butter, butter oil, special milks – sterilized milk, homogenized milk, soft curd milk, flavoured milk, fermented milk, yoghurt, cheese, ice cream, ghee, Khoa, Chhana, Paneer, Dahi, Shrikhand, Kheer, Rabri, Kulfi and Lassi, casein powder (edible) and milk powder.	8
2.	Egg	Preservation of shell eggs, egg cleaning, oil treatment, cold storage, thermo stabilisation, immersion in liquids, preservation of albumin and yolk powder production.	5
3.	Fleshy foods	a. Preslaughter care requirements, ante mortem examination of animal, slaughtering of meat – scientific methods of slaughter, ritual, religious methods of slaughter, dressing and cutting of carcass in sheep, pig, buffalo and poultry.	4
		b. Post mortem examination of carcass, grading and packaging of meat, post mortem changes in meat, methods of tenderization and factors affecting tenderization.	3
		c. Meat preservation – chilling, freezing, curing, smoking, canning, dehydration, irradiation and hurdle concept.	5
		d. Meat and poultry products – meat emulsion, sausage, patties, roll, loaves, luncheon meats, meat balls, nuggets, fermented sausages, ham and bacon, indigenous meat products, cured meats, canned products, restricted meat products, sectioned and formed meat products, intermediate moisture meat product.	8

4.	Fishes and Marine products	a. Onboard handling – Handling, washing, sorting, Evisceration, removal of gills, bleeding icing, bulking, shelving and boxing	3
		b. Processing – postmortern changes, drying, dehydration, smoking, marination, salting, canning, fermentation, freezing, chemical treatments, low dose irradiation, high pressure treatment, MAP, vaccum packaging, gas packaging, hurdle concept	5
		c. Value added Fish and marine products – minced fish, fish finger, surimi, fish burger, fish protein concentrates, flakes, fish oils, chitin, chitosan, seaweeds, shark fin and fin rays.	5
Total Duration			54

### References

1. Lawrie R A, Lawrie's Meat Science, 5th Ed, Woodhead Publisher, England, 1998
2. Parkhurst & Mountney, Poultry Meat and Egg Production, CBS Publication, New Delhi, 1997
3. Pearson & Gillet Processed Meats, 3 Ed, CBS Publication, New Delhi, 1997
4. Shai Barbut, Poultry Products Processing, CRC Press 2005
5. Stadelman WJ, Owen J Cotterill Egg Science and Technology, 4th Ed. CBS Publication New Delhi, 2000
6. Hall GM, Fish Processing Technology, VCH Publishers Inc., NY, 1992
7. Sen DP, Advances in Fish Processing Technology, Allied Publishers Pvt. Limited 2005

**ALLIED PAPER III - FOOD PRODUCT DEVELOPMENT AND MARKETING- I**

**SUB.CODE: 15BFSNA03**  
**MAX.MARKS: 100**

**HOURS T+P=C**  
**1+2=2**

**Objectives**

- To develop innovative food product based of locally available raw materials.
- To standardize the developed product and evaluate sensory attributes.

<b>S.No</b>	<b>Topic/Module</b>	<b>Key Learning Outcome</b>	<b>Duration in Hrs</b>
1	Market survey of existing various products	i. Market analysis of ready to serve, ready to cook, ready mix and health mix powders using questionnaire	12
2	Raw material availability survey	i. Availability of raw materials for a new product	6
3	Product formulation	i. Aim of the product ii. Product formula iii. Equipments and utensils required iv. Manufacturing protocol v. Nutritive value calculation vi. Discussion	12
4	Assessment on innovative concept in product	i. Innovative concept in product formula ii. Innovative concept in manufacturing protocol	6
5	Product standardisation	i. Standardisation of finished product (portion size and number of servings)	6
6	Assessment of product feasibility	i. Financial, technical and marketing perspective	6
7	Sensory evaluation of the new developed product	i. Subjective ii. objective	6
<b>Total Duration</b>			<b>54</b>

**References**

1. Usha Chandrasekhar, 2002, Food science and application in Indian Cookery, 1<sup>st</sup> Edition.
2. M Earle, R Earle , A Anderson, Sep 2001, Food product development, 1<sup>st</sup> Edition.
3. Srilakshmi, 2016, Food science, 7<sup>th</sup> Edition.

**CORE PAPER V - FOOD PROCESSING AND PRESERVATION PRACTICAL – I**

**SUB.CODE: 15BFSNC05**  
**MAX.MARKS: 100**

**HOURS T+P=C**  
**1+2=2**

**Objectives**

- To learn how to preserve non perishable and perishable food items by using preservative and processing techniques.

S.No	Topic/Module	Key Learning Outcomes	Duration in Hrs
1	Non – perishable items	i. Preparation of puffed and popped cereals; papads	9
		ii. Preparation of health mixes	6
		iii. Preparation of ice cream cone	6
		iv. Preparation of masala powders	9
		v. Preparation of ready mixes	6
		vi. Preparation of extruded products	9
2	Semi – perishable items	i. Preparation of enrobed mix for fleshy foods	9
<b>Total Duration</b>			<b>54</b>

**Reference**

1. Dauthy, M.E. 1995, fruit and vegetable processing, FAO Agricultural services Bulletin, 119, Rom.
2. Desrosier N.W. 1973, The technology of food preservation. The AV publishing co. inc. wet poet, Connecticut.

## ELECTIVE PAPER I - NUTRITIONAL CHEMISTRY

SUB.CODE: 15BFSNEL01  
MAX.MARKS: 100

HOURS: T+P=C  
2+1=2

### Objectives

- To gain knowledge on classification, properties and functional characteristics of nutrients in food.

S.No.	Topics/Modules	Key Learning Outcomes	Duration in Hrs
1.	Colloids and Water	a. Colloids - definition, types, properties & uses in food system.	2
		b. Water- Structure, Functions of water, Hydrogen bonding, Types of water in foods, Water content in foods; Water activity- Definition, Relationship between water activity and water, Effect of water activity on food safety, Analysis of water and water activity.	5
2.	Carbohydrates	a. Carbohydrates - classification, sources, structure, functions, physico-chemical reactions - Hygroscopicity & solubility, optical rotation, maillard reaction, caramalisation, gelatinization, dextrinization and retrogradation.	10
		b. Fibre - classification, sources, functional properties and uses.	3
3.	Proteins	classification, sources, structure, functions of proteins, physico-chemical reactions of protein in food system- dissociation, denaturation, hydration, swelling, foam formation & stabilisation, emulsification, amino acid in Maillard reaction.	10
4.	Lipids	Classification, sources, functions; Fatty acid – Classification, structure and properties, physico-chemical reactions – isomerisation, hydrogenation, unsaturation, inter-esterification, emulsification, auto-oxidation and rancidity.	10
5.	Vitamins	classification, sources and functions of vitamins in food.	5
6.	Minerals	classification, sources and functions of minerals in food.	5
7.	Phytochemicals	Phyto nutrients and bio active compounds – classification, sources and its functions	4
<b>Total Duration</b>			<b>54</b>

### References:

- Coultatte, T.O., "Food – The Chemistry of Components", Rsc, Royal Society of Chemistry.
- Iqbal.s.a., Mido.Y, "Food Chemistry" Discovered Publishing Houses, New Delhi, 2005.
- Lilian hoagland Meyer, "Food Chemistry", CBS Publishers and Distributors, 4596/1-A, 11 Darya Ganj, New Delhi- 110 002 (India).
- Alais, Lindan, "Food Biochemistry", Ellishorunros LTD., New York.
- Potter, N.N.1978, Food Science 3rd Ed. AVI, Westport.

# *Semester IV*

## Core VI- Food Quality Control

SUB. CODE:15BFSNC06

MAX.MARKS: 100

HOURS T+P=C

3+0=3

### Objectives

- To provide a basic understanding of safety, quality concepts and practice in food industries
- To plan and organize a quality control system
- To provide basic acquaintance with standards and specifications

S.No.	Topics/Modules	Key Learning Outcomes	Duration in Hrs
1.	Introduction to food Safety and sanitation	<ul style="list-style-type: none"><li>• Definition of food safety and hazard, types of hazards – physical, chemical and biological hazards and management of hazards</li><li>• Hygiene and sanitation in food industries – physical and chemical contaminants in food chain, control methods using physical and chemical agents, waste disposal, pest and rodent control and personnel hygiene</li></ul>	6
2.	Introduction to food quality	<ul style="list-style-type: none"><li>• Definition of food quality, quality concepts, quality perception, quality attributes – physical, chemical, nutritional and sensory and its role in food quality</li><li>• Objectives, importance and functions of quality control</li></ul>	12
3.	Food quality assessment	<ul style="list-style-type: none"><li>• Quality assessment of cereals and legumes, fruits and vegetables, dairy products, meat, poultry, egg and processed food products</li><li>• Sensory evaluation of food quality –introduction, panel screening, selection of panel members, methods of sensory evaluation</li><li>• Statistical quality control of foods</li><li>• Consumer studies – types of consumer studies, factors influencing consumer survey, comparison of laboratory panels with consumer panels, limitations of consumer survey</li></ul>	12
4.	Food quality management	<ul style="list-style-type: none"><li>• Objectives, importance and functions of quality control and quality assurance</li><li>• Quality management systems in India</li><li>• Food safety management tools – Basic concept, GHPs, GMPs, HACCP, ISO series, TQM, risk analysis, Accreditation and Auditing</li><li>• Core developments in food quality management</li></ul>	12
5.	Food laws and legislations	<ul style="list-style-type: none"><li>• Food grades and standards</li><li>• Different existing food legislations</li><li>• International food regulations and certifications</li><li>• Indian food regulations and certifications</li></ul>	12
Total Duration			54



**References:**

1. Philip. A.C. Reconceptualizing Quality. New Age International Publishers, Bangalore. 2001
2. Bhatia, R. AbdIchhpiyan, R.L. Quality assurance in microbiology. CBS publishers and Distributors, New Delhi. 2004.
3. Kher, C.P. Quality Control for the food Industry. ITC Publishers. Geneva. 2000
4. Gould, W.A and Gould, R.W. (1998). Total Quality Assurance for the Food Industries, CTI Publications Inc. Baltimore.
5. Pomeroy, Y. and McLoar, C.E. (1996): Food Analysis: Theory and Practice, CBS publishers and Distributor, New Delhi.

**Core VII – Instrumentation and Process Control****SUB.CODE: 15BFSNC07****MAX.MARKS: 100****HOURS T+P=C****3+0=3****Objectives**

- To acquaint knowledge on fundamentals of food processing equipments and its process control
- To provide sound knowledge in the basic concepts of process control and automation in a food processing unit

S.No.	Topics/Modules	Key Learning Outcomes	Duration in Hrs
1.	Unit operations in food processing	<ul style="list-style-type: none"><li>• classifications; Design and selection of Food Processing equipments</li><li>• Mechanical transport equipment- pumps, process piping and valves, conveyors</li><li>• Food storage equipment – solid and liquid food storage equipments</li><li>• Mechanical processing equipment - peelers, dehullers / dehuskers, size reduction- slicers/ dicers, mincers, cutters, crushers and grinders; Size enlargement- Agglomerators, homogenizers and mixers</li><li>• Mechanical separation equipment – Sorters, separators – solid /solid separators, solid / liquid separators.</li></ul>	12
2.	Heat processing equipments	<ul style="list-style-type: none"><li>• Heat transfer equipments – heat exchangers;</li><li>• Heat generation equipments- microwave oven, ohmic heating system, infrared emitters</li><li>• Food evaporation equipments- Evaporators</li><li>• Thermal processing equipments – Blanchers, sterilizers and pasteurizers</li></ul>	8
3.	Mass transfer equipments	<ul style="list-style-type: none"><li>• Distillers, extraction and leaching equipments, gas and liquid absorption equipments, adsorption and ion exchange equipments, crystallizers</li><li>• Food Dehydration equipment- dryers</li><li>• Refrigeration and freezing equipment – refrigerators, freezers, thawers, freeze driers or lyophilizers</li></ul>	8
4.	Equipments for novel food processes	<ul style="list-style-type: none"><li>• Membrane separation equipment, irradiation system, extruders, fermenters, pulse electric field processing equipment , High pressure processing equipment, pulsed light processing equipment</li></ul>	8
5.	Food packaging	<ul style="list-style-type: none"><li>• fillers, closures, sealers, wrappers, aseptic</li></ul>	6

	equipments	packaging equipment and palletizers	
6.	Instrumentation and process control	<ul style="list-style-type: none"> <li>• Process variables and its measurement</li> <li>• Introduction to sensors and sensing elements for temperature, pressure, flow, level, speed, forces, torque, pH, colour, opacity, viscosity etc.</li> <li>• Introduction to control system, types of control system, advantages and disadvantages</li> <li>• Data logging basics, interface between data logger and sensors</li> <li>• Introducing automation in food industry – HMI/SCADA systems for automation – advantages of real time data of high precision</li> </ul>	12
<b>Total Duration</b>			<b>54</b>

#### References:

1. Donald R. Coughanowr., "Process System analysis and control" Mc- Graw Hill International Edition, Second Edition,
2. Nagoorkani.A "Control Systems", RBA publications, first edition ninth reprint 2002
3. S.Baskar,"Instrumentation control system measurements and controls"Anuradha Agencies Publishers,2004
4. Eckman, D.P., Industrial Instrumentation, Wiley Eastern Ltd., New York 1990.
5. Process system Analysis & Control, D.R. Coughanoowr, McGraw Hill Publication
6. Fellows, P.J. (2000), Food Processing technology: Principles and Practice, Second edition, CRC woodheadpublishing ltd, Cambridge.
7. Peter Zeuthen and Leif Bogh – Sorensen, (2003), Food Preservation techniques, Woodhead publishing ltd.
8. George D. Saravacos and Athanasios E. Kostaropoulos (2002) Handbook of Food Processing Equipment, Kluwer Academic /Plenum publishers.

**ALLIED PAPER IV - FOOD PRODUCT DEVELOPMENT AND MARKETING PRACTICAL- II**

**SUB.CODE: 15BFSNA04**  
**MAX.MARKS: 100**

**HOURS T+P=C**  
**1+2=2**

**Objectives**

- To estimate the quality of the developed food product
- To find out the suitable packaging material and steps in applying for FSSAI licensing

<b>S.no</b>	<b>Topic/Module</b>	<b>Key learning Outcome</b>	<b>Duration in Hrs</b>
1	Raw material	i. Justification for the raw materials used ii. CCP (critical control points) and GHP (good hygienic practises)	12
2	Process line standardisation	i. Analyse the CCP,GHP and GMP followed during product formulation	6
3	Product quality control	i. Standard Operating Procedure for the developed product	15
4	Packaging and labelling	i. Types of packaging materials used ii. Parts of labelling iii. Creation of new label for the developed product	12
5	FSSAI licence	i. Licensing procedure	9
<b>Total Duration</b>			<b>54</b>

**References**

1. [www.fssai.gov.in](http://www.fssai.gov.in)

**CORE PAPER VIII - FOOD PROCESSING AND PRESERVATION PRACTICAL – II**

**SUB.CODE: 15BFSNC08**  
**MAX.MARKS: 100**

**HOURS T+P=C**  
**1+2=2**

**Objectives**

- To learn how to preserve non perishable and perishable food items by using preservative and processing techniques.

S.No.	Topics/Modules	Key Learning Outcomes	Duration in Hrs
1.	Fruits	Preparation of preserved items from fruits a. Jam and osmotic dehydrated fruit – preserve b. Squash and fruit juice concentrate	12
2.	Vegetables	i. Preparation of pickle ii. Preparation of sauce and ketchup iii. Preparation of dried and dehydrated vegetables	12
3.	Milk	i. Preparation of cream, butter and ghee ii. Preparation of paneer iii. Preparation of ice-cream and custard	15
4.	Fleshy Foods	i. Preparation of dried fish ii. Preparation of salted and dried meat iii. Preparation of pickle from prawn, fish and meat	15
<b>Total Duration</b>			<b>54</b>

**References**

1. Dauthy, M.E. 1995, fruit and vegetable processing, FAO Agricultural services Bulletin, 119, Rom.
2. Desrosier N.W. 1973, The technology of food preservation. The AV publishing co. inc. wet poet, Connecticut.

## **ELECTIVE II – FOOD FOR LIFE**

**SUB.CODE. 15BFSNEL02**  
**MAX.MARKS: 100**

**HOURS T+P=C**  
**2+1=2**

### **Objectives:**

- To highlight the principles of menu planning and nutritional requirements in different stages of life cycle
- To exhibit the current view on dietary guidelines for Indians, food preparation, selection, consumption trend and food equity in India

<b>S.No.</b>	<b>Topics/Modules</b>	<b>Key Learning Outcomes</b>	<b>Duration in Hrs</b>
1.	Principles of meal planning	<ul style="list-style-type: none"><li>• Food groups and Food exchange list</li><li>• Factors affecting meal planning and food related behaviour</li><li>• Methods of assessment of nutrient requirements</li><li>• Steps in planning balanced diet</li></ul>	8
2.	Dietary Guidelines for Indians	<ul style="list-style-type: none"><li>• Current diet and nutrition scenario</li><li>• Dietary goals</li><li>• 15 dietary guidelines for Indians</li><li>• Energy cost for exercise and physical activity</li><li>• Menu planning considerations for special occasions</li><li>• Menu planning considerations in catering and service operations</li></ul>	8
3.	Food preparation, selection and consumption	<ul style="list-style-type: none"><li>• Food preparation – preparation of food, methods of cooking, medium of cooking and changes during cooking</li><li>• Criteria for selection and purchase of nutritious food</li><li>• Role of nutritional labeling in selection and purchase of food</li><li>• Transition in food consumption pattern</li><li>• Factors affecting food consumption pattern – social, economic, nutritional and environmental</li><li>• Past and present food trends</li></ul>	10
4.	Food equity	<ul style="list-style-type: none"><li>• Definition of food equity and inequity</li><li>• Circumstances that relate to food inequities - access to a continuous and safe supply of water, availability of safe and nutritious food, financial means to meet food needs, knowledge of nutrition principles to enable appropriate selection of food, distribution issues</li><li>• Influences on food availability and distribution</li></ul>	12

		<p>towards food equity - geography/climate, religious/cultural beliefs, socioeconomic status, government policy such as trade restrictions, natural disasters such as flooding or drought, war, educational levels, multinationals, technological developments such as transport and refrigeration</p> <ul style="list-style-type: none"> <li>• Access to food by different groups of people – rural and isolated people, people on low incomes or unemployed, women and children, people with disabilities, the aged/elderly, Aboriginal and indigenous people, chronically ill people, people with dementia, alcohol and drug abusers, homeless people</li> <li>• Food production practices – cash cropping and subsistence farming</li> <li>• Government and voluntary support networks for food equity</li> </ul>	
5.	Diet in different stages of life cycle	<ul style="list-style-type: none"> <li>• RDA, nutritional requirements and balanced diet planning for pregnancy, lactation, infancy, childhood, adolescence, adulthood and aged</li> <li>• Factors influencing food habits in different stages of life</li> </ul>	16
<b>Total Duration</b>			<b>54</b>

## References

1. Swaminathan, M. Advanced text book on Food and Nutrition, , An mol Publication Pvt, Ltd, Second Edition. 2004.
2. Mahtab S. Bamji, Prasad Rao, N. Vinodini Reddy. Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd, Second Edition, 2003.
3. Srilakshmi, B. Nutrition Science, New Age International [p] Ltd, New Delhi
4. Sumati. R. Mudambi, M.V Rajagopal., Fundamentals of Foods & Nutrition, 4th Edition New age International publishers New Delhi, 2006.
5. Melvin H. Williams., Nutrition for health fitness & Sport. 5th edition McGraw – Hill, publishing Co., 1999.
6. Gordon M. Wardlaw, Anne M. Smith Contemporary Nutrition, McGraw – Hill International Edition - 2006.

## QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR FOOD PROCESSING

### What are Occupational Standards(OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

#### Contact Us:

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1. Introduction and Contacts.....[1]
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6. Assessment Criteria.....[26]

### Introduction

#### Qualifications Pack – Quality Assurance Manager

**SECTOR:** FOOD PROCESSING

**SUB-SECTOR:** Fruit and vegetable, food grain milling (including oilseeds), dairy products, meat and poultry, fish & sea food, bread and bakery, alcoholic beverages, aerated water/soft drinks, soya food, packaged foods

**OCCUPATION:** Quality Assurance

**REFERENCE ID:** FIC/Q7007

**ALIGNED TO:** NCO-2004/NIL

A Quality Assurance Manager is responsible for implementing and meeting quality, safety and regulatory requirements of food products produced in the organisation.

**Brief Job Description:** A Quality Assurance Manager is responsible for implementing and ensuring that food products produced meet standards set by both the organisation and regulatory authorities, develop and review quality and safety policies, manage audits and oversee manufacturing and production processes.

**Personal Attributes:** A Quality Assurance Manager must have the ability to read, write, communicate, calculate, plan, organize and prioritize. S/he must have concentration, physical stamina, mechanical aptitude and trouble shooting skills.S/he must have an understanding of food safety standards and requirements and personal and professional hygiene.



Job Details

Qualifications Pack Code	FIC/Q7007		
Job Role	Quality Assurance Manager		
Credits (NSQF)	TBD	Version number	1.0
Sector	Food Processing	Drafted on	26/11/2015
Sub-sector	Fruit and Vegetable, Food Grain Milling (Including Oilseeds), Dairy Products, Meat and Poultry, Fish & Sea Food, Bread and bakery, Alcoholic beverages, Aerated water/soft drinks, Soya food, Packaged Foods	Last reviewed on	23/02/2016
Occupation	Quality Assurance	Next review date	30/03/2019
NSQC clearance on	N/A		

Job Role	Quality Assurance Manager
Role Description	A Quality Assurance Manager is responsible for implementing and ensuring that food products produced meet standards set by both the organisation and regulatory authorities, develop and review quality and safety policies, manage audits and oversee manufacturing and production processes.
NSQF level	6
Minimum Educational Qualifications	Masters degree in science, preferably
Maximum Educational Qualifications	Not applicable
Training (Suggested but not mandatory)	<ol style="list-style-type: none"> <li>1. Total Quality Management</li> <li>2. Occupational Health &amp; Safety Advisory Services</li> <li>3. Environmental Management System</li> <li>4. Food Safety Standards and Regulations (as per FSSAI)</li> </ol>
Minimum job entry age	30 years
Experience	8-10 years in a food processing unit
Applicable National Occupational Standards (NOS)	<p><b>Compulsory:</b></p> <ol style="list-style-type: none"> <li>1. <a href="#">FIC/N7021 Lead quality function in food processing units</a></li> <li>2. <a href="#">FIC/N7022 Manage quality in food processing units</a></li> <li>3. <a href="#">FIC/N7023 Manage audit and implement health and safety system in food processing unit</a></li> </ol> <p><b>Optional:</b> N.A.</p>
Performance Criteria	As described in the relevant OS units

Definitions

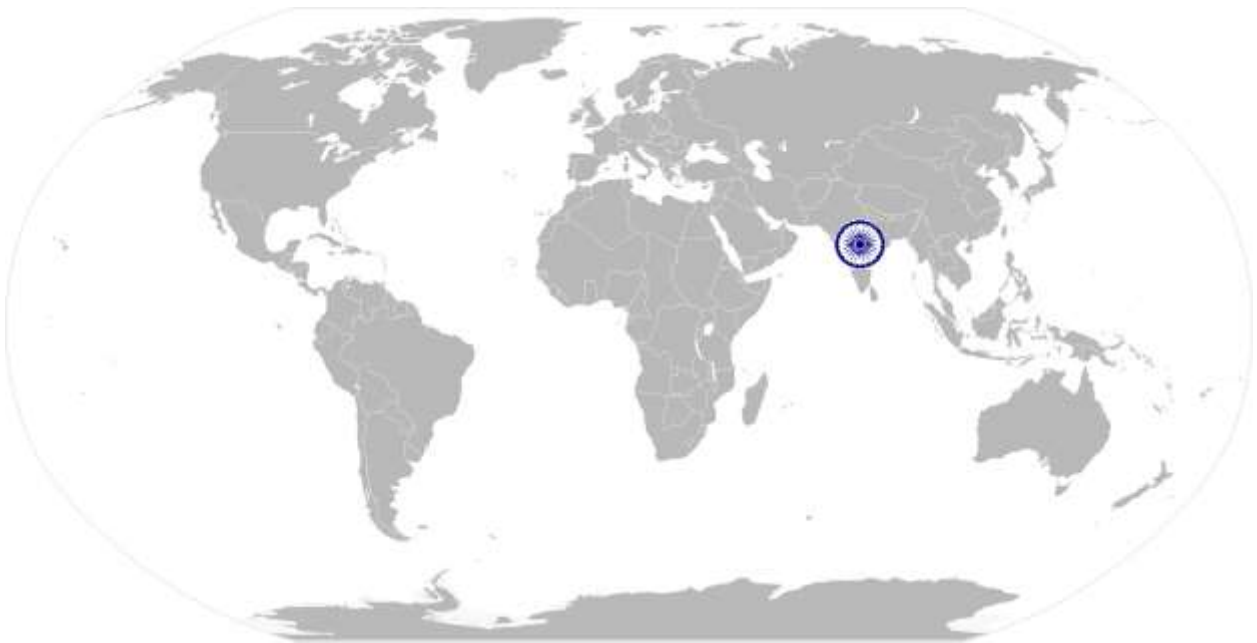
Keywords /Terms	Description
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through analysis and form the basis of OS.
Job Role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
OS	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
NOS	NOS are Occupational Standards which apply uniquely in the Indian context.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Qualifications Pack	Qualifications Pack comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A Qualifications Pack is assigned a unique qualification pack code.
Unit Code	Unit Code is a unique identifier for an Occupational Standard , which is denoted by an 'N'
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
Organizational Context	Organizational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills or Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.

Acronyms

Keywords /Terms	Description
CIP	Clean In Place
COP	Clean Out Of Place
ERP	Enterprise Resource Planning
FIFO	First In First Out
FEFO	First Expiry First Out
FSSAI	Food Safety and Standards Authority of India
GMP	Good Manufacturing Practice
GHP	Good Hygiene Practices
HACCP	Hazard Analysis and Critical Control Point
ISO	International Standard for organization
NOS	National Occupational Standard
NSQF	National Skill Qualification Framework
OS	Occupational Standard
OHSAS	Occupational Health and Safety Advisory Specification
PC	Performance Criteria
QP	Qualification Pack
SSC	Sector Skill Council
SOP	Standard Operating Procedure
QMS	Quality Management System

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# National Occupational Standard



## Overview

This OS unit is about leading quality function in food processing units by developing operational plan for quality function, providing leadership to quality team and managing budget for quality function.

**FIC/N7021**
**Lead quality function in food processing units**
**National Occupational Standard**

<b>Unit Code</b>	<b>FIC/N7021</b>
<b>Unit Title (Task)</b>	<b>Lead quality function in food processing units</b>
<b>Description</b>	This OS unit is about leading quality function in food processing units.
<b>Scope</b>	This unit/task covers the following: <ul style="list-style-type: none"> <li>• Develop and implement operational plans for quality function</li> <li>• Provide leadership to the quality team</li> <li>• Manage Budget</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Develop and implement operational plans for quality function</b>	To be competent, the user/individual must be able to: <ul style="list-style-type: none"> <li>PC1. develop operational plans for the quality department that is consistent with the objectives and goals of organisation</li> <li>PC2. develop operational plan that is flexible and complements quality from incoming materials, production of products, outgoing finished products, storage and distribution, and until the products reach the consumer</li> <li>PC3. develop operational plan for managing environmental issues</li> <li>PC4. set demanding but achievable objectives and targets for quality function and assign responsibilities to all employees of quality team</li> <li>PC5. implement plan, evaluate periodically, analyze and recommend changes</li> <li>PC6. monitor and control the operational plan to achieve its overall objectives</li> <li>PC7. design new work processes, procedures, systems, structures and roles for the changes implemented in the organisation, quality system, and legal regulations</li> <li>PC8. review and ensure implemented changes are effective and meets the requirements of the organisation</li> </ul>
<b>Provide leadership to the quality team</b>	To be competent, the user/individual must be able to: <ul style="list-style-type: none"> <li>PC9. communicate clearly and enthusiastically the organisation vision and values, make employees understand and commit their energy and expertise to achieve organisation goals</li> <li>PC10. understand the organisation and employees, develop a leadership style and apply them appropriately to achieve department targets and organisation goals</li> <li>PC11. communicate with employees regularly and effectively, help them identify their strengths, support to overcome their weakness, listen to their grievances and provide appropriate solutions, and win their trust and support</li> <li>PC12. motivate and support employees to achieve their work and development objectives, and provide recognition when they are successful</li> <li>PC13. encourage employees to take responsibilities, to take own decisions within agreed boundaries, to take lead in their own areas of expertise for their development</li> <li>PC14. initiate personnel actions, such as promotions, transfers, discharges or disciplinary measures</li> <li>PC15. lead quality department and team successfully through difficulties and challenges</li> </ul>

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**Lead quality function in food processing units**

<b>Manage Budget</b>	<p>To be competent, the user/individual must be able to:</p> <p>PC16. consult with employees of quality department and evaluate the past, present and future trends and prepare realistic budget for functioning of quality department and for achieving quality in the organisation and producing quality products</p> <p>PC17. submit the proposed budget to the management for approval, discuss and, if required, negotiate the proposed budget to secure required fund</p> <p>PC18. propose revision of the budget, in case of any unforeseen development, discuss with the management to agree with the revisions</p> <p>PC19. identify and delegate budget control responsibilities to the team with clearly defined activities, establish systems to monitor and evaluate actual expenditure against budget</p> <p>PC20. identify the causes of any significant variances in budget control, discuss with team and ensure prompt corrective action is taken</p> <p>PC21. encourage team to think and identify ways of reducing expenditure, analyze and pursue the suggested ideas</p> <p>PC22. review the financial performance of quality department periodically and identify improvements for the future</p>
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. principles and processes involved in business and organizational planning</p> <p>KA2. organisaiton ideas, goals and policies</p> <p>KA3. business processes of the organisation</p> <p>KA4. food regualtory system related to the process and products produced in the organisation</p> <p>ka5.</p> <p>KA5. financial and accounting procedures of the organisation</p> <p>KA6. budget management</p> <p>KA7. code of business conduct</p> <p>KA8. resource management</p> <p>KA9. organisation policies realted to transfers, promotions, disciplinary action</p> <p>KA10. production management</p> <p>KA11. manpower modelling and handling</p>
<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. risk analysis and risk management</p> <p>KB2. principles and methods of planning for regular and contingency situations</p> <p>KB3. methods to monitor and control operational plans to achieve their objectives</p> <p>KB4. methods to communicate with people of varying nature and in different situations</p> <p>KB5. methods to identify and address difficulties and challenges</p> <p>KB6. managing changes, and techniques to manage expectations during change</p> <p>KB7. methods to motivate and lead team to achieve organisational goals</p> <p>KB8. types of difficulties and challenges that may arise, including conflict, diversity and inclusion issues within the area, and ways of identifying and overcoming them</p> <p>KB9. budgetary systems, methods to monitor, control and evaluate performance</p>



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**Lead quality function in food processing units**

	against budgets
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. note the information communicated</p> <p>SA2. note the raw materials used for production and the finished products produced</p> <p>SA3. note the readings of the process parameters and provide necessary information to fill the process chart</p> <p>SA4. note down observations (if any) related to the process</p> <p>SA5. write information documents to internal departments/ internal teams</p> <p>SA6. note down the data for online ERP or as per applicability in the organization</p>
	<b>Reading Skills</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA7. read and interpret the process required for producing various types of products</p> <p>SA8. read and interpret and process flowchart for all products produced</p> <p>SA9. read equipment manuals and process documents to understand the equipments operation and process requirement</p> <p>SA10. read internal information documents sent by internal teams</p>
	<b>Oral Communication (Listening and Speaking skills)</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA11. discuss task lists, schedules and activities</p> <p>SA12. effectively communicate with team members</p> <p>SA13. question in order to understand the nature of the problem and to clarify queries</p> <p>SA14. attentively listen and comprehend the information given by the speaker</p> <p>SA15. communicate clearly on the issues being faced</p>
<b>B. Professional Skills</b>	<b>Decision Making</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue</p> <p>SB2. handle issues in case the manager is not available (as per the authority matrix defined by the organization)</p>
	<b>Plan and Organize</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB3. plan and organize the work order and jobs received</p> <p>SB4. organize raw materials and packaging materials required for all products</p> <p>SB5. plan and prioritize the work based on the instructions received</p> <p>SB6. plan to utilise time and equipment's effectively</p> <p>SB7. organize all process/ equipment manuals so as to access information easily</p> <p>SB8. support the manager in scheduling tasks for helper(s)</p>
	<b>Customer Centricity</b>

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	The user/individual on the job needs to know and understand how to: SB9. understand customer requirements and their priority and respond as per their needs
	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to: SB10. support manager in solving problems by detailing out problems SB11. discuss the possible solutions with the manager for problem solving
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB12. apply domain information about maintenance processes and technical knowledge about tools and equipment
	<b>Critical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB13. use common sense and make judgments on day to day basis SB14. use reasoning skills to identify and resolve basic problems SB15. use intuition to detect any potential problems which could arise during operations SB16. use acquired knowledge of the process for identifying and handling issues





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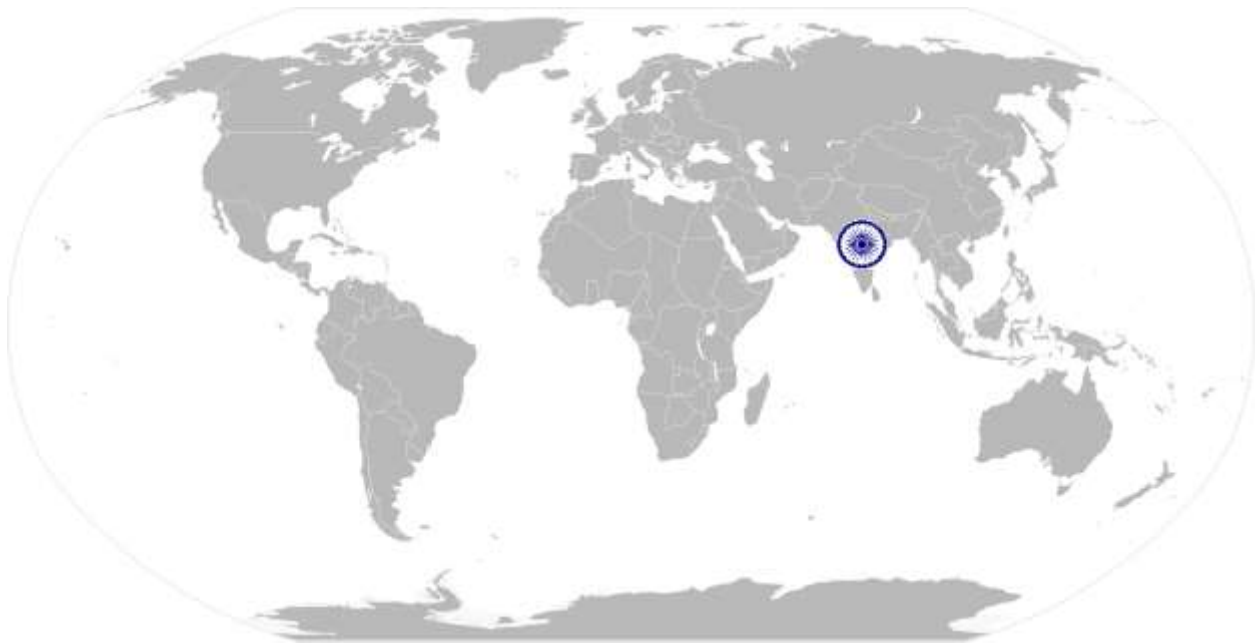
## NOS Version Control

NOS Code	FIC/N7021		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	26/11/2015
Industry Sub-sector	Fruit and Vegetable, Food Grain Milling (Including Oilseeds), Dairy Products, Meat and Poultry, Fish & Sea Food, Bread and bakery, Alcoholic beverages, Aerated water/soft drinks, Soya food, Packaged Foods	Last reviewed on	23/02/2016
Occupation	Quality Assurance	Next review date	30/03/2019

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# National Occupational Standard



## Overview

This OS unit is about managing quality in all functions of the food processing unit.

**FIC/N7022**
**Manage quality in food processing units**

National Occupational Standard

<b>Unit Code</b>	<b>FIC/N7022</b>
<b>Unit Title (Task)</b>	<b>Manage quality in food processing units</b>
<b>Description</b>	This OS unit is about managing quality in all functions of the food processing unit by implementing and monitoring quality system, and ensuring product compliance
<b>Scope</b>	This unit/task covers the following: <ul style="list-style-type: none"> <li>• Quality management in the organization (for food processing unit)</li> <li>• Implement and monitor quality system (for food processing unit)</li> <li>• Ensure product compliance (for food processing unit)</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Quality management in the organization (for food processing unit)</b>	To be competent, the user/individual must be able to: <ul style="list-style-type: none"> <li>PC1. establish objective/road map and budget for quality function</li> <li>PC2. communicate and share the company quality philosophy to key personnel in the organisation</li> <li>PC3. analyze quality performance and measure against internal and external standards</li> <li>PC4. prepare monthly summaries of quality issues for presentation to the senior management team</li> <li>PC5. keep senior management informed of significant developments in quality assurance activities</li> <li>PC6. support organization's various key decision making processes like cost reviews and its approval, identification, review and approvals of efficient contract manufactures etc</li> <li>PC7. support organisation profit making strategies by providing cost effective solution like developing new suppliers, ingredients, new method of packaging and identifying cost reduction opportunities in existing materials</li> </ul>
<b>Implement and monitor quality system (for food processing unit)</b>	To be competent, the user/individual must be able to: <ul style="list-style-type: none"> <li>PC8. implement food quality and safety regulatory requirements like FSSAI</li> <li>PC9. implement procedure, standards and specifications to meet quality goals of the organisation</li> <li>PC10. develop and review standards on environmental requirements, health and safety policies</li> <li>PC11. interact with marketing and sales departments to understand client requirements and expectations, analyze if they are met through present quality system and improve the existing system, if required</li> <li>PC12. monitor performance of the quality management system, produce data and report on performance, analyze statistical data to determine present standards, if required, make suggestions for changes and improvements and methods to implement them</li> <li>PC13. direct and coordinate company's quality program like implementation of ISO, HACCP systems and procedures</li> <li>PC14. prepare employees for a quality audit process for obtaining accreditation, certifications to a standard or a mark of quality</li> </ul>

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**Manage quality in food processing units**

	<p>PC15. establish, review and evaluate key performance indicators</p> <p>PC16. support new projects for validation, liaison with government agencies to ensure statutory and regulatory compliances</p> <p>PC17. support R&amp;D, marketing, packaging team in new concept development, review of formulation and applicable product/package regulatory requirements</p> <p>PC18. analyze ways to reduce waste and increase efficiency</p> <p>PC19. develop and implement effective consumer/customer communication and feedback system to ensure the communication down the line, and minimizing the customer complaints</p> <p>PC20. compile quality control reports, create statistical process control metrics, manage non-conformity discrepancy reports, and recommend continuous improvement activities</p>
<b>Ensure product compliance (for food processing unit)</b>	<p>To be competent, the user/individual must be able to:</p> <p>PC21. ensure food products produced meet the organisation standards, national and international regulations</p> <p>PC22. ensure routine sampling, testing and inspection of raw materials, packing materials, production on-line samples, and finished products to achieve product quality</p> <p>PC23. ensure appropriate calibration of testing equipments</p> <p>PC24. ensure all legal licenses are renewed and up-to-date</p> <p>PC25. carry out audits to identify areas of weakness within organization system, document audit findings and recommend ways to improve them</p> <p>PC26. manage audits by third-party</p> <p>PC27. analyze and understand consumer complaints on product, identify reasons, and implement control and preventive measure</p> <p>PC28. carry out assessments on cross functions, share findings with respective department managers, advise and guide them on implementing quality procedures in their areas of function</p> <p>PC29. monitor performance by gathering relevant data and producing statistical reports</p> <p>PC30. oversee production processes to ensure production of products with consistent quality standards established by the organisation and government</p> <p>PC31. monitor production processes, process layouts, process sequences to obtain quality products through processes</p> <p>PC32. direct personnel, workers engaged in inspection and testing activities to ensure continuous control over raw materials, production process, packaging, finished products, facilities, storage, distribution and sale</p> <p>PC33. encourage employees of quality department to take personal responsibility for achieving quality standards and to address or report critical issues</p> <p>PC34. monitor and rate performance of employees in quality department, identify skill gap and areas of improvement and recommend and nominate in suitable training program</p> <p>PC35. organize training and awareness programs and ensure employees are up-to-date on quality systems and requirements</p> <p>PC36. provide or organize training on organisation standards, legal regulations on food (FSSAI), testing procedures, production, effect of process parameters on</p>

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**Manage quality in food processing units**

	production process and product quality, basic microbiology, health and safety, hygiene practices, Good Manufacturing Practices (GMP) etc.
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <ul style="list-style-type: none"> <li>KA1. organisation policies and goals</li> <li>KA2. quality management</li> <li>KA3. budget management</li> <li>KA4. food regulatory policies and procedures related to products produced in the organisation</li> <li>KA5. quality mark accreditations of the organisations</li> <li>KA6. audit procedures</li> <li>KA7. code of business conduct</li> <li>KA8. leadership techniques</li> <li>KA9. manage competency requirements of the qa personnels</li> <li>KA10. manpower modelling and handling</li> </ul>
<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <ul style="list-style-type: none"> <li>KB1. quality management principles and methods, tools and techniques</li> <li>KB2. current developments, tools and techniques in quality management, legal and regulatory requirements</li> <li>KB3. marks, awards or accreditation in line with organisation's values and methods to obtain them</li> <li>KB4. methods to develop and implement quality system that deliver results at reasonable cost and acceptable level of risk</li> <li>KB5. methods to maintain and ensure quality system</li> <li>KB6. methods to evaluate if processes and product quality are meeting the organisation and regulatory standards</li> <li>KB7. methods to detect and record any non-conformance related to processes and product quality</li> <li>KB8. methods to investigate reason for non- conformance and decide on appropriate corrective actions</li> <li>KB9. methods to monitor effectiveness of quality system</li> <li>KB10. methods to improve business processes, quality systems and procedures</li> <li>KB11. FSSAI</li> <li>KB12. international regulations like FDA, CODEX Alimentarius etc</li> <li>KB13. QMS</li> <li>KB14. ISO</li> <li>KB15. HACCP</li> <li>KB16. GMP</li> </ul>
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<p><b>Writing Skills</b></p> <p>The user/ individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> <li>SA1. note the information communicated</li> <li>SA2. note the raw materials used for production and the finished products produced</li> <li>SA3. note the readings of the process parameters and provide necessary</li> </ul>



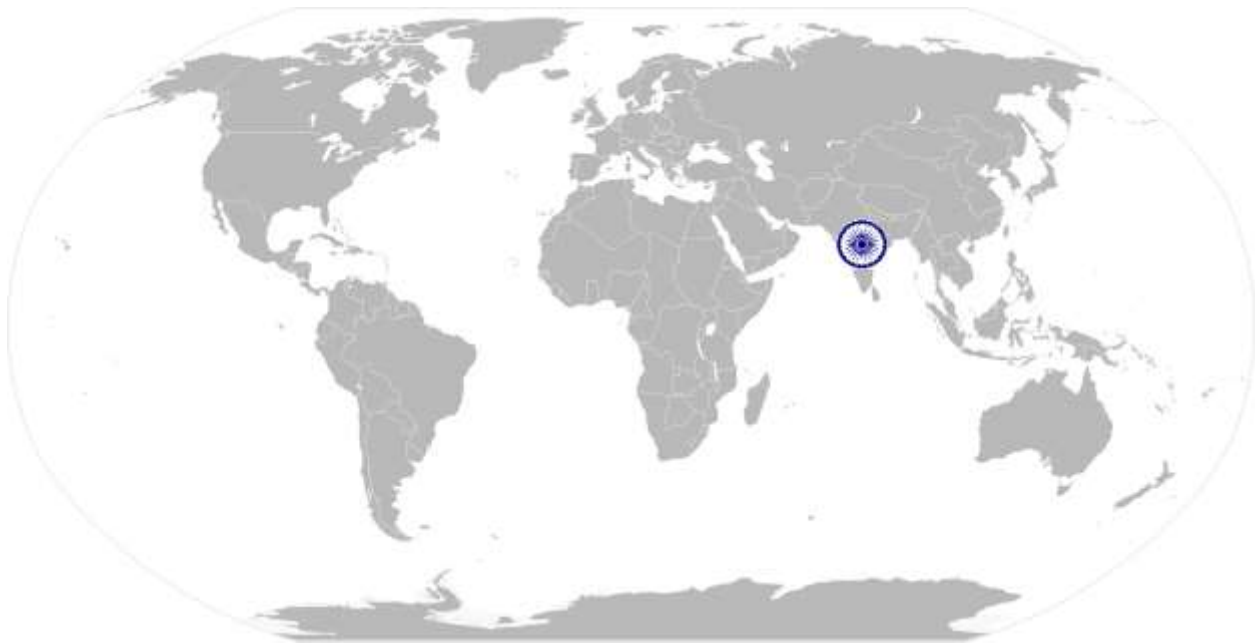
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**Manage quality in food processing units**

	information to fill the process chart SA4. note down observations (if any) related to the process SA5. write information documents to internal departments/ internal teams SA6. note down the data for online ERP or as per applicability in the organization
	<b>Reading Skills</b>
	The user/individual on the job needs to know and understand how to: SA7. read and interpret the process required for producing various types of products SA8. read and interpret and process flowchart for all products produced SA9. read equipment manuals and process documents to understand the equipments operation and process requirement SA10. read internal information documents sent by internal teams
	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/individual on the job needs to know and understand how to: SA11. discuss task lists, schedules and activities SA12. effectively communicate with team members SA13. question in order to understand the nature of the problem and to clarify queries SA14. attentively listen and comprehend the information given by the speaker SA15. communicate clearly on the issues being faced
<b>B. Professional Skills</b>	<b>Decision Making</b>
	The user/individual on the job needs to know and understand how to: SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue SB2. handle issues in case the manager is not available (as per the authority matrix defined by the organization)
	<b>Plan and Organize</b>
	The user/individual on the job needs to know and understand how to: SB3. plan and organize the work order and jobs received SB4. organize raw materials and packaging materials required for all products SB5. plan and prioritize the work based on the instructions received SB6. plan to utilise time and equipment's effectively SB7. organize all process/ equipment manuals so as to access information easily SB8. support the manager in scheduling tasks for helper(s)
	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to: SB9. understand customer requirements and their priority and respond as per their needs
	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to: SB10. support manager in solving problems by detailing out problems SB11. discuss the possible solutions with the manager for problem solving
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB12. apply domain information about maintenance processes and technical knowledge about tools and equipment

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	<p><b>Critical Thinking</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB13. use common sense and make judgments on day to day basis</p> <p>SB14. use reasoning skills to identify and resolve basic problems</p> <p>SB15. use intuition to detect any potential problems which could arise during operations</p> <p>SB16. use acquired knowledge of the process for identifying and handling issues</p>
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## NOS Version Control

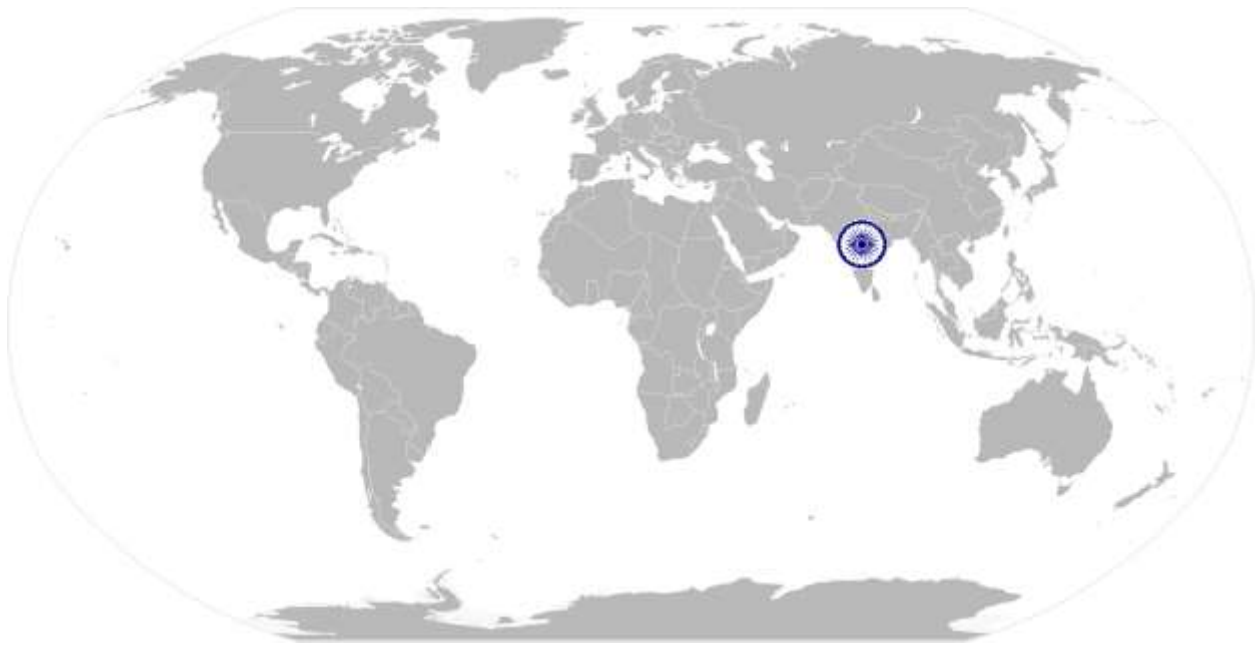
NOS Code	FIC/N7022		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	26/11/2015
Industry Sub-sector	Fruit and Vegetable, Food Grain Milling (Including Oilseeds), Dairy Products, Meat and Poultry, Fish & Sea Food, Bread and bakery, Alcoholic beverages, Aerated water/soft drinks, Soya food, Packaged Foods	Last reviewed on	23/02/2016
Occupation	Quality assurance	Next review date	30/03/2019

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# National Occupational Standard



## Overview

This OS unit is on managing audit and implementing health and safety system in food processing units

**FIC/N7023**
**Manage audit and implement health and safety system**

## National Occupational Standard

Unit Code	FIC/N7023
Unit Title (Task)	Manage audit and implement health and safety system in food processing units
Description	This OS unit is about managing audit and implementing health and safety system in food processing units
Scope	This unit/task covers the following: <ul style="list-style-type: none"> <li>• Manage and conduct quality audits (for food processing unit)</li> <li>• Implement health and safety system (for food processing unit)</li> </ul>
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
<b>Manage and conduct quality audits (for food processing unit)</b>	To be competent, the user/individual must be able to: <ul style="list-style-type: none"> <li>PC1. establish to the quality team the importance of documentation, provide training on documentation system, and ensure all quality documents are maintained systematically</li> <li>PC2. ensure all relevant records and documents are complete, up-to-date and accessible</li> <li>PC3. ensure corrective actions agreed in previous audits have been implemented, and recommendations have been considered and acted upon</li> <li>PC4. manage third party audit by providing the auditor with access to all relevant information, records and documentation</li> <li>PC5. discuss with the auditor the results of the audit and agree appropriate corrective actions to any non-conformances identified and the date by which the actions would be completed</li> <li>PC6. ensure agreed corrective actions are carried out by agreed dates</li> <li>PC7. carry out quality audits across cross functions in the organisation, at suppliers, distributors and market to ensure quality standards are maintained throughout the system</li> <li>PC8. perform audits by establishing clearly the scope of the audit, the responsibilities of the auditees, the quality procedures that apply to their work, previous audit history and expectations to maintain quality, encourage to co-operate fully, and carry out audit to reveal any deviations from relevant quality procedures</li> <li>PC9. share with the auditees the results of the audit and agree appropriate corrective actions for any non-conformances and the date by which the actions should be carried out, and check if corrective actions have been carried out by agreed dates</li> <li>PC10. identify and analyze any problems related to process and quality procedures, report findings and recommendations to management for immediate action</li> <li>PC11. maintain complete records of quality audits for management review and future reference</li> </ul>
<b>Implement health and safety system (for food processing)</b>	To be competent, the user/individual must be able to: <ul style="list-style-type: none"> <li>PC12. establish organization's responsibilities for health and safety regulations and ensure there is a written health and safety policy applicable for all employees</li> </ul>

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**Manage audit and implement health and safety system**

unit)	<p>PC13. ensure health and safety policy and procedures are clearly communicated to all employees of the organisation</p> <p>PC14. ensure health and safety to be a priority while planning organisation standards</p> <p>PC15. implement system for identifying hazards and assessing risks in processing food products, and set procedures to control and prevent them</p> <p>PC16. implement system for gmp, haccp, fifo/fefo, product recall etc</p> <p>PC17. organize training to the employees on food safety, hygiene and sanitation for effective implementation of the systems</p> <p>PC18. implement food and safety procedures in all areas of function to ensure food safety and hygiene system is followed from procurement of raw material, production of product, packaging, storage, distribution and until the product reaching the consumer</p> <p>PC19. ensure health and safety policy is practiced across the organisation, effectively monitored, reviewed and revised at regular intervals to meet the changes in national and international regulations</p> <p>PC20. ensure systems are in place for effective monitoring, measuring and reporting the performance of health and safety system</p> <p>PC21. conduct unannounced audits in all functions of the organisation to ensure health and safety procedures are being followed</p>
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: <ul style="list-style-type: none"> <li>KA1. organisaiton policies and goals</li> <li>KA2. quality management system</li> <li>KA3. quality mark accreditations of the organisations</li> <li>KA4. audit procedures</li> <li>KA5. audit management</li> <li>KA6. food regualtory policies and procedures related to products produced in the organisaiton</li> <li>KA7. documentation and records management system</li> <li>KA8. health and safety policy</li> <li>KA9. food safety system like FSSAI</li> </ul>
<b>B. Technical Knowledge</b>	The user/individual on the job needs to know and understand: <ul style="list-style-type: none"> <li>KB1. methods of ensuring records and documentation are complete and up-to-date</li> <li>KB2. industry requirements for quality management and auditing</li> <li>KB3. various audit methods and techniques</li> <li>KB4. methods of preparation for audit</li> <li>KB5. methods of carrying out quality system audits to meet and maintain quality standards</li> <li>KB6. methods to carry out audit with available documents and identifying any discrepancies</li> <li>KB7. methods and procedures to decide and suggest appropriate corrective actions to each discrepancy</li> <li>KB8. methods and procedures to identify any discrepancies in system, possible risks to organization and employees</li> </ul>

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**Manage audit and implement health and safety system**

	KB9. methods to identify and analyze inherent problems with processes and quality procedures KB10. procedure to prepare and present audit reports KB11. regulations, guidelines and codes of practice related to health and safety, food safety, hygiene and sanitation (as per fssai) KB12. environmental standards KB13. methods to implement health and safety in food processing unit KB14. industry standards like gmp, haccp and product recall process KB15. types of hazards such as physical, chemical and biological hazards and methods to measures, control and prevent them KB16. methods to establish systems for monitoring, measuring and reporting on health and safety KB17. audit procedures to ensure food safety, hygiene and sanitation in the organization
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	The user/ individual on the job needs to know and understand how to: SA1. note the information communicated SA2. note the raw materials used for production and the finished products produced SA3. note the readings of the process parameters and provide necessary information to fill the process chart SA4. note down observations (if any) related to the process SA5. write information documents to internal departments/ internal teams SA6. note down the data for online ERP or as per applicability in the organization
	<b>Reading Skills</b>
	The user/individual on the job needs to know and understand how to: SA7. read and interpret the process required for producing various types of products SA8. read and interpret and process flowchart for all products produced SA9. read equipment manuals and process documents to understand the equipments operation and process requirement SA10. read internal information documents sent by internal teams
	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/individual on the job needs to know and understand how to: SA11. discuss task lists, schedules and activities SA12. effectively communicate with team members SA13. question in order to understand the nature of the problem and to clarify queries SA14. attentively listen and comprehend the information given by the speaker SA15. communicate clearly on the issues being faced
<b>B. Professional Skills</b>	<b>Decision Making</b>
	The user/individual on the job needs to know and understand how to: SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue SB2. handle issues in case the manager is not available (as per the authority matrix)

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**Manage audit and implement health and safety system**

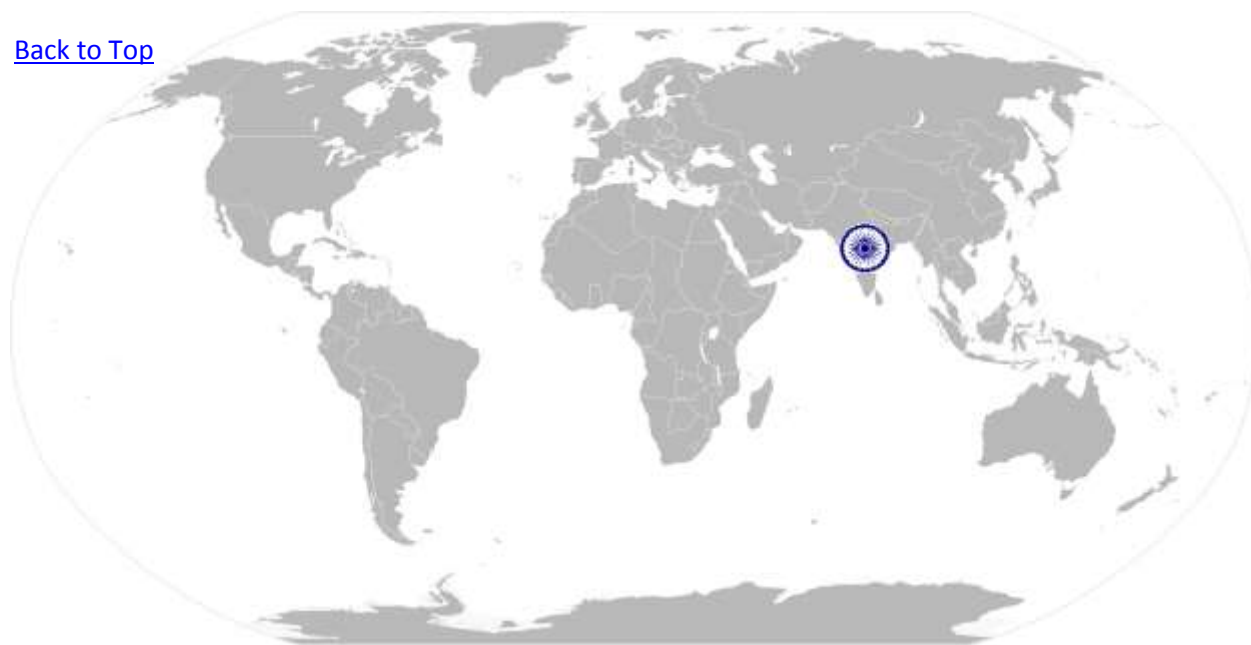
	defined by the organization)
	<b>Plan and Organize</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB3. plan and organize the work order and jobs received</p> <p>SB4. organize raw materials and packaging materials required for all products</p> <p>SB5. plan and prioritize the work based on the instructions received</p> <p>SB6. plan to utilise time and equipment's effectively</p> <p>SB7. organize all process/ equipment manuals so as to access information easily</p> <p>SB8. support the manager in scheduling tasks for helper(s)</p>
	<b>Customer Centricity</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB9. understand customer requirements and their priority and respond as per their needs</p>
	<b>Problem Solving</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB10. support manager in solving problems by detailing out problems</p> <p>SB11. discuss the possible solutions with the manager for problem solving</p>
	<b>Analytical Thinking</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB12. apply domain information about maintenance processes and technical knowledge about tools and equipment</p>
	<b>Critical Thinking</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB13. use common sense and make judgments on day to day basis</p> <p>SB14. use reasoning skills to identify and resolve basic problems</p> <p>SB15. use intuition to detect any potential problems which could arise during operations</p> <p>SB16. use acquired knowledge of the process for identifying and handling issues</p>



**FIC/N7023**
**Manage audit and implement health and safety system**

## NOS Version Control

NOS Code	FIC/N7023		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	26/11/2015
Industry Sub-sector	Fruit and Vegetable, Food Grain Milling (Including Oilseeds), Dairy Products, Meat and Poultry, Fish & Sea Food, Bread and bakery, Alcoholic beverages, Aerated water/soft drinks	Last reviewed on	23/02/2016
Occupation	Quality Assurance	Next review date	30/03/2019

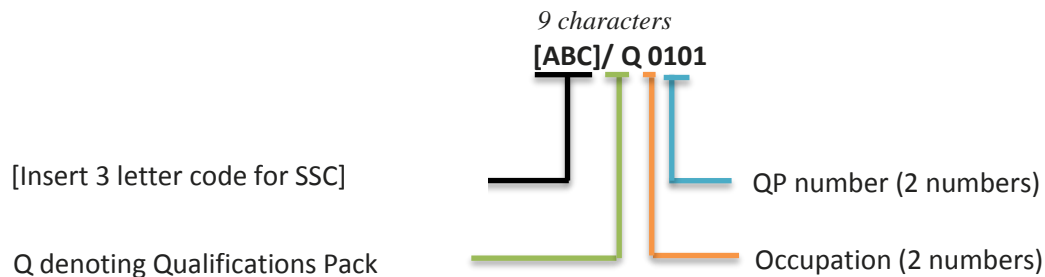
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## Qualifications Pack for Quality Assurance Manager

### Annexure

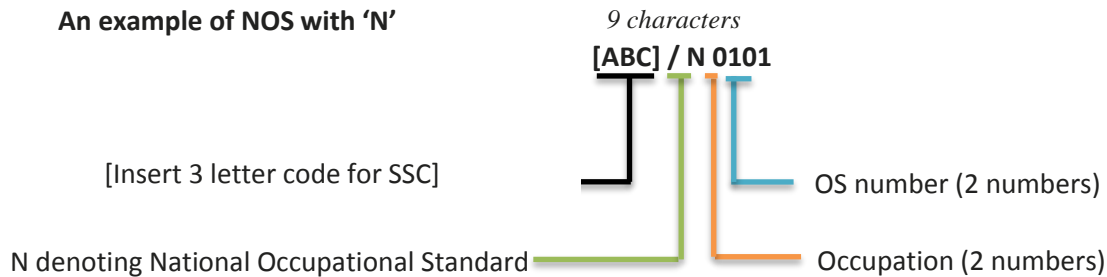
#### Nomenclature for QP and NOS

##### Qualifications Pack



##### Occupational Standard

##### An example of NOS with 'N'



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## Qualifications Pack for Quality Assurance Manager

The following acronyms/codes have been used in the nomenclature above:

Sub-sector	Range of Occupation numbers
Fruit and Vegetable	01 – 09
Food Grain Milling (including Oilseeds)	10 - 19
Dairy products	20 - 30
Meat and Poultry	30 – 40
Fish and Sea Food	40 - 49
Bread and Bakery	50 - 59
Alcoholic Beverages	60 - 69
Aerated water/ soft drinks	
Quality Analysis (involving physical and chemical lab analysis)	76 – 79
Packaging, Refrigeration and Procurement	70 – 75
Soya Food	80 – 84
Packaged Foods	85 - 90
Miscellaneous	90 - 95

Sequence	Description	Example
Three letters	Industry name	FIC
Slash	/	/
Next letter	Whether QP or NOS	Q or N
Next two numbers	Occupation code	01
Next two numbers	OS number	01



## Assessment Criteria

### CRITERIA FOR ASSESSMENT OF TRAINEES

**Job Role** Quality Assurance Manager

**Qualification Pack** FIC/Q7007

**Sector Skill Council** Food Processing

#### Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC
3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below)
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria
5. To pass the Qualification Pack, every trainee should score a minimum of 70% in aggregate
6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack

Assessment outcomes	Assessment criteria for outcomes	Marks Allocation			
		Total Marks	Out Of	Theory	Skills Practical
<b>1.FIC/N7021 ( Lead quality function in food processing units)</b>	PC1. develop operational plans for the quality department that is consistent with the objectives and goals of organisation	<b>100</b>	5	2	3
	PC2. develop operational plan that is flexible and complements quality from incoming materials, production of products, outgoing finished products, storage and distribution, and until the products reach the consumer		5	2	3
	PC3. develop operational plan for managing environmental issues		5	2	3
	PC4. set demanding but achievable objectives and targets for quality function and assign responsibilities to all employees of quality team		5	1	4
	PC5. implement plan, evaluate periodically, analyze and recommend changes		5	1	4

### Assessment Criteria

	PC6. monitor and control the operational plan to achieve its overall objectives	5	2	3
	PC7. design new work processes, procedures, systems, structures and roles for the changes implemented in the organisation, quality system, and legal regulations	5	2	3
	PC8. review and ensure implemented changes are effective and meets the requirements of the organisation	5	2	3
	PC9. communicate clearly and enthusiastically the organisation vision and values, make employees understand and commit their energy and expertise to achieve organisation goals	5	2	3
	PC10. understand the organisation and employees, develop a leadership style and apply them appropriately to achieve department targets and organisation goals	5	2	3
	PC11. communicate with employees regularly and effectively, help them identify their strengths, support to overcome their weakness, listen to their grievances and provide appropriate solutions, and win their trust and support	5	2	3
	PC12. motivate and support employees to achieve their work and development objectives, and provide recognition when they are successful	5	2	3
	PC13. encourage employees to take responsibilities, to take own decisions within agreed boundaries, to take lead in their own areas of expertise for their development	5	2	3
	PC14. initiate personnel actions, such as promotions, transfers, discharges or disciplinary measures	5	2	3
	PC15. lead quality department and team successfully through difficulties and challenges	5	2	3
	PC16. consult with employees of quality department and evaluate the past, present and future trends and prepare realistic budget for functioning of quality department	4	1	3

### Assessment Criteria

	and for achieving quality in the organisation and producing quality products				
	PC17. submit the proposed budget to the management for approval, discuss and, if required, negotiate the proposed budget to secure required fund		4	1	3
	PC18. propose revision of the budget, in case of any unforeseen development, discuss with the management to agree with the revisions		4	1	3
	PC19. identify and delegate budget control responsibilities to the team with clearly defined activities, establish systems to monitor and evaluate actual expenditure against budget		4	1	3
	PC20. identify the causes of any significant variances in budget control, discuss with team and ensure prompt corrective action is taken		3	1	2
	PC21. encourage team to think and identify ways of reducing expenditure, analyze and pursue the suggested ideas		3	1	2
	PC22. review the financial performance of quality department periodically and identify improvements for the future		3	1	2
			<b>100</b>	<b>35</b>	<b>65</b>
<b>2. FIC/N7022 (Manage quality in food processing units)</b>	PC1. establish objective/road map and budget for quality function		2	0.5	1.5
	PC2. communicate and share the company quality philosophy to key personnel in the organisation		3	1	2
	PC3. analyze quality performance and measure against internal and external standards		3	1	2
	PC4. prepare monthly summaries of quality issues for presentation to the senior management team		3	2	1
	PC5. keep senior management informed of significant developments in quality assurance activities		2	0.5	1.5
	PC6. support organization's various key decision making processes like cost		3	1	2

### Assessment Criteria

	reviews and its approval, identification, review and approvals of efficient contract manufactures etc			
	PC7. support organisation profit making strategies by providing cost effective solution like developing new suppliers, ingredients, new method of packaging and identifying cost reduction opportunities in existing materials	3	2	1
	PC8. implement food quality and safety regulatory requirements like fssai	3	2	1
	PC9. implement procedure, standards and specifications to meet quality goals of the organisation	3	1	2
	PC10. develop and review standards on environmental requirements, health and safety policies	3	1	2
	PC11. interact with marketing and sales departments to understand client requirements and expectations, analyze if they are met through present quality system and improve the existing system, if required	3	1	2
	PC12. monitor performance of the quality management system, produce data and report on performance, analyze statistical data to determine present standards, if required, make suggestions for changes and improvements and methods to implement them	3	1	2
	PC13. direct and coordinate company's quality program like implementation of iso, haccp systems and procedures	3	1	2
	PC14. prepare employees for a quality audit process for obtaining accreditation, certifications to a standard or a mark of quality	3	1	2
	PC15. establish, review and evaluate key performance indicators	3	1	2
	PC16. support new projects for validation, liaison with government agencies to ensure statutory and regulatory compliances	3	1	2

### Assessment Criteria

	PC17. support r&d, marketing, packaging team in new concept development, review of formulation and applicable product/package regulatory requirements	3	1	2
	PC18. analyze ways to reduce waste and increase efficiency	3	1	2
	PC19. develop and implement effective consumer/customer communication and feedback system to ensure the communication down the line, and minimizing the customer complaints	3	1	2
	PC20. compile quality control reports, create statistical process control metrics, manage non-conformity discrepancy reports, and recommend continuous improvement activities	3	1	2
	PC21. ensure food products produced meet the organisation standards, national and international regulations	3	1	2
	PC22. ensure routine sampling, testing and inspection of raw materials, packing materials, production on-line samples, and finished products to achieve product quality	2	0.5	1.5
	PC23. ensure appropriate calibration of testing equipments	2	0.5	1.5
	PC24. ensure all legal licenses are renewed and up-to-date	2	0.5	1.5
	PC25. carry out audits to identify areas of weakness within organization system, document audit findings and recommend ways to improve them	3	1	2
	PC26. manage audits by third-party	3	1	2
	PC27. analyze and understand consumer complaints on product, identify reasons, and implement control and preventive measure	3	1	2
	PC28. carry out assessments on cross functions, share findings with respective department managers, advise and guide them on	3	1	2

### Assessment Criteria

	implementing quality procedures in their areas of function				
	PC29. monitor performance by gathering relevant data and producing statistical reports		2	0.5	1.5
	PC30. oversee production processes to ensure production of products with consistent quality standards established by the organisation and government		3	1	2
	PC31. monitor production processes, process layouts, process sequences to obtain quality products through processes		3	1	2
	PC32. direct personnel, workers engaged in inspection and testing activities to ensure continuous control over raw materials, production process, packaging, finished products, facilities, storage, distribution and sale		3	1	2
	PC33. encourage employees of quality department to take personal responsibility for achieving quality standards and to address or report critical issues		2	0.5	1.5
	PC34. monitor and rate performance of employees in quality department, identify skill gap and areas of improvement and recommend and nominate in suitable training program		3	1	2
	PC35. organize training and awareness programs and ensure employees are up-to-date on quality systems and requirements		2	0.5	1.5
	PC36. provide or organize training on organisation standards, legal regulations on food (fssai), testing procedures, production, effect of process parameters on production process and product quality, basic microbiology, health and safety, hygiene practices, good manufacturing practices (gmp) etc.		3	1	2
			<b>100</b>	<b>35</b>	<b>65</b>

### Assessment Criteria

<b>3. FIC/N7023 (Manage audit and implement health and safety system)</b>	PC1. establish to the quality team the importance of documentation, provide training on documentation system, and ensure all quality documents are maintained systematically		5	1	4
	PC2. ensure all relevant records and documents are complete, up-to-date and accessible		4	1	3
	PC3. ensure corrective actions agreed in previous audits have been implemented, and recommendations have been considered and acted upon		4	2	2
	PC4. manage third party audit by providing the auditor with access to all relevant information, records and documentation		5	2	3
	PC5. discuss with the auditor the results of the audit and agree appropriate corrective actions to any non-conformances identified and the date by which the actions would be completed		5	1	4
	PC6. ensure agreed corrective actions are carried out by agreed dates		4	1	3
	PC7. carry out quality audits across cross functions in the organisation, at suppliers, distributors and market to ensure quality standards are maintained throughout the system		5	2	3
	PC8. perform audits by establishing clearly the scope of the audit, the responsibilities of the auditees, the quality procedures that apply to their work, previous audit history and expectations to maintain quality, encourage to co-operate		5	2	3

### Assessment Criteria

	fully, and carry out audit to reveal any deviations from relevant quality procedures				
	PC9. share with the auditees the results of the audit and agree appropriate corrective actions for any non-conformances and the date by which the actions should be carried out, and check if corrective actions have been carried out by agreed dates		4	1	3
	PC10. identify and analyze any problems related to process and quality procedures, report findings and recommendations to management for immediate action		5	2	3
	PC11. maintain complete records of quality audits for management review and future reference		4	1	3
	PC12. establish organization's responsibilities for health and safety regulations and ensure there is a written health and safety policy applicable for all employees		5	2	3
	PC13. ensure health and safety policy and procedures are clearly communicated to all employees of the organisation		5	2	3
	PC14. ensure health and safety to be a priority while planning organisation standards		5	2	3
	PC15. implement system for identifying hazards and assessing risks in processing food products, and set procedures to control and prevent them		5	2	3



### Assessment Criteria

	PC16. implement system for gmp, haccp, fifo/fefo, product recall etc	5	2	3
	PC17. organize training to the employees on food safety, hygiene and sanitation for effective implementation of the systems	5	2	3
	PC18. implement food and safety procedures in all areas of function to ensure food safety and hygiene system is followed from procurement of raw material, production of product, packaging, storage, distribution and until the product reaching the consumer	5	2	3
	PC19. ensure health and safety policy is practiced across the organisation, effectively monitored, reviewed and revised at regular intervals to meet the changes in national and international regulations	5	2	3
	PC20. ensure systems are in place for effective monitoring, measuring and reporting the performance of health and safety system	5	1	4
	PC21. conduct unannounced audits in all functions of the organisation to ensure health and safety procedures are being followed	5	2	3
		<b>100</b>	<b>35</b>	<b>65</b>

# *Semester V*

### CORE IX - FOOD MICROBIOLOGY

SUB. CODE:15BFSNC09  
MAX.MARKS: 100

HOURS T+P = C  
3+0= 3

#### Objectives

- To gain knowledge of the role of micro-organism in health, disease and food processing unit.
- To understand the role of microbes in relation to food spoilage and food borne disease.

S.No.	Topics/Modules	Key Learning Outcomes	Duration in Hrs
1.	<b>Introduction and scope of food microbiology</b>	<ul style="list-style-type: none"><li>• Brief history of food microbiology</li><li>• Introduction to important microorganisms in food</li><li>• General characteristics of bacteria, fungi, virus, protozoa and algae</li><li>• Cultivation of microorganisms – Nutritional requirements, types of media used and method of isolation</li></ul>	<b>8</b>
2.	<b>Spoilage and microbiology of food</b>	<ul style="list-style-type: none"><li>• Food spoilage – types and sources</li><li>• Water activity and food spoilage</li><li>• Contamination of<ul style="list-style-type: none"><li>A) cereal and cereal products</li><li>B) sugar and sugar products</li><li>C) vegetables and fruits</li><li>D) meat and meat products</li><li>E) fish, egg and poultry</li><li>F) milk and milk products</li><li>G) canned foods</li></ul></li></ul>	<b>12</b>
3.	<b>Food fermentation</b>	<ul style="list-style-type: none"><li>• Fermentation –definition and types</li><li>• Microorganisms used in food fermentations</li><li>• Dairy fermentation -starter cultures and their types, concept of probiotics</li><li>• Fermented foods-types, methods of manufacture for vinegar, sauerkraut, tempeh, miso, soya sauce ,beer, wine and traditional Indian foods</li></ul>	<b>8</b>
4.	<b>Food borne diseases</b>	<ul style="list-style-type: none"><li>• Types – food borne infections and intoxications</li></ul>	<b>6</b>
5.	<b>Control of microorganisms</b>	<ul style="list-style-type: none"><li>• Fundamentals of control of microorganisms in food – Extrinsic and intrinsic factors affecting growth and survival of microorganisms, use of high and low temperature, dehydration, freezing, freeze drying, irradiation and preservatives in food</li></ul>	<b>6</b>
6.	<b>Destruction of</b>	<ul style="list-style-type: none"><li>• Sterilisation and disinfection – methods,</li></ul>	<b>6</b>

	microorganisms	Common disinfectants used in home and at industries, Tests to identify the effectiveness of sterilization and disinfection.	
7.	Indices of sanitary quality	<ul style="list-style-type: none"> <li>• Indices of food, milk and water sanitary quality</li> <li>• Microbiological criteria of foods, water and milk testing</li> <li>• Sampling of air, water, dust, soil, food and food handlers to study the various sources of transmission of microorganism in food</li> </ul>	8
<b>Total Duration</b>			<b>54</b>

### References:

1. Frazier W C., (2002): Food Microbiology, Mc Graw Hill Book Co., 6th edition, N.Delhi.
2. Pelezar, M.I and Reid, R.D, (1993): Microbiology, 5th edition, McGraw Hill Book Company, New York.
3. Jay, James, M (2000): Modern Food Microbiology, 2nd edition, CBS Publisher.
4. Adams, M.R. and Moses M.G. (1995): Food Microbiology. 1st edition, New Age International (P) Ltd.
5. Joshua A K., (2000): Microbiology, Popular Book Depot, Chennai
6. Ananthanarayanan R and Panicker C K J., Textbook of Microbiology, Orient Longman, Chennai

### **CORE X - FOOD PACKAGING TECHNOLOGY**

**SUB.CODE:15BFSNC10**  
**MAX.MARKS: 100**

**HOURS T+P =C**  
**3+0 = 3**

#### **Objectives**

- To gain knowledge on packaging material used in food packaging.
- To understand the different types and method of food package.

<b>S.No.</b>	<b>Topics/Modules</b>	<b>Key Learning Outcomes</b>	<b>Duration in Hrs</b>
1.	<b>Introduction and scope of food packaging</b>	<ul style="list-style-type: none"><li>• Definition, importance and role of food packaging</li><li>• Principles in the development of safe and protective packing</li><li>• Factors determining the packaging requirements of various foods</li><li>• Classification of packaging</li></ul>	<b>6</b>
2.	Packaging materials	<ul style="list-style-type: none"><li>• Properties and application of primary packaging materials<ul style="list-style-type: none"><li>a. Paperboards, metals, plastics, wood, plywood, glass, flexible packaging materials</li><li>b. Labels, caps and closures and wads, adhesives, inks and lacquers, cushioning materials, reinforcements etc.</li></ul></li></ul>	<b>8</b>
3.	Packaging systems and methods for food products	Vaccum packaging, gas flush packaging, CAP & MAP, aseptic and retort packaging, Bag-in-Box packaging, artificial and intelligent packaging	<b>10</b>
4.	Food packaging design	<ul style="list-style-type: none"><li>• Package design for fresh horticultural produce and animal foods, dry and moisture sensitive foods, frozen foods, fats and oils, thermally processed foods and beverages.</li><li>• Food marketing and role of packaging</li></ul>	<b>6</b>
5.	Testing and evaluation of packaging material	Thickness, tensile strength, puncture resistance, bursting strength, seal strength, water vapor permeability, CO <sub>2</sub> permeability, oxygen permeability, grease resistance	<b>8</b>
6.	Testing and evaluation of packaged foods	Compatibility and shelf life studies, evaluation of transport worthiness of filled packages	<b>6</b>
7.	Packaging laws and regulations	<ul style="list-style-type: none"><li>• FDA, PFA, Packaging Commodity Rules, Weight and Measures Act, Packaging and Labelling Rules and Regulations of FSSAI</li><li>• Coding and marking including bar coding</li></ul>	<b>10</b>

		<ul style="list-style-type: none"> <li>• Environmental &amp; Eco issues and waste disposal</li> </ul>	
<b>Total Duration</b>			<b>54</b>

### References:

1. Robertson GL, Food Packaging – Principles and Practice, CRC Press Taylor and Francis Group, 2012.
2. Paine FA and Paine HY, A Handbook of Food Packaging, Blackie Academic and Professional, 1992.
3. Coles R, McDowell D, Kirwan MJ Food Packaging Technology. Blackwell, 2003.
4. De S, Outlines of Dairy Technology, Oxford Publishers, 1980
5. Jenkins WA and Harrington JP, Packaging Foods with Plastics, Technomic Publishing Company Inc., USA, 1991
6. Richard Coles and Mark Kirwan, “Food and Beverage Packaging Technology”, Second Edition, A John Wiley & Sons, Ltd., Publication, 2011.
7. Dr.B.Kumar and Dr.S.Natarajan and Dr.M.Govindarajan, “Fundamentals of Packaging”, Published by PHI Learning Pvt Ltd, Jan. 2009

### **CORE XI- FOOD MICROBIOLOGY PRACTICAL**

**SUB.CODE: 15BFSNC11**  
**MAX.MARKS: 100**

**HOURS T+P=C**  
**0+3=2**

#### **Objective**

- To familiarize the students with procedures of microbial culturing, aseptic technique, staining, identification of microorganisms and the conditions necessary for microbial growth.

<b>S.No.</b>	<b>Module</b>	<b>Key Learning Outcomes</b>	<b>Duration in Hrs</b>
1.	General	Standard operating procedures for microbial laboratory	6
2.	Morphology of microorganisms	Examine the morphology of microorganism present in the given food sample by i. Simple staining technique ii. Negative staining technique iii. Gram staining technique	9
3.	Media	Preparation of culture media for the growth of microorganisms	6
4.	Microbial load	Enumerate the microbial load of given food samples by i. Spread plate method ii. Pour plate method iii. Streak plate method	9
5.	Characterization of microorganisms	Biochemical characterization of microorganisms	9
6.	Safety and Hygiene	Enumerate the microbial load of food processing equipments and vessels	6
7.	Indicator microorganisms	Assessment of indicator microorganisms present in the given food sample	9
<b>Total Duration</b>			<b>54</b>

#### **References:**

1. Garbutt, John, (1997): Modern food microbiology, Arnold, London.
2. FSSAI manual on the methods of microbiological testing.
3. Frazier W C., (2002): Food Microbiology, McGraw Hill Book Co., 6th edition, N.Delhi.
4. Peleazar, M.I and Reid, R.D, (1993): Microbiology, 5th edition, McGraw Hill Book Company, New York.
5. Jay, James, M (2000): Modern Food Microbiology, 2nd edition, CBS Publisher.

## **CORE XII - FOOD QUALITY ANALYSIS PRACTICAL**

**SUB.CODE: 15BFSNC12**  
**MAX.MARKS: 100**

**HOURS: T+P=C**  
**1+2=2**

### **Objectives**

- To learn the estimation and testing techniques used in quality analysis of food items.

<b>S.No.</b>	<b>Topic/Module</b>	<b>Key Learning Outcomes</b>	<b>Duration in Hrs</b>
1.	General	Standard operating procedures for food analysis laboratory	3
2.	Cereals, Pseudo cereals, Millets and Pulses	i. Determination of moisture content ii. Determination of total ash content iii. Determination of acid insoluble ash content iv. Determination of crude fibre v. Examine the microscopic structure of different starches	18
3.	Fruits and Vegetables	i. Determination of titrable acidity	3
4.	Fleshy Foods and Egg	i. Determination of protein	3
5.	Fats & Oils, Nuts and Oilseeds	i. Determination of specific gravity and refractive index ii. Determination of melting point of fat iii. Determination of total fat content iv. Tests for oils	12
6.	Milk and Milk Products	i. Detection of components in milk	6
7.	Spices and Condiments Sugar and Jaggery	i. Test for adulterants	12
<b>Total Duration</b>			<b>54</b>

### **References:**

1. FSSAI manual of methods of analysis of foods – cereals and cereal products
2. FSSAI manual of methods of analysis of foods – fruit and vegetable products
3. FSSAI manual of methods of analysis of foods – milk and milk products
4. FSSAI manual of methods of analysis of foods – oils and fats
5. FSSAI manual of methods of analysis of foods – spices and condiments



### ELECTIVE III- FOOD FOR DISEASES

SUB.CODE: 15BFSNEL03  
MAX.MARKS: 100

HOURS: T+P=C  
2+1=2

#### Objective

- To familiarize the students with food items, nutraceutical and functional component of food specific for the prevention and control of various diseases.

S.No.	Topics/Modules	Key Learning Outcomes	Duration in Hrs
1.	<b>Introduction to nutraceuticals and functional food</b>	<ul style="list-style-type: none"><li>Definition, synonymous terms</li><li>Basis of claims for a compound as nutraceutical</li><li>Regulatory issues for nutraceuticals including CODEX</li></ul>	<b>6</b>
2.	Nutraceutical properties of nutrient component of food	<ul style="list-style-type: none"><li>Nutraceutical properties of<ul style="list-style-type: none"><li>a. polysaccharides</li><li>b. bioactive lipids</li><li>c. bioactive peptides</li><li>d. bioactive polyphenols and carotenoids</li><li>e. vitamins</li></ul></li></ul>	<b>10</b>
3.	Nutraceutical potential of food	<ul style="list-style-type: none"><li>Nutraceutical potential of<ul style="list-style-type: none"><li>a. Cereals, pulses, millets, pseudo cereals</li><li>b. Fruits and vegetables</li><li>c. Nuts and oilseeds</li><li>d. Milk</li><li>e. Meat, egg, fish and poultry</li><li>f. Spices and condiments</li><li>g. Seaweeds, tea and honey</li></ul></li></ul>	<b>10</b>
4.	Nutraceutical and functional food in diseases	<ul style="list-style-type: none"><li>Concept of angiogenesis and the role of nutraceuticals/functional foods</li><li>Nutraceuticals for cardiovascular diseases, gastrointestinal disorders, renal diseases, cancer, diabetes, cholesterol management, obesity, joint pain, immune enhancement, age-related macular degeneration, endurance performance and mood disorders</li></ul>	<b>14</b>
5.	Manufacturing of nutraceuticals	<ul style="list-style-type: none"><li>Manufacturing aspects of selected nutraceuticals such as lycopene, isoflavonoids, prebiotics and probiotics, glucosamine, phytosterols etc.</li><li>Formulation of functional foods containing nutraceuticals – stability and analytical issues, labelling issues.</li></ul>	<b>8</b>
6.	Testing and evaluation of nutraceuticals	<ul style="list-style-type: none"><li>Clinical testing of nutraceuticals and health foods</li><li>Interactions of prescription drugs and</li></ul>	<b>6</b>

		nutraceuticals <ul style="list-style-type: none"> <li>• Adverse effects and toxicity of nutraceuticals</li> <li>• Nutrigenomics and its relation to nutraceuticals</li> </ul>	
<b>Total Duration</b>			<b>54</b>

### References:

1. Brigelius-Flohé, J & Joost HG. 2006. *Nutritional Genomics: Impact on Health and Disease*. Wiley VCH.
2. Cupp J & Tracy TS. 2003. *Dietary Supplements: Toxicology and Clinical Pharmacology*. Humana Press.
3. Gibson GR & William CM. 2000. *Functional Foods - Concept to Product*.
4. Goldberg I. 1994. *Functional Foods: Designer Foods, Pharma Foods*.
5. Losso JN. 2007. *Angi-angiogenic Functional and Medicinal Foods*. CRC
6. Press. Manson P. 2001. *Dietary Supplements*. 2<sup>nd</sup> Ed. Pharmaceutical Press.
7. Campbell JE & Summers JL. 2004. *Dietary Supplement Labeling Compliance*.
8. Neeser JR & German BJ. 2004. *Bioprocesses and Biotechnology for Nutraceuticals*.
9. Chapman & Hall. Robert EC. 2006. *Handbook of Nutraceuticals and Functional Foods*. 2<sup>nd</sup> Ed.
10. Wildman. Shi J. (Ed.). 2006. *Functional Food Ingredients and Nutraceuticals: Processing Technologies*. CRC Press.
11. Webb GP. 2006. *Dietary Supplements and Functional Foods*. Blackwell Publ.
12. Dhiraj A. Vatter and Vatsalamaitin, *Functional foods, Nutraceutical and Natural products – concepts and applications*, DES tech publications, 2016.
13. Aluko and Rotimi E, *Functional foods and Nutraceuticals*, Springer publications, 2012.
14. Robert E.C. Wildman, *Handbook of Nutraceutical and Functional foods*, II edition, CRC press, 2006.
15. Brian Lockwood, *Nutraceutical*, II editions.

# *Semester VI*

**CORE XIII – FOOD INDUSTRIAL BY-PRODUCTS AND WASTE MANAGEMENT****SUB.CODE: 15BFSNC13**  
**MAX.MARKS: 100****HOURS: T+P=C**  
**3+0=3****Objectives**

- To impart knowledge about waste minimization, utilizing and developing various techniques to get best out of waste from various food industries.

S.No.	Topic/Module	Key Learning Outcomes	Duration in Hrs
1.	Food industry by-products and waste	Introduction Status in India Types of waste and by-products from food industries Composition and characterization Need for treatment and utilization Impact on environment	10
2.	Waste treatment methods	Membrane separation, advanced oxidation/reduction, electrolytic methods, up-flow anaerobic sludge blanket (UASB), aerobic and anaerobic methods, activated sludge treatment, sludge thickening, sludge conditioning, sludge dewatering, composting and incineration, land filling, vermicomposting.	12
3.	Utilization of fruits, vegetables and sugar by-products and waste	Types of waste in fruits and vegetable processing industries. Process for waste utilization from fruit and vegetable industries Fermentation for production of alcohol and vinegar, oil & flavoring components, pigments extraction and acid production from waste By products utilization of sugar industry	10
4.	Utilization of by-products from cereals, millets, pulses, oilseeds and tuber crops	Utilization of by products from wheat, rice, corn, dhal milling Utilization of husk, bran, cob, germ, broken and powder Oil processing industries – Introduction, De-oiled cake, animal feed, fertilizer, bio sorbents, waxes, soap stock, cocoa butter replacer. Tuber processing industries- Introduction, enzyme production, biogas, bakers yeast, bioethanol, animal feed, corn syrup, organic acids, nutraceuticals.	12
5.	Utilization of by-products from Animal products based industries	Dairy industry - Introduction- opportunities – whey, bio surfactants, bacteriocin. Meat, fish, poultry and egg processing industries- bio active peptide, protein extract, gelatin, heparin, pepsin, bio molecule from bone and blood, keratin from animal hair, bone meal, meat meal, chondroitin sulfate, squalene, fish oil, micro nutrients- vitamins and minerals, pigments.	10
		Total	54

## **References**

### **TEXT BOOKS:**

1. Chandrasekaran M., —Valorization of Food Processing By-Products||, CRC Press, 2013.
2. Vasso Oreopoulou and Winfried Russ, —Utilization of By-Products and Treatment of Waste in the Food Industry||, Springer Science Business Media, USA, 2007.

### **REFERENCE BOOKS:**

1. Keith Waldron, —Handbook of waste management and co-product recovery in food processing||, Wood head Publishing Ltd., England, 2007.
2. Green J.H. and Kramer A., —Food Processing Waste Management||, AVI Publishing Company, Malaysia,1981.
3. Nelson L. Nemerow and Franklin J. Agardy, —Strategies of Industrial and Hazardous Waste Management||, John Wiley and Sons, 1998.

## **CORE XIV – FOOD TRADE AND BUSINESS MANAGEMENT**

**SUB.CODE: 15BFSNC14**

**HOURS: T+P=C**

**MAX.MARKS: 100**

**3+0=3**

### **Objectives**

- To impart knowledge about entrepreneurship concepts, trade and business plan
- To make the students understand Business plan, Launching and Management of Small Business.

<b>S.No.</b>	<b>Topic/Module</b>	<b>Key Learning Outcomes</b>	<b>Duration in Hrs</b>
1.	Entrepreneurship Concepts	Concept and Functions of entrepreneurship, Need and Myths of entrepreneurship, process of entrepreneurship, types, competencies and ethics of entrepreneurship, Intrapreneurship, social entrepreneurship, foodpreneurship.	<b>06</b>
2.	Start-up and Business Plan	Objectives of a Business Plan, Business Planning Process, Opportunity Identification and Selection, Contents of a Business Plan, Execution of business plan, Feasibility analysis, Innovations leading to entrepreneurial ventures, components of business- industry, trade and commerce, technology licensing, intellectual property law, patents, trademarks and copyright.	<b>06</b>
3.	Concept of Market and Marketing Mix	Concept of market and its evolution, E-business and E-commerce, Market environment at micro and macro level, Techniques of market research and market survey, Market expansion, marketing mix	<b>06</b>
4.	Business Finance and Arithmetic	Cash register, unit of sale, unit cost and unit price, types of cost, income statement, cash flow projections, break-even analysis for a single product or service, taxes	<b>12</b>
5.	Resource mobilization	Planning effective resource mobilization, estimating financial requirements, estimate capital requirement, sources of finance, mentorship, size and capital based classification of business enterprises, sources of business information, ICT in business.	<b>08</b>
6.	Trade and Policies	India's Agricultural Trade Policy and Sustainable Development goals, Food Policy in India, Import and export procedures and guidelines in India	<b>08</b>
7.	Business Development Services	Business development service providers in India - DIC, MSME, NSIC, SIDCO, Financial Institutions and Banks.	<b>08</b>
		<b>Total</b>	<b>54</b>

### **References**

#### **TEXT BOOKS:**

1. CBSE publication, Class XI, Entrepreneurship, 3<sup>rd</sup> Edition, 2013.
2. S.S.Khanka, —Entrepreneurial Development, 4<sup>th</sup> Edition, S.Chand & Company Ltd., 2012.
3. Madhurima Lall and Shikha Sahai, —Entrepreneurship, 2<sup>nd</sup> Edition, Excel Books, New Delhi, 2008.

**REFERENCE BOOKS:**

1. Robert D Hisrich, Michael P Peters and Dean A Shepherd, —Entrepreneurship, Sixth Edition, Tata McGraw Hill, New Delhi, 2009.
2. Mary Coulter, —Entrepreneurship in Action, Second Edition, Prentice Hall of India, New Delhi, 2005.
3. Jain P.C., —Handbook for New Entrepreneurs, Oxford University Press, Oxford, 2003.
4. African Technology Policy Studies Network, Entrepreneurship Skills: Training Manual for Scientists, 2012.

## **CORE XV – NUTRITION ASSESSMENT AND DIET PLANNING**

**SUB.CODE: 15BFSNC15**  
**MAX.MARKS:100**

**HOURS: T+P=C**  
**1+3=2**

### **Objectives**

- To inculcate practical training on the Assessment of Nutritional parameters and basics of diet planning for specific conditions.

S.No.	Topic/Module	Key Learning Outcomes	Duration in Hrs
1.	Methods of Assessments	1. Anthropometric Assessments of Individuals	3
		2. Case study on Biochemical Assessments of Individuals	6
		3. 24 hr recall method	3
		4. Three days recall method	3
2.	Planning, preparation and calculation of diet for specific conditions	a) Normal diet	3
		b) Liquid diet	3
		c) Soft diet	3
		d) High and low caloric diet	3
		e) Bland diet for peptic ulcer	3
		f) Diet for Viral hepatitis and cirrhosis	3
		g) Diet for Diabetes mellitus	3
		h) Diet for Hypertension and Atherosclerosis	3
		i) Diet for Nephritis and Nephrotic syndrome	6
		k) Low and medium cost diets for P.E.M., Anemia & vitamin A deficiency	9
Total			54

### **References**

1. Complete Module on Meal Planning. Assessed on 03.06.2018.  
(<http://download.nos.org/srsec321newE/321-E-Lesson-5.pdf>)



<b>Course Name</b>	<b>IT Applications in Food Industry</b>	<b>Programme Name</b>	<b>B.Voc Food Science and Nutrition</b>
Course Code	15BFSNC16	Academic Year Introduced	2015 - 16
Type of Course	Practical	Semester	VI

#### **COURSE OBJECTIVES AND HOURS OF INSTRUCTION**

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Microsoft Office	To familiarize with the basics and functions of Microsoft office applications	18
Enterprise Resource Planning (ERP) software	To learn the Enterprise Resource Planning and employ it in Food industry	18
Automated software	To recognize the value of automated software in Food industry	18
Total Hours of Instruction		54

Tu-Tutorial, P-Practical, Te-Tests, To-Total Hours COURSE PLAN

Module/Experiment No.	Intended learning Chapters	Psychomotor domain activity
1.	Microsoft Word	To create a Microsoft Word Document and to learn the functions of Microsoft word document and access it .
2.	Microsoft Excel	To create a Microsoft Excel and to learn the functions of Microsoft Excel and access it
3.	Microsoft Power point Presentation	To create a Microsoft Power point presentation, to access and apply it
4.	Automated Software	To gain knowledge on the automation softwares through an industrial visit

#### **REFERENCES**

TEXTBOOKS	
1	Singh, R. P. (1996). Computer Applications in Food Technology: Use of Spreadsheets in Graphical, Statistical, And Process Analysis. Elsevier.
2	Teixeira, A. A., & Shoemaker, C. F. (2012). Computerized food processing operations. Springer Science & Business Media.
3	Sinha, P. K., & Sinha, P. (2016). Information Technology: Theory and Practice. PHI Learning Pvt. Ltd..
REFERENCE BOOKS	
1	Vlach, J. (1992). Basic Network Theory: With Computer Applications. New York: Van Nostrand Reinhold.
2	Gunasekaran, S. (1996). Computer vision technology for food quality assurance. Trends in Food Science & Technology, 7(8), 245-256.
3	Sinha, P. K., & Sinha, P. (2003). Computer Fundamentals. BPB Publications (sixth edition)
JOURNALS AND DOCUMENTS	
1	International Journal of Supply Chain Management, Exceling Tech Publishers
2	Trends in Food Science and Technology ,Elsevier
3	IFIP Advances in Information and Communication Technology ,Springer Nature

**ELECTIVE PAPER – NUTRITION AND PHYSICAL FITNESS****SUB.CODE: 15BFSNEL04****HOURS: L+T+P=C****MAX.MARK: 100****1+0+2=2****Course Objectives and Outcomes**

<b>Unit/Module Title</b>	<b>Objectives</b>	<b>Learning Outcomes</b>	<b>Hours of Instruction L+Tu+Te=To</b>
Human Physiology	To learn about the structure and functions of systems in a human body	Able to identify the individual functions of the systems	8+2+1=11
Therapeutic Nutrition	To categorize the disease conditions and plan diet	Able to modify the dietary needs based on their requirement	8+2+1=11
Assessment of Nutritional Status	To learn about the assessment techniques	Able to illustrate assessment methods	7+2+1=10
Importance of Physical Fitness	To relate activities based on their endurance, time etc.	Able to interpret activities that utilises energy in enormous amount	7+2+1=10
Nutrition in Sports and Fitness	To learn about the energy utilisation, RDA for sports	Able to prepare diet and counsel the athletes	7+2+3=12
<b>Total Hours of Instruction</b>			<b>54 (18*3)</b>

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

**Syllabus**

<b>Unit /Module No.</b>	<b>Unit/Module Title</b>	<b>Intended Learning Chapters</b>	
		<b>Knowledge Components</b>	<b>Analytical Components</b>
I	Human Physiology	Structure and function - Cell, Skeletal system, Blood and Circulatory system, Gastro-intestinal system, Excretory, Respiratory system, Endocrine system, Reproductive system, Immune system, Special senses	Identify the functions of the body system
II	Therapeutic Nutrition	Etiology, symptoms, and dietary management in diseases of the gastrointestinal tract, metabolic disorders, kidney diseases, diseases of cardio vascular system, diet for weight management, diet for allergic conditions	Plan and calculate the diets for disease conditions

III	Assessment of Nutritional Status	<ul style="list-style-type: none"> <li>a. Indirect methods – Demography, vital statistics, mortality and morbidity patterns, literacy rate, unemployment rate, socio-economic profile.</li> <li>b. Direct methods – Anthropometry, clinical assessment, biochemical estimations, diet survey.</li> </ul>	Assessment of Height, weight, skin fold thickness, Mid - Upper arm Circumference. Body Mass Index (BMI), Waist - Hip Ratio (WHR).
IV	Importance of Physical Fitness	<ul style="list-style-type: none"> <li>a. Importance and benefits of physical activity</li> <li>b. Physical Activity – frequency, intensity, time and type with examples</li> <li>c. Physical Activity Guidelines and physical activity pyramid</li> </ul>	Perform endurance activities and analyse the change in heart rate, blood pressure.
V	Nutrition in Sports and Fitness	<ul style="list-style-type: none"> <li>a. Physiology and biochemistry of exercise</li> <li>b. Muscle contraction, Energy sources for muscle use, ATP</li> <li>c. Nutritional assessment and counselling for athletes.</li> <li>d. Nutrition needs of male, female, younger and older athletes.</li> </ul>	Plan and calculate the diet for athletes based on their recommendations.

#### **Reference:**

#### **Reference Book:**

1. Wardlaw, Smith. Contemporary Nutrition: A Functional Approach. 2nd ed: 2012. Mc Graw Hill.
2. Williams Melvin. Nutrition for health, fitness and sports. 2004. Mc Graw Hill
3. Joshi AS. Nutrition and Dietetics 2010. Tata Mc Graw Hill.

#### **Journals and Documents**

1. NIN manual on Nutrition and Hydration guidelines for excellence in sports performance

## QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR FOOD PROCESSING

### What are Occupational Standards(OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

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### Introduction

### Qualifications Pack – Production Manager

**SECTOR:** FOOD PROCESSING

**SUB-SECTOR:** FRUIT AND VEGETABLE, FOOD GRAIN MILLING (INCLUDING OILSEEDS), DAIRY PRODUCTS, MEAT AND POULTRY, FISH & SEA FOOD, BREAD AND BAKERY, ALCOHOLIC BEVERAGES, AERATED WATER/SOFT DRINKS, SOYA FOOD, PACKAGED SNACKS, PACKING AND REFRIGERATION

**OCCUPATION:** PROCESSING

**REFERENCE ID:** FIC/Q9003

**ALIGNED TO:** NCO-2004/1222.70

A Production Manager is responsible for production of food products and meeting quantity, quality and cost standards.

**Brief Job Description:** A Production Manager is responsible for production of food products through the process of production planning, coordinating and controlling production process to achieve quantity and quality products.

**Personal Attributes:** A Production Manager must have the ability to read, write, communicate, plan, organize and prioritize. S/he must possess mathematical organizational and analytical skills, ability to concentrate, physical stamina, mechanical aptitude and trouble shooting skills and have an understanding of food safety standards and requirements.

Job Details	Qualifications Pack Code	FIC/Q9003		
	Job Role	Production Manager		
	Credits (NSQF)	TBD	Version number	1.0
	Sector	Food Processing	Drafted on	26/11/2015
	Sub-sector	Fruit and vegetable, Food grain milling (including oilseeds), Dairy products, Meat and Poultry, Fish & Sea food, Bread and Bakery, Alcoholic Beverages, Aerated water/soft drinks, Soya food, Packaged snacks, Packing and refrigeration	Last reviewed on	30/03/2016
	Occupation	Processing	Next review date	30/03/2019
	NSQC clearance date	N/A		

Job Role	Production Manager
Role Description	A Production Manager is responsible for production of food products through the process of production planning, coordinating and controlling production process to achieve quantity and quality products, reviewing production process to minimize production cost and optimizing production.
NSQF level	7
Minimum Educational Qualifications	Bachelor's degree in engineering
Maximum Educational Qualifications	Not Applicable
Training (Suggested but not mandatory)	<ol style="list-style-type: none"> <li>1. ISO</li> <li>2. HACCP</li> <li>3. Six Sigma</li> <li>4. OHSAS</li> <li>5. Integrated Management System</li> <li>6. Food Safety Standards and Regulations (as per FSSAI)</li> </ol>
Minimum Job Entry Age	21 years
Experience	10-12 yrs in food processing unit
Applicable National Occupational Standards (NOS)	<p><b>Compulsory:</b></p> <ol style="list-style-type: none"> <li>1. <a href="#">FIC/N9014 Manage production process in food processing unit</a></li> <li>2. <a href="#">FIC/N9015 Manage production optimization and cost efficiency in food processing unit</a></li> <li>3. <a href="#">FIC/N9016 Manage documentation system and implement safety and environmental policies in food processing unit</a></li> </ol> <p><b>Optional:</b> N.A.</p>
Performance Criteria	As described in the relevant OS units

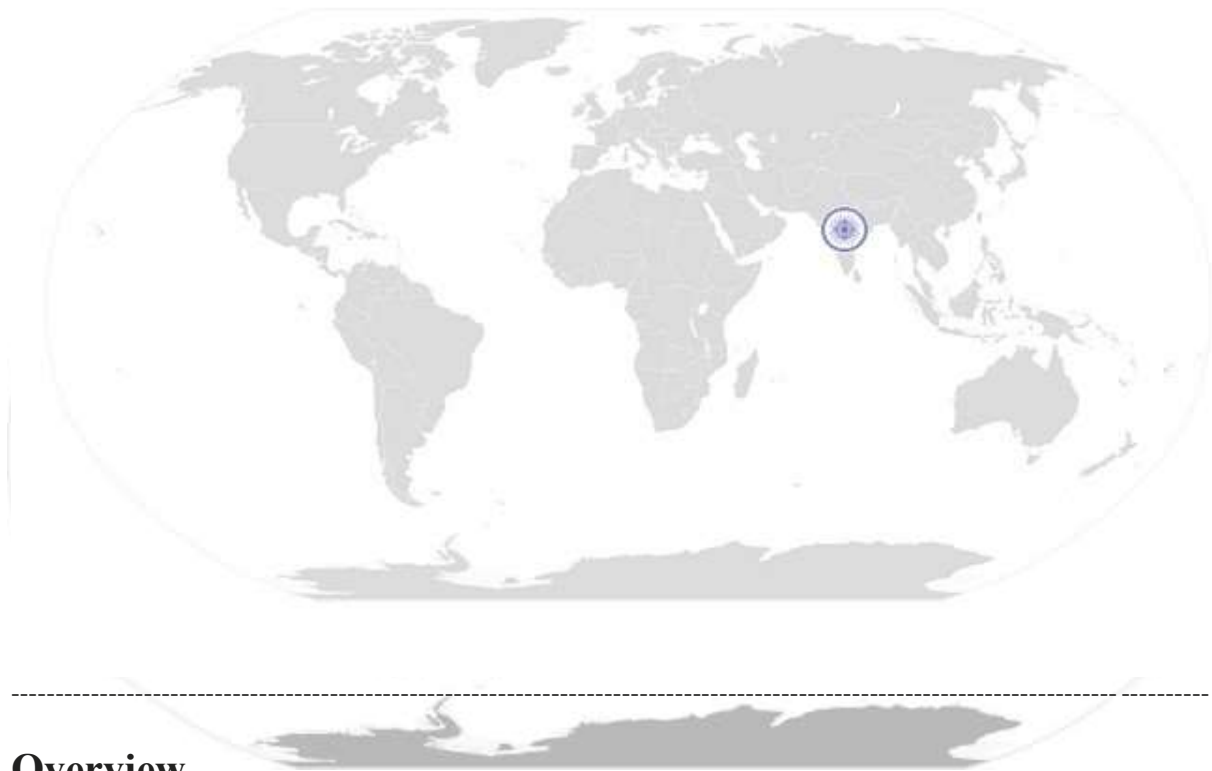
Definitions

Keywords /Terms	Description
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through analysis and form the basis of OS.
Job Role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
OS	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
NOS	NOS are Occupational Standards which apply uniquely in the Indian context.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Qualifications Pack	Qualifications Pack comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A Qualifications Pack is assigned a unique qualification pack code.
Unit Code	Unit Code is a unique identifier for an Occupational Standard , which is denoted by an 'N'
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
Organizational Context	Organizational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills or Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.

Acronyms

Keywords /Terms	Description
CIP	Clean In Place
COP	Clean Out Of Place
ERP	Enterprise Resource Planning
FIFO	First In First Out
FEFO	First Expiry First Out
FSSAI	Food Safety and Standards Authority of India
GMP	Good Manufacturing Practice
GHP	Good Hygiene Practices
HACCP	Hazard Analysis and Critical Control Point
NOS	National Occupational Standard
NSQF	National Skill Qualification Framework
OS	Occupational Standard
PC	Performance Criteria
QP	Qualification Pack
SSC	Sector Skill Council
SOP	Standard Operating Procedure
QMS	Quality Management System

# National Occupational Standard



## Overview

This OS unit is about managing production process in food processing unit by providing leadership to production team, planning production, coordinating maintenance, managing production and new product trials.



**FIC/N9015**
**Manage production optimization and cost efficiency**

National Occupational Standard

<b>Unit Code</b>	<b>FIC/N9014</b>
<b>Unit Title (Task)</b>	<b>Manage production process in food processing unit</b>
<b>Description</b>	This OS unit is about managing production process in food processing units.
<b>Scope</b>	This unit/task covers the following: <ul style="list-style-type: none"> <li>• Provide leadership to production team</li> <li>• Schedule production</li> <li>• Co-ordinate maintenance</li> <li>• Manage production</li> <li>• Manage new product trials</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Provide leadership to production team</b>	PC1. communicate the organisation policies and goals clearly to the employees of production team, make them understand and commit their energy and expertise to achieve organisation goals PC2. achieve department targets and organisation goals by understanding the organisation and employees, developing a leadership style and applying them appropriately PC3. communicate with employees regularly and effectively, help them identify their strengths, provide support to overcome their weakness, listen to their grievances and provide appropriate solutions, and win their trust and support PC4. motivate and support employees to achieve their work and development objectives, and provide recognition when they are successful PC5. encourage employees to take responsibilities, to take own decisions within agreed boundaries, to take lead in their own areas of expertise for their development PC6. initiate personnel actions, such as promotions, transfers, discharges or disciplinary measures PC7. lead production department and team successfully through difficulties and challenges
<b>Schedule production</b>	PC8. review the sales forecast for the week/month (or) monthly production plan discussed with plant manager (or) customer requirement (as applicable) and identify production priorities to meet market requirement PC9. identify and confirm resource availability such as raw materials, packing materials, equipment availability and capacity, production capacity, manpower requirement and availability, stock level, storage capacity, transport capacity etc PC10. plan details of production in terms of output quantity and quality, cost, time

**FIC/N9015**
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	<p>and manpower requirements</p> <p>PC11. analyze the consequences of failing to meet production/delivery timelines to meet the schedule, notify relevant authorities of any possibility that demand cannot be met within required timeframe</p> <p>PC12. develop production schedule to meet market demands/priorities and delivery timelines within budget and with available resources, consult production plan with inter department heads and production supervisor, instruct supervisor to allocate work to production team</p> <p>PC13. communicate the production schedule to cross function heads through communication system followed by the organisation such as e-mail or upload in the ERP system</p>
<b>Co-ordinate maintenance</b>	<p>PC14. identify and confirm equipment requirements to meet production target, share production schedule with equipment requirement to maintenance manager/supervisor for maintenance plan that aligns with production plan</p> <p>PC15. co-ordinate with maintenance manager/supervisor to understand materials, consumables and manpower requirement and availability for maintenance activities, for uninterrupted production</p> <p>PC16. understand equipment maintenance process and procedure and co-ordinate for maintenance activities during breakdown, emergency response, routine cleaning and servicing, etc.</p> <p>PC17. analyze equipment maintenance data to interpret equipment performance and arrive at production capability of each process equipment</p> <p>PC18. co-ordinate with maintenance team to ensure reliable equipment performance with minimal disruption to production, to minimize down time during equipment breakdowns, and to optimize equipment efficiency to achieve production target</p> <p>PC19. lead and build team spirit between production and maintenance personnel through effective communication to enhance equipment performance and to identify production improvement opportunities</p> <p>PC20. ensure maintenance procedures are followed meet food safety and environmental requirements</p>
<b>Mange Production</b>	<p>PC21. monitor production process for usage of raw materials, packaging materials, manpower, wastage against production plan and identify reason for variances against plan</p> <p>PC22. address the reason for variation in achieving production schedule, production target within allocated budget</p> <p>PC23. adjust production schedule in response to variables affecting achievement of production target</p> <p>PC24. monitor production output and cost, adjust processes and resources to minimize cost and to achieve quantity and quality product</p>

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	<p>PC25. reschedule production plan in case of urgent requirement or any unforeseen event, to minimize wastage and to utilize materials/utilities and resources efficiently, discuss and negotiate changes with inter department team on time for their support and team work</p> <p>PC26. review production schedule and process, consult /discuss with supervisor, team and cross function teams identify opportunities for improvement and develop recommendations for improvement on production process</p> <p>PC27. set polices, plans and procedures, and take initiative to implement the identified improvement opportunities to control cost and to achieve better yield and quality</p> <p>PC28. monitor, review and ensure production details are documented to meet the documentation requirements of the organisation, and to meet audit requirements like ISO, HACCP, etc.</p>
<b>Manage new product trials</b>	<p>PC29. understand objective of trial production, trial product processing method and specification, select production team for trial, discuss with cross function team like planning, QA, maintenance etc, clarify roles and responsibilities and level of authority to the team and cross function</p> <p>PC30. prepare technical production procedures considering all engineering and process parameters for new product trial, educate and train supervisors and operators on trial procedure</p> <p>PC31. identify and consider all possible hazards, prepare plan and procedures to prevent and control hazards, provide training to trial team to handle hazards</p> <p>PC32. prepare detailed trial production schedule to manage production process without overlapping/affecting with regular production, and considering availability of raw materials and packaging materials, machine availability and capability, man power availability and competency etc</p> <p>PC33. monitor trial production against plan to identify variances and factors that need to be adjusted to achieve product of required specification within the planned time</p> <p>PC34. document and evaluate trial production data and identify process/parameters to be modified/changed to achieve product of required specification</p> <p>PC35. prepare trial production report with recommendations on improvement opportunities, and share with cross function heads and relevant authorities for suggestion and consideration</p>
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. organisaition goals and policies</p> <p>KA2. business processes of the organisation</p>

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company / organization and its processes)	KA3. production management KA4. food regulatory system related to the process and products produced in the organisation KA5. resource management KA6. manpower modelling and handling KA7. code of business conduct
<b>B. Technical Knowledge</b>	The user/individual on the job needs to know and understand: KB1. risk analysis and risk management KB2. principles and methods of planning for regular and contingency situations KB3. methods to monitor and control operational plans to achieve objectives KB4. methods to communicate with people of varying nature and in different situations KB5. methods to identify and address difficulties and challenges KB6. production management and production process for products produced in the organisation KB7. process equipment design, capability, operation and maintenance KB8. process improvement tools and techniques KB9. methods to identify and assess current performance and identify improvement opportunities and proposals KB10. basic maintenance approaches and models KB11. methods to analyze process information KB12. statistical tools analyse process capability KB13. methods to measure effectiveness of production process and maintenance KB14. food regulatory systems like FSSAI KB15. GMP KB16. GHP KB17. HACCP KB18. QMS KB19. ISO KB20. OHSAS
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b> The user/ individual on the job needs to know and understand how to: SA1. note the information communicated SA2. note the raw materials used for production and the finished products produced SA3. note the readings of the process parameters and provide necessary information to fill the process chart SA4. note down observations (if any) related to the process SA5. write information documents to internal departments/ internal teams

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	SA6. note down the data for online ERP or as per applicability in the organization
	<b>Reading Skills</b>
	The user/individual on the job needs to know and understand how to:
	SA7. read and interpret the process required for producing various types of products
	SA8. read and interpret and process flowchart for all products produced
	SA9. read equipment manuals and process documents to understand the equipments operation and process requirement
	SA10. read internal information documents sent by internal teams
	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/individual on the job needs to know and understand how to:
	SA11. discuss task lists, schedules and activities
	SA12. effectively communicate with team members
	SA13. question in order to understand the nature of the problem and to clarify queries
	SA14. attentively listen and comprehend the information given by the speaker
	SA15. communicate clearly on the issues being faced
<b>B. Professional Skills</b>	<b>Decision Making</b>
	The user/individual on the job needs to know and understand how to:
	SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue
	SB2. handle issues in case the manager is not available (as per the authority matrix defined by the organization)
	<b>Plan and Organize</b>
	The user/individual on the job needs to know and understand how to:
	SB3. plan and organize the work order and jobs received
	SB4. organize raw materials and packaging materials required for all products
	SB5. plan and prioritize the work based on the instructions received
	SB6. plan to utilise time and equipment's effectively
	SB7. organize all process/ equipment manuals so as to access information easily
	SB8. support the manager in scheduling tasks for helper(s)
	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to:
	SB9. understand customer requirements and their priority and respond as per their needs
	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to:
	SB10. support manager in solving problems by detailing out problems
	SB11. discuss the possible solutions with the manager for problem solving
	<b>Analytical Thinking</b>



FIC/N9015

## Manage production optimization and cost efficiency

	The user/individual on the job needs to know and understand how to: SB12. apply domain information about maintenance processes and technical knowledge about tools and equipment
	<b>Critical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB13. use common sense and make judgments on day to day basis SB14. use reasoning skills to identify and resolve basic problems SB15. use intuition to detect any potential problems which could arise during operations SB16. use acquired knowledge of the process for identifying and handling issues



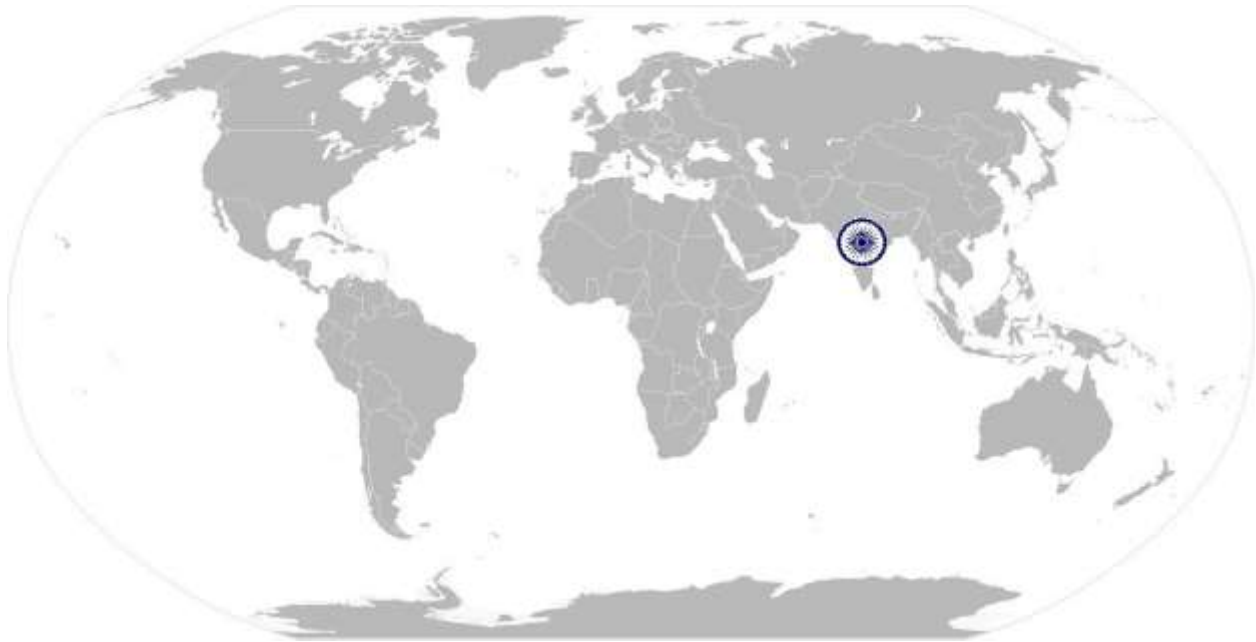
**FIC/N9015**
**Manage production optimization and cost efficiency**

## NOS Version Control

NOS Code	FIC/N9014		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	26/11/2015
Industry Sub-sector	Fruit and vegetable, Food grain milling (including oilseeds), Dairy products, Meat and Poultry, Fish & Sea food, Bread and Bakery, Alcoholic Beverages, Aerated water/soft drinks, Soya food, Packaged snacks, Packing and refrigeration	Last reviewed on	30/03/2016
Occupation	Processing	Next review date	30/03/2019

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# National Occupational Standard



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## Overview

This OS unit is about managing production optimization and cost efficiency by managing utilities and energy, optimizing production, implementing changes in production process and managing production within budget during production process in food processing unit.



**FIC/N9015**
**Manage production optimization and cost efficiency**

National Occupational Standard

<b>Unit Code</b>	<b>FIC/N9015</b>
<b>Unit Title (Task)</b>	<b>Manage production optimization and cost efficiency in food</b>
<b>Description</b>	This OS unit is about managing production optimization and cost efficiency, and managing production within budget in food processing unit
<b>Scope</b>	<ul style="list-style-type: none"> <li>Optimize production</li> <li>Manage utilities and energy for a production process</li> <li>Implement change in production process</li> <li>Manage production within budget</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Optimize production</b>	<p>PC1. review production reports and analyze equipment performance, process capability, change over time, maintenance, consumables, power etc, to identify factors that affect performance of production and recommend improvement opportunities</p> <p>PC2. compile performance data on process and equipment to identify cause for lack of performance, evaluate opportunities to improve, identify cost saving options, propose changes in process, and implement proposal with proper approvals</p> <p>PC3. review production process with supervisor and machine operators to identify reasons for slowdown or stop of production process, provide recommendations to overcome efficiency issues, take feedback, develop plans for implementing recommended changes, monitor changes implemented, and review changes and improvement</p>
<b>Manage utilities and energy for a production process</b>	<p>PC4. calculate utilities and energy usage in production area and for production process, identify methods to minimize usage</p> <p>PC5. develop plans and procedures to minimize use of utilities and energy without affecting the production efficiency</p> <p>PC6. identify energy and utility losses or sources of waste, analyze reason, recommend methods to improve efficient energy/utility application, ensure recommendations are implemented, and monitor improvement</p> <p>PC7. identify areas where utilities and energy can be saved, and Identify methods to save energy like recycling energy and utilities such as steam, heat and water, following proper maintenance methods to avoid leaks and losses etc, and prepare efficient production schedule such that target is met with efficient utilization of energy and utility</p> <p>PC8. analyze usage pattern of energy and other utilities in production area and</p>

**FIC/N9015**
**Manage production optimization and cost efficiency**

	process against budget allocation, identify cost effective options for minimizing wastage, and implement changes
<b>Implement change in production process</b>	<p>PC9. identify system, production process that need to be changed, identify opportunities for implementing change in production process, analyze impact of change on product quality, impact on the team and present production process</p> <p>PC10. communicate with relevant authorities/superiors the need for change, results and benefits expected out of change</p> <p>PC11. design new processes, procedures, systems, structures with roles and responsibilities, key performance indicators, training needs, safety system, contingency plans, monitoring and reporting system to implement planned changes in production process</p> <p>PC12. provide training and support to implement changes, develop a strategy to help teams implement change</p> <p>PC13. monitor changes implemented in production process and ensure changes are effective and meet the organisation and regulatory requirements</p> <p>PC14. document and communicate the progress achieved through implemented change to the management and everyone involved, and make them understand and enjoy achievement</p> <p>PC15. recognize and reward employees and teams for implementing change in production system and achieving better efficiency</p>
<b>Manage production within budget</b>	<p>PC16. manage budget efficiently by managing production with available resource, by avoiding overtime and too many casual workers/helpers</p> <p>PC17. plan effectively to secure, confirm and allocate required manpower to meet production target within budget, monitor resource utilization, to achieve production target within existing resource</p> <p>PC18. identify situations where actual budget exceeds the approved budget, investigate reason for variance and take appropriate corrective action to keep budget under control</p> <p>PC19. identify the impact on budget of production-related decisions like scheduling holidays, adjusting production volume, scheduling equipment maintenance etc, before scheduling production, and identify opportunities to improve performance against budget</p> <p>PC20. identify the causes for any significant variances in budget control, discuss with team and ensure prompt corrective action is taken to keep expenditure under control</p> <p>PC21. encourage team to think and identify ways of reducing expenditure, analyze and pursue the suggested ideas</p>

**FIC/N9015**
**Manage production optimization and cost efficiency**

<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: <ul style="list-style-type: none"> <li>KA1. organisaiton policies and goals</li> <li>KA2. principles and processes involved in business</li> <li>KA3. organization strategy, policies, proecedures and standards</li> <li>KA4. financial and accounting procedures of the organisation</li> <li>KA5. budget management</li> <li>KA6. code of business conduct</li> <li>KA7. manpower modelling and handling</li> </ul>
	<b>B. Technical Knowledge</b> <p>The user/individual on the job needs to know and understand:</p> <ul style="list-style-type: none"> <li>KB1. production management and production process for products produced in the organisation</li> <li>KB2. process equipment design, capability, operation and maintenance</li> <li>KB3. process improvement tools and techniques</li> <li>KB4. methods to identify and assess current performance and identify improvement opportunities and proposals</li> <li>KB5. methods to analyze process information</li> <li>KB6. statistical tools to analyse process capability</li> <li>KB7. methods to calculate energy usage and methods save energy</li> <li>KB8. analyzing process, procedures, policies and structure that need to be changed</li> <li>KB9. reason for implementing changes, risks and benefits expected out of changes planned and implemented</li> <li>KB10. methods to assess the benefits and risks associated with change</li> <li>KB11. methods to influence change process in the management</li> <li>KB12. accounting models to manage budget</li> <li>KB13. budgetary systems, methods to monitor, control and evaluate performance against budgets</li> <li>KB14. food regulatory system like FSSAI</li> <li>KB15. GMP</li> <li>KB16. GHP</li> <li>KB17. HACCP</li> <li>KB18. QMS</li> <li>KB19. ISO</li> <li>KB20. OHSAS</li> </ul>
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	The user/ individual on the job needs to know and understand how to: <ul style="list-style-type: none"> <li>SA1. note the information communicated</li> <li>SA2. note the raw materials used for production and the finished products produced</li> </ul>

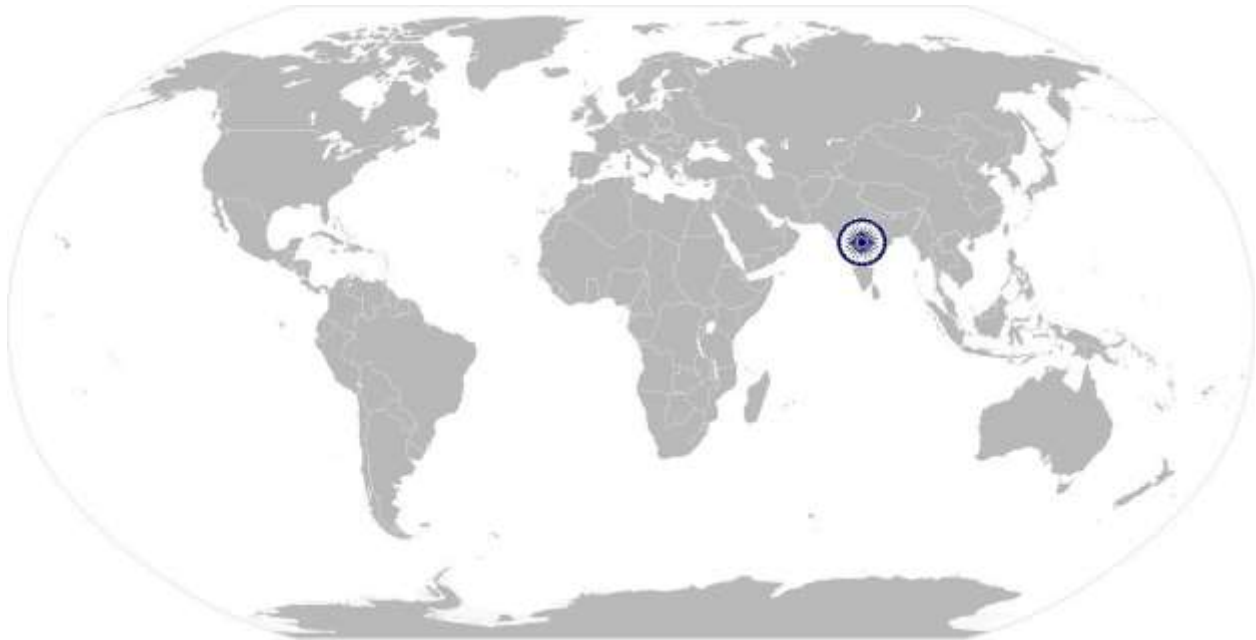
**FIC/N9015**
**Manage production optimization and cost efficiency**

	SA3. note the readings of the process parameters and provide necessary information to fill the process chart SA4. note down observations (if any) related to the process SA5. write information documents to internal departments/ internal teams SA6. note down the data for online ERP or as per applicability in the organization
	<b>Reading Skills</b>
	The user/individual on the job needs to know and understand how to: SA7. read and interpret the process required for producing various types of products SA8. read and interpret and process flowchart for all products produced SA9. read equipment manuals and process documents to understand the equipments operation and process requirement SA10. read internal information documents sent by internal teams
	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/individual on the job needs to know and understand how to: SA11. discuss task lists, schedules and activities SA12. effectively communicate with team members SA13. question in order to understand the nature of the problem and to clarify queries SA14. attentively listen and comprehend the information given by the speaker SA15. communicate clearly on the issues being faced
<b>B. Professional Skills</b>	<b>Decision Making</b>
	The user/individual on the job needs to know and understand how to: SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue SB2. handle issues in case the manager is not available (as per the authority matrix defined by the organization)
	<b>Plan and Organize</b>
	The user/individual on the job needs to know and understand how to: SB3. plan and organize the work order and jobs received SB4. organize raw materials and packaging materials required for all products SB5. plan and prioritize the work based on the instructions received SB6. plan to utilise time and equipment's effectively SB7. organize all process/ equipment manuals so as to access information easily SB8. support the manager in scheduling tasks for helper(s)
	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to: SB9. understand customer requirements and their priority and respond as per their needs
	<b>Problem Solving</b>

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## Manage production optimization and cost efficiency

	The user/individual on the job needs to know and understand how to: SB10. support manager in solving problems by detailing out problems SB11. discuss the possible solutions with the manager for problem solving
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB12. apply domain information about maintenance processes and technical knowledge about tools and equipment
	<b>Critical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB13. use common sense and make judgments on day to day basis SB14. use reasoning skills to identify and resolve basic problems SB15. use intuition to detect any potential problems which could arise during operations SB16. use acquired knowledge of the process for identifying and handling issues





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**Manage production optimization and cost efficiency**

## NOS Version Control

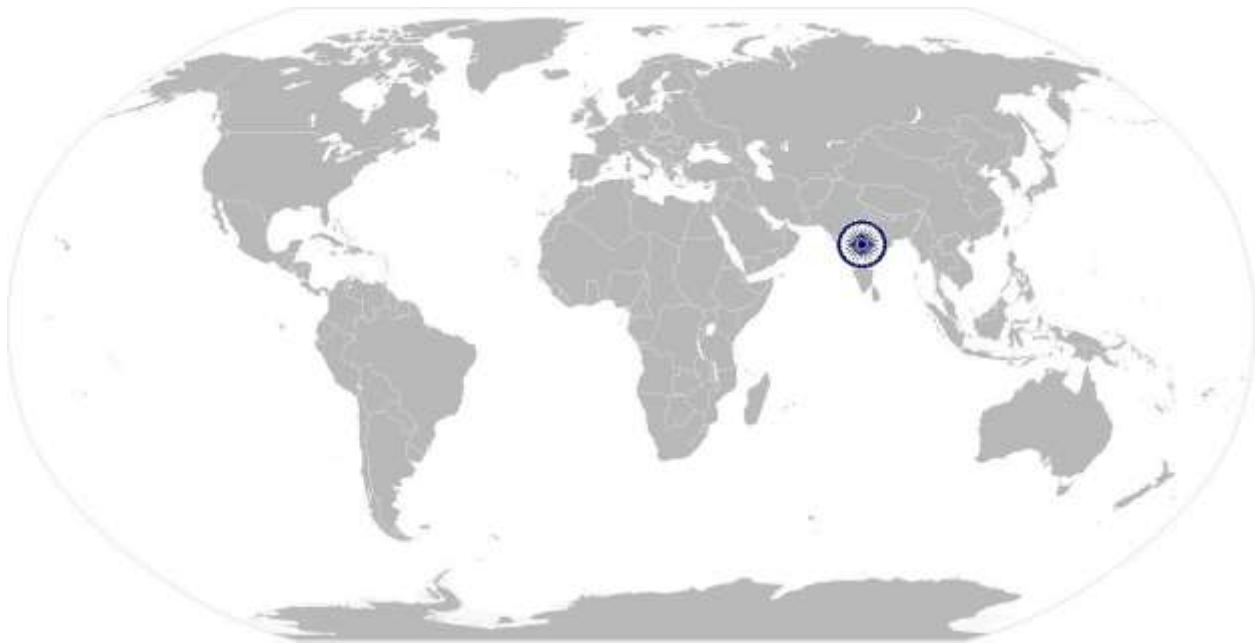
NOS Code	FIC/N9015		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	26/11/2015
Industry Sub-sector	Fruit and vegetable, Food grain milling (including oilseeds), Dairy products, Meat and Poultry, Fish & Sea food, Bread and Bakery, Alcoholic Beverages, Aerated water/soft drinks, Soya food, Packaged snacks, Packing and refrigeration	Last reviewed on	30/03/2016
Occupation	Processing	Next review date	30/03/2019

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FIC/N9016

Manage documentation system and implement safety and  
environmental policies

# National Occupational Standard



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## Overview

This OS unit is on managing documentation and implementing safety environmental policies in food processing units

**FIC/N9016**

## Manage documentation system and implement safety and environmental policies

National Occupational Standard

<b>Unit Code</b>	<b>FIC/N9016</b>
<b>Unit Title (Task)</b>	<b>Manage documentation system and implement safety and environmental policies in food processing unit</b>
<b>Description</b>	This OS unit is about managing documentation and implementing safety environmental policies in production process in food processing units
<b>Scope</b>	<ul style="list-style-type: none"> <li>Implement and monitor documentation system in production process</li> <li>Implement and monitor safety and environmental management policies and procedures</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Implement and monitor documentation system in production process</b>	<p>PC1. establish to production team the importance of documentation, provide training on documentation system, and ensure all documents are maintained systematically</p> <p>PC2. ensure all relevant records and documents are complete, up-to-date and accessible for audits on production process</p> <p>PC3. during audit provide the auditor with access to all relevant information, records and documents</p> <p>PC4. ensure corrective actions recommended and implemented are documented to assure production process is carried in accordance with organisation and regulatory standards</p> <p>PC5. establish methods to track production information from documented and maintained records</p>
<b>Implement and monitor safety and environmental management policies and procedures</b>	<p>PC6. establish to production team importance of safety and environment requirements related to food processing unit, communicate information about safety and environmental policies and related procedures to the team</p> <p>PC7. co-ordinate with quality team to prepare policies and sops on safety and environment requirements related to production function, and ensure those procedure are followed in production area and during production process</p> <p>PC8. ensure safe work procedures are followed in production area and during production process</p> <p>PC9. ensure policies and standard operating procedures on safety and environment requirements are accessible to all employees of production team, and are followed to meet the regulatory requirements</p> <p>PC10. identify safety and environmental hazards relevant to production processes, implement system to handle risks</p> <p>PC11. provide or organize training through relevant authorities on safety and environmental management system, to understand methods to control and</p>



**FIC/N9016**

**Manage documentation system and implement safety and environmental policies**

	<p>prevent hazards</p> <p>PC12. conduct inspections in work place on use of protective clothing and accessories, and to ensure safety system is followed during production process</p> <p>PC13. conduct audits and review records on safety and environmental system to monitor if control systems are followed by production team, and address non-compliance following organisation standards</p> <p>PC14. implement system on waste management in production area and process, monitor and confirm waste collection, treatment, recycling or disposal is carried out meeting industry requirements and environmental regulations</p> <p>PC15. respond to environmental management hazard identification and incidents in an appropriate and timely way</p> <p>PC16. review practice and procedures followed on safety, conduct risk assessments, identify non-compliance, and provide recommendations to address gaps and non-conformances</p> <p>PC17. review environmental records documents maintained, analyze data to evaluate effectiveness of the environmental management system and identify areas for improvement, plan and implement improvements to meet regulatory requirements</p>
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. organisaiton policies and goals</p> <p>KA2. documentation and records management system</p> <p>KA3. quality management system</p> <p>KA4. enviroment management system</p> <p>KA5. quality mark accreditations of the organisations</p> <p>KA6. audit procedures and audit requirements</p> <p>KA7. health and safety policy</p> <p>KA8. food safety system like FSSAI</p>
<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. importance and methods of ensuring records and documentation are complete and up-to-date</p> <p>KB2. methods of carrying out audits to meet and maintain industry standards and regulatory requirements</p> <p>KB3. methods to carry out audit with available documents and identifying any discrepancies</p> <p>KB4. methods and procedures to identify any discrepancies in system, possible risks to organization and employees</p> <p>KB5. methods to identify and analyze inherent problems with processes and procedures followed</p>

**FIC/N9016**

**Manage documentation system and implement safety and environmental policies**

	<p>KB6. regulations, guidelines and codes of practice related to health and safety, food safety, hygiene and sanitation (as per FSSAI)</p> <p>KB7. environmental standards</p> <p>KB8. methods to implement health and safety in food processing unit</p> <p>KB9. industry standards like GMP, GHP, HACCP</p> <p>KB10. types of hazards such as physical, chemical and biological hazards and methods to measures, control and prevent them</p> <p>KB11. methods to establish systems for monitoring, measuring and reporting on health and safety</p> <p>KB12. audit procedures to ensure food safety, hygiene and sanitation in the organization</p> <p>KB13. food regulatory system like FSSAI</p> <p>KB14. occupational Health and Safety Management Systems (OHSAS)</p>
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. write project reports</p> <p>SA2. write reports on production process, production efficiency</p> <p>SA3. write clear and concise report to management on functions of production process and proposals</p> <p>SA4. write information documents to internal department managers</p>
	<b>Reading Skills</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA5. read technical documents related to production process of the organization</p> <p>SA6. read and interpret equipment designs</p> <p>SA7. read legal and safety, environmental and regulatory documents pertaining to the organization</p> <p>SA8. read and understand internal information documents sent by cross function managers</p>
	<b>Oral Communication (Listening and Speaking skills)</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA9. communicate the organisation vision and values, policy and goals with enthusiasm and commitment to inspire the production team</p> <p>SA10. communicate clearly to the team on department goals/targets, and the needs and methods of planning and prioritizing</p> <p>SA11. communicate transparently and honestly on the intention and agenda to win the confidence of the employees</p> <p>SA12. demonstrate respect while communicating to the employees and while listening to others problems</p> <p>SA13. communicate confidently while sharing ideas and voicing difference of</p>

**FIC/N9016**

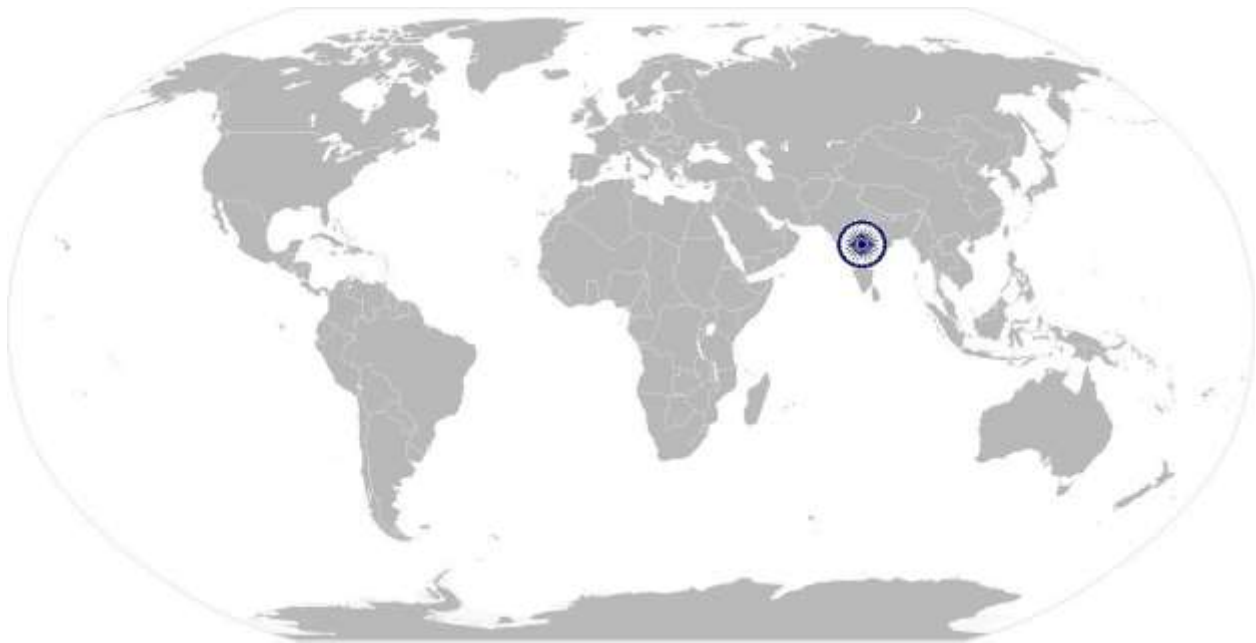
**Manage documentation system and implement safety and environmental policies**

	<p>opinion</p> <p>SA14. listen to issues related to the department, motivate people and provide ideas to resolve issues</p> <p>SA15. motivate and encourage team to provide feedback and constructive ideas</p> <p>SA16. respond to questions, provide feedback and encourage employees to come out with solution for problems and support new ideas</p> <p>SA17. listen attentively to the employees problems related to organisation, production process, department or conflicts between employees and resolve issues</p>
<b>B. Professional Skills</b>	<p><b>Planning and Organizing</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. plan operational model for implementing production management system in the organisation</p> <p>SB2. understand goals, objectives of the organisation and plan resources, allot responsibilities to complete on time and lead towards success</p> <p>SB3. plan realistic goals for employees to achieve production target of the organisation</p> <p>SB4. delegate authority, assign responsibilities, and provide direction to the achieve organisation and department goals</p> <p>SB5. plan, organize and lead team to work towards achieving department and organisation goals</p> <p><b>Judgment and Critical Thinking</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB6. use reasoning skills to make judgements on issues related to production process and management</p> <p>SB7. make judgements considering the constraints, values and polices of the organisation</p> <p>SB8. use acquired knowledge and experience to analyze, evaluate, compare, discuss, make judgements, infer and arrive at solutions to solve problems</p> <p><b>Take initiatives</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB9. take initiatives to provide training on prodcuton management to all employees of organisation</p> <p>SB10. take initiatives for promotions, growth and transfer of employees</p> <p>SB11. take initiatives to identify areas and ways to implement cost effective measures in the organisation</p> <p><b>Problem Solving and Decision making</b></p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. make clear, consistent, transparent decisions</p> <p>SB2. show integrity, fairness and consistency in decision-making</p>

**FIC/N9016**

**Manage documentation system and implement safety and environmental policies**

	<p>SB3. identify nature of problems, apply balanced approach to problems and decide on solutions</p> <p>SB4. combine, evaluate and reason with information and data to make decisions and solve problems</p> <p>SB5. distinguish relevant from irrelevant information and make timely decisions</p> <p>SB6. use logical reasoning to make decisions on relative importance of information and choosing the best solution</p>
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**FIC/N9016**

**Manage documentation system and implement safety and environmental policies**

## **NOS Version Control**

NOS Code	FIC/N9016		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	26/11/2015
Industry Sub-sector	Fruit and vegetable, Food grain milling (including oilseeds), Dairy products, Meat and Poultry, Fish & Sea food, Bread and Bakery, Alcoholic Beverages, Aerated water/soft drinks, Soya food, Packaged snacks, Packing and refrigeration	Last reviewed on	30/03/2016
Occupation	Processing	Next review date	30/03/2019

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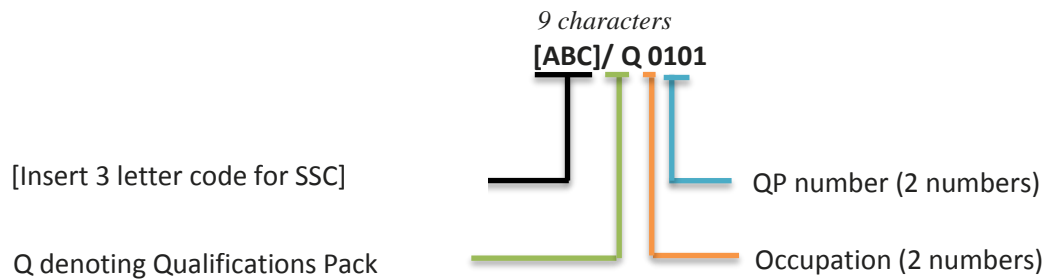


## Qualifications Pack for Production Manager

### Annexure

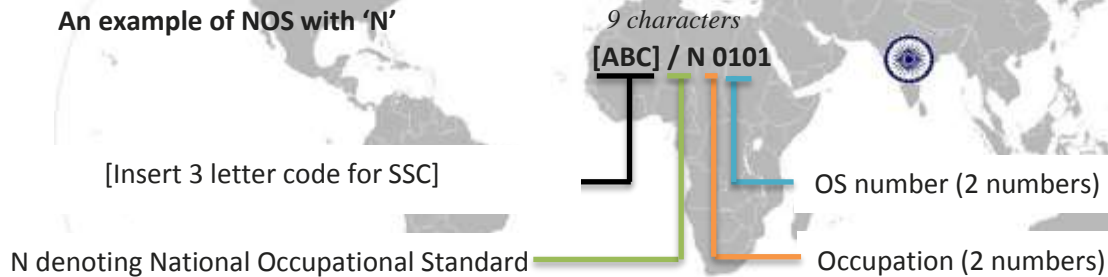
#### Nomenclature for QP and NOS

##### Qualifications Pack



##### Occupational Standard

###### An example of NOS with 'N'



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## Qualifications Pack for Production Manager

The following acronyms/codes have been used in the nomenclature above:

Sub-sector	Range of Occupation numbers
<b>Fruit and Vegetable</b>	<b>01 – 09</b>
<b>Food Grain Milling (including Oilseeds)</b>	<b>10 - 19</b>
<b>Dairy products</b>	<b>20 - 30</b>
<b>Meat and Poultry</b>	<b>30 – 40</b>
<b>Fish and Sea Food</b>	<b>40 - 49</b>
<b>Bread and Bakery</b>	<b>50 - 59</b>
<b>Alcoholic Beverages</b>	<b>60 - 69</b>
<b>Aerated water/ soft drinks</b>	
<b>Quality Analysis (involving physical and chemical lab analysis)</b>	<b>76 – 79</b>
<b>Packaging, Refrigeration and Procurement</b>	<b>70 – 75</b>
<b>Soya Food</b>	<b>80 – 84</b>
<b>Packaged Foods</b>	<b>85 - 90</b>
<b>Miscellaneous</b>	<b>90 - 95</b>

Sequence	Description	Example
<b>Three letters</b>	Industry name	FIC
<b>Slash</b>	/	/
<b>Next letter</b>	Whether QP or NOS	Q or N
<b>Next two numbers</b>	Occupation code	01
<b>Next two numbers</b>	OS number	01

## Assessment Criteria

### CRITERIA FOR ASSESSMENT OF TRAINEES

**Job Role** Production Manager

**Qualification Pack** FIC/Q9003

**Sector Skill Council** Food Processing

#### Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC
3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below)
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria
5. To pass the Qualification Pack, every trainee should score a minimum of 70% in every NOS
6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack

Assessment outcomes	Assessment criteria for outcomes	Marks Allocation			
		Total Marks	Out Of	Theory	Skills Practical
<b>1. FIC/N9014 (Manage production process in food processing unit)</b>	PC1. Communicate clearly the organisation policies and goals to the employees of production team, make them understand and commit their energy and expertise to achieve organisation goals	<b>100</b>	2.5	1	1.5
	PC2. Achieve department targets and organisation goals by understanding the organisation and employees, developing a leadership style and applying them appropriately		2.5	1	1.5
	PC3. Communicate with employees regularly and effectively, help them identify their strengths, provide support to overcome their weakness, listen to their grievances and provide appropriate solutions, and win		3	1	2



### Assessment Criteria

	their trust and support				
	PC4. Motivate and support employees to achieve their work and development objectives, and provide recognition when they are successful		2.5	1	1.5
	PC5. Encourage employees to take responsibilities, to take own decisions within agreed boundaries, to take lead in their own areas of expertise for their development		2.5	1	1.5
	PC6. Initiate personnel actions, such as promotions, transfers, discharges or disciplinary measures		3	1	2
	PC7. Lead production department and team successfully through difficulties and challenges		3	1	2
	PC8. Review the sales forecast for the week/month (or) monthly production plan discussed with plant manager (or) customer requirement (as applicable) and identify production priorities to meet market requirement		3	1	2
	PC9. Identify and confirm resource availability like raw materials, packing materials, equipment availability and capacity, production capacity, manpower requirement and availability, stock level, storage capacity, transport capacity etc		3	1	2
	PC10. Plan details of production in terms of output quantity and quality, cost, time and manpower requirements		3	1	2
	PC11. Analyze the consequences of failing to meet production/delivery timelines to meet the schedule, notifying relevant authorities of any possibility that demand cannot be met within required timeframe		3	1	2
	PC12. Develop production schedule to meet market demands/priorities and delivery timelines within budget and with available resources, consult production		3	1	2

### Assessment Criteria

	plan with inter department heads and production supervisor, instruct supervisor to allocate work to production team				
	PC13. Communicate the production schedule to cross function heads through communication system followed by the organisation like e-mail or upload in the erp system		2.5	1	1.5
	PC14. Identify and confirm equipment requirements to meet production target, share production schedule with equipment requirement to maintenance manager/supervisor for maintenance plan that aligns with production plan		2.5	1	1.5
	PC15. Co-ordinate with maintenance manager/supervisor to understand materials, consumables and manpower requirement and availability for maintenance activities, for uninterrupted production		3	1	2
	PC16. Understand equipment maintenance process and procedure and co-ordinate for maintenance activities during breakdown, emergency response, routine cleaning and servicing etc		2.5	1	1.5
	PC17. Analyze equipment maintenance data to interpret equipment performance and arrive at production capability of each process equipment		3	1	2
	PC18. Co-ordinate with maintenance team to ensure reliable equipment performance with minimal disruption to production, to minimize down time during equipment breakdowns, and to optimize equipment efficiency to achieve production target		3	1	2
	PC19. Lead and build team spirit between production and maintenance personnel through effective communication to enhance equipment performance and to identify production		2.5	1	1.5

### Assessment Criteria

	improvement opportunities				
	PC20. Ensure maintenance procedures followed meet food safety and environmental requirements		2.5	1	1.5
	PC21. Monitor production process for usage of raw materials, packaging materials, manpower, wastage against production plan and identify reason for variances against plan		3	1	2
	PC22. Address the reason for variation in achieving production schedule, production target within allocated budget		3	1	2
	PC23. Adjust production schedule in response to variables affecting achievement of production target		3	1	2
	PC24. Monitor production output and cost, adjust processes and resources to minimize cost and to achieve quantity and quality product		3	1	2
	PC25. Reschedule production plan in case of urgent requirement or any unforeseen event, to minimize wastage and to utilize materials/utilities and resources efficiently, discuss and negotiate changes with inter department team on time for their support and team work		3	1	2
	PC26. Review production schedule and process, consult /discuss with supervisor, team and cross function teams identify opportunities for improvement and develop recommendations for improvement on production process		3	1	2
	PC27. Set policies, plans and procedures, and take initiative to implement the identified improvement opportunities to control cost and to achieve better yield and quality		3	1	2

### Assessment Criteria

	PC28. Monitor, review and ensure production details are documented to meet the documentation requirements of the organisation, and to meet audit requirements like iso, haccp etc		3	1	2
	PC29. Understand objective of trial production, trial product processing method and specification, select production team for trial, discuss with cross function team like planning, qa, maintenance etc, clarify roles and responsibilities and level of authority to the team and cross function		3	1	2
	PC30. Prepare technical production procedures considering all engineering and process parameters for new product trial, educate and train supervisors and operators on trial procedure		3	1	2
	PC31. Identify and consider all possible hazards, prepare plan and procedures to prevent and control hazards, provide training to trial team to handle hazards		2.5	1	1.5
	PC32. Prepare detailed trial production schedule to manage production process without overlapping/affecting with regular production, and considering availability of raw materials and packaging materials, machine availability and capability, man power availability and competency etc		3	1	2
	PC33. Monitor trial production against plan to identify variances and factors that need to be adjusted to achieve product of required specification within the planned time		3	1	2
	PC34. Document and evaluate trial production data and identify process/parameters to be modified/changed to achieve product of required specification		3	1	2

### Assessment Criteria

	PC35. Prepare trial production report with recommendations on improvement opportunities, and share with cross function heads and relevant authorities for suggestion and consideration		3	1	2
			<b>100</b>	<b>35</b>	<b>65</b>
<b>2. FIC/N9015( Manage production optimization and cost efficiency in food processing unit)</b>	PC1. Review production reports and analyze equipment performance, process capability, change over time, maintenance, consumables, power etc, to identify factors that affect performance of production and recommend improvement opportunities	<b>100</b>	5	1	4
	PC2. Compile performance data on process and equipment to identify cause for lack of performance, evaluate opportunities to improve, identify cost saving options, propose changes in process, and implement proposal with proper approvals		4	1	3
	PC3. Review production process with supervisor and machine operators to identify reasons for slowdown or stop of production process, provide recommendations to overcome efficiency issues, take feedback, develop plans for implementing recommended changes, monitor changes implemented, and review changes and improvement		5	2	3
	PC4. Calculate utilities and energy usage in production area and for production process, identify methods to minimize usage		5	2	3
	PC5. Develop plans and procedures to minimize use of utilities and energy without affecting the production efficiency		5	2	3
	PC6. Identify energy and utility losses or sources of waste, analyze reason, recommend methods to improve efficient energy/utility application, ensure recommendations are		5	2	3

### Assessment Criteria

	implemented, and monitor improvement				
	PC7. Identify areas where utilities and energy can be saved, and identify methods to save energy like recycling energy and utilities such as steam, heat and water, following proper maintenance methods to avoid leaks and losses etc, and prepare efficient production schedule such that target is met with efficient utilization of energy and utility		5	2	3
	PC8. Analyze usage pattern of energy and other utilities in production area and process against budget allocation, identify cost effective options for minimizing wastage, and implement changes		5	2	3
	PC9. Identify system, production process that need to be changed, identify opportunities for implementing change in production process, analyze impact of change on product quality, impact on the team and present production process		5	2	3
	PC10. Communicate with relevant authorities/superiors the need for change, results and benefits expected out of change		4	1	3
	PC11. Design new processes, procedures, systems, structures with roles and responsibilities, key performance indicators, training needs, safety system, contingency plans, monitoring and reporting system to implement planned changes in production process		5	2	3
	PC12. Provide training and support to implement changes, develop a strategy to help teams implement change		4	1	3
	PC13. Monitor changes implemented in production process and ensure changes are effective and meet the organisation and regulatory requirements		5	1	4

### Assessment Criteria

	PC14. Document and communicate the progress achieved through implemented change to the management and everyone involved, and make them understand and enjoy achievement		5	2	3
	PC15. Recognize and reward employees and teams for implementing change in production system and achieving better efficiency		4	1	3
	PC16. Manage budget efficiently by managing production with available resource, by avoiding overtime and too many casual workers/helpers		5	2	3
	PC17. Plan effectively to secure, confirm and allocate required manpower to meet production target within budget, monitor resource utilization, to achieve production target within existing resource		5	2	3
	PC18. Identify situations where actual budget exceeds the approved budget, investigate reason for variance and take appropriate corrective action to keep budget under control		5	2	3
	PC19. Identify the impact on budget of production-related decisions like scheduling holidays, adjusting production volume, scheduling equipment maintenance etc, before scheduling production, and identify opportunities to improve performance against budget		5	2	3
	PC20. Identify the causes for any significant variances in budget control, discuss with team and ensure prompt corrective action is taken to keep expenditure under control		5	2	3
	PC21. Encourage team to think and identify ways of reducing expenditure, analyze and pursue the suggested ideas		4	1	3
			<b>100</b>	<b>35</b>	<b>65</b>

### Assessment Criteria

<b>3. FIC/N9016 (Manage documentation system and implement safety and environmental policies in food processing unit)</b>	PC1.	Establish to production team the importance of documentation, provide training on documentation system, and ensure all documents are maintained systematically		6	2	4
	PC2.	Ensure all relevant records and documents are complete, up-to-date and accessible for audits on production process		6	2	4
	PC3.	During audit provide the auditor with access to all relevant information, records and documents		6	3	3
	PC4.	Ensure corrective actions recommended and implemented are documented to assure production process is carried in accordance with organisation and regulatory standards		6	2	4
	PC5.	Establish methods to track production information from documented and maintained records		5	2	3
	PC6.	Establish to production team importance of safety and environment requirements related to food processing unit, communicate information about safety and environmental policies and related procedures to the team		6	2	4
	PC7.	Co-ordinate with quality team to prepare policies and sops on safety and environment requirements related to production function, and ensure those procedure are followed in production area and during production process		6	2	4
	PC8.	Ensure safe work procedures are followed in production area and during production process		6	2	4



### Assessment Criteria

	PC9. Ensure policies and standard operating procedures on safety and environment requirements are accessible to all employees of production team, and are followed to meet the regulatory requirements		5	2	3
	PC10. Identify safety and environmental hazards relevant to production processes, implement system to handle risks		6	2	4
	PC11. Provide or organize training through relevant authorities on safety and environmental management system, to understand methods to control and prevent hazards		6	2	4
	PC12. Conduct inspections in work place on use of protective clothing and accessories, and to ensure safety system is followed during production process		6	2	4
	PC13. Conduct audits and review records on safety and environmental system to monitor if control systems are followed by production team, and address non-compliance following organisation standards		6	2	4
	PC14. Implement system on waste management in production area and process, monitor and confirm waste collection, treatment, recycling or disposal is carried out meeting industry requirements and environmental regulations		6	2	4
	PC15. Respond to environmental management hazard identification and incidents in an appropriate and timely way		6	2	4
	PC16. Review practice and procedures followed on safety, conduct risk assessments, identify non-		6	2	4

### Assessment Criteria

	compliance, and provide recommendations to address gaps and non-conformances				
	PC17. Review environmental records documents maintained, analyze data to evaluate effectiveness of the environmental management system and identify areas for improvement, plan and implement improvements to meet regulatory requirements		6	2	4
			<b>100</b>	<b>35</b>	<b>65</b>