PERIYAR UNIVERSITY

Periyar Palkalai Nagar, Salem-636011
(Reaccredited with 'A' Grade by the NAAC)

SCHOOL OF PROFESSIONAL STUDIES

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

B.Voc. FOOD SCIENCE AND NUTRITION

[Choice Based Credit System (CBCS)]

OBE REGULATIONS AND SYLLABUS

(Effective from the academic year 2018-2019 and thereafter)

B.Voc. FOOD SCIENCE AND NUTRITION
REGULATIONS (2018-19 onwards)

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. The department has been sanctioned to offer B.Voc. Food Science and Nutrition programme from the academic year 2015 -16 with funding assistance from UGC (Rs.1.7 crores for both the Food Science and Nutrition and Textiles and Apparel Design Programmes) in alignment with NSQF curriculum framework. The department is aligned with qualification packs of Food Industry Capacity and Skill Initiative Sector Skill Council of National Skill Development Corporation for its curriculum structure and effective teaching learning process.

General Graduate Attributes

Every student graduated B.Voc., Food Science and Nutrition Degree will be

- An Industrial Expert - Purchase and Store, Processing, Quality Control and Assurance and Production of Food and Agricultural Commodities.
- An Innovator and Creator
- An Entrepreneur
- Socially and Personally Responsible
- An Individual with Positive and Flexible Attitude

Programme Specific Qualification Attributes

- **Knowledge and understanding** on Science and Handling of raw materials, methods of processing perishable, semi-perishable and non-perishable foods, food quality control and evaluation by applying FSSAI and ISO Standards, food packaging technology, food safety measures, rules, regulations, Act, quality assurance system for food production, food waste management, food business and trade operation, nutritional chemistry, nutrition in life and nutritional management of disease.
- **Analytical skill** on basic food science and chemistry, processing and preservation of perishable, semi-perishable and non-perishable foods, development of bakery products, food product development and marketing, checking the quality of food, nutritional assessments and diet Planning for an individual, IT-Applications in food industries, etc
- **Application skill** on handling and enterprising the nutritional conservation and balancing the available nutrients in food manufacturing system at the industry, institutional kitchens, school lunch programme, hospital catering and personalized diet, development of convenience foods, sago processing technology, minimally processed foods, etc
- **Scientific skills** on innovative food product development, designing business plan and quality assurance system for a product, identifying nutritional policy gap in the community and personalized nutrition
- **Job specific qualification skills** (NSDC QPs) on Purchase Assistant-Food and Agricultural Commodities, Plant Baker/Dairy Products Processor, Quality Assurance Manager/Chief Miller, Production Manager.

Vision

Inculcation of knowledge, productive learning, life and entrepreneurship skills and employability among the youth related to Food Science and Nutrition

Programme Objectives and Outcomes

Hence to inculcate the importance in developing Food and Nutritional Science among the budding Food Scientists, Nutritionists and Food Processing Industrialists, the B.Voc., *Food Science and Nutrition* programme is aimed with the following objectives and outcomes.

Programme Educational Objectives	Programme Outcomes	Programme Specific Objectives
Learners are trained to perform the duties and responsibilities of 1. Purchase Executive/ Purchase Assistant 2. Store Executive/ Store In Charge/ Store Assistant 3. Quality Assurance Manager 4. Food Microbiologist 5. Executive-Production / Line-In Charge (Raw material line, Pre-processing line, Processing line) 6. Packaging Line In-charge / Packaging Line Supervisor / Packaging Technician 7. Production Manager 8. Food Regulatory Affairs Manager 9. Plant Baker/ Craft Baker/Assistant Baker/ Plant Biscuit Production Specialist/Baking Technician/Operative (Oven Operator)/Mixing Technician (Dough Maker)/ Cake decorator/ Bread and Cake Slicer/ Slicing Machine Operator	The student is able to know, understand, apply, analyze, evaluate and create the relationship between food, technology, nutritional science and quality of life. **PO-01:** able to identify the methods of procuring, sorting, grading, safe storing of food raw materials **PO-02**: able to determine the processing and preservation techniques of different food groups and calculate the cost analysis on innovative nutritious products developed **PO-03:** able to generate quality assured, microbially safe, nutritionally secured production system for an end product with safe packaging technologies **PO-04:**able to solve the issues and problems prevailing in food trade and business operation, food waste management, Computer application in food industries **PO-05:** able to manage the diet of an individual through personalised nutritional care and able to identify the causes/determinants of nutritional deficiency disorders/metabolic disorders	**PSO-01:** Engineered to theoretical and practical aspects of the entire food chain from farm to fork. **PSO-02:** Gain insight into the food formulations, food quality testing and management of safe food production. **PSO-03:** Develop skills for various job roles related to Food Science and Technology division and entrepreneurship.

This programme is offered under Choice Based Credit system (CBCS). Students can earn more credits than the stipulated minimum of 180 credits, through Extra Credit Courses (includes courses under FoSTAC), Massive Open Online Courses (SWAYAM).

Candidate's eligibility for admission

Any candidate who 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. Vocational stream students are most preferred.

Duration of the course - Three years (120 days per semester includes 30 days of Apprenticeship)

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	- 72
Credits for Skill Component	- 108
Total credits	**- 180**

Part –B

Modular Training Delivery Plan (Extra) – 04	- 08
Total credits	**- 08**

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

Teaching methodologies

The **classroom teaching** would be through conventional lectures, video presentations and use of OHP and Powerpoint 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.

Modular Training Delivery Plan

Students should undergo one **Modular Training Delivery Plan** in each semester (II, IV and VI) in accordance with the curriculum as extra credit courses. Each course completion will fetch additional two credits for the students during their course of study.

S.No.	Title of MTDP	Semester	Duration (week)
1.	Milling Techniques/Sago Processing Techniques	II	5 days (40 hours)
2.	Minimal Processing of Fruits and vegetables/Meat Butchering Techniques	IV	5 days (40 hours)
3.	FoSTaC Basic Level (Manufacturing Sector)/HACCP Level 1	VI	5 days (40 hours)

CBCS- STRUCTURE OF THE PROGRAMME

The programme structure comprises two parts.

Course Component	No. of Courses	Hours of Learning	Marks	Credits
Part A (General Education Component)				
Language I – Tamil/Hindi	02	108	200	06
Language II – Functional English Practical	02	144	200	06
Core Courses	16	864	1600	41
Allied Courses	04	216	400	08
Elective Courses	04	216	400	09
Foundation/Value Education Courses	02	72	200	02
Online Courses	+03	+54	-	-
Modular Training Delivery Programme (MTD) (Extra Credit Courses)	+02	+80	100	4 (Extra)
FoSTaC Basic Level (Manufacturing Sector)/HACCP Level 1 (Extra Credit Courses)	+01	+40	50	2 (Extra)
Total	**30+06**	**1620+174**	**3150**	**72+6 (Extra)**
Part B (Skill Component)				
NSDC-QP	04	1512	400	72
Internship	06	1440	300	12
Portfolio	06	(in QP hour)	300	12

Mini Project	06	(in Apprenticeship hour)	300	12
Total	**22**	**2955**	**1300**	**108**

Scheme for Evaluation

Evaluation will be done on a continuous basis and will be evaluated five times during the course work. The first evaluation will be in the 4th week, the second in the 8th week, third in the 12th week, fourth week in the 18th week and the end – semester examination in the 20th week. The General Education Component is assessed by the University and Skill Education Component by the University and SSCs.

Extra-curricular Activities

The students have to participate in the following activities of the University Departments or outside the University (minimum of 10 hours in a semester) and it is mandatory that the students have to submit two participation/winner certificates in any one of the activities every year to the Department.

1. NSS/NCC/YRC camps and its competitions
2. Inter-institutional/Interdepartmental competitions
3. Personality Development programmes
4. Student Seminar
5. Placement training
6. Typewriting class
7. Language coaching class

Remedial Coaching

In order to improve the knowledge, skills and linguistic proficiency of students who need special attention, remedial coaching classes on

a. Basic laboratory techniques
b. Oral presentation skills
c. Notes taking and exam preparation techniques

is conducted for one hour in a week in rotation by all faculty in the Department as extra workload for teaching. The hour will be mentioned in the time table to motivate the students to attend the remedial classes.

Mentor-Mentee System

The students of Department of Food Science and Nutrition are supported by all faculties in the Department personally and professionally through mentor and mentee system under the umbrella of Youth Club. Faculties will guide the students on all aspects of Youth Club policies.

Both Mentor and Mentee will follow the guidelines of Youth Club. All students will become a member of the Youth Club, and can forecast their activities to build their general graduate attributes.

Grading System

Evaluation of performance of students is based on a 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, B.Sc. Food Technology and all its related disciplines awarded by any UGC recognized Universities and Institutions.

CURRICULAR FRAMEWORK OF B.Voc. PROGRAMME

SEM	PART	COURSE CODE	COURSE	HRS		CREDIT	MARKS		
				L/T	P		IA	EA	TOTAL
Semester I									
General Education Component									
I	I	18BFSNL01/ 18BFSNLH01	Part I -Tamil-I/ Hindi - I	3	-	3	25	75	100
	II	18BFSNE01	Part II – Functional English Practical - I	2	2	3	40	60	100
	III	18BFSNC01	Core I - Science & Handling of Raw Material	3	-	3	25	75	100
	III	18BFSNA01	Allied I – Food Science and Chemistry –I Practical	1	2	2	40	60	100
	IV	18BFSNV01	Val.Edu.I– Yoga and Fitness Practical	-	2	1	40	60	100

	IV	18BFSNOC01	Online Course - SWAYAM	1	-	-	-	-	-
	Skill Component								
	V	18BFSNSC01	QP - Purchase Assistant (Level – 4)	10	4	12	-	100	100
	VI	18BFSNAS01	QP - Purchase Assistant Internship	-	-	2	20	30	50
	VII	18BFSNPF01	QP - Purchase Assistant Portfolio	-	-	2	20	30	50
	VIII	18BFSNMP01	QP - Purchase Assistant Mini Project	-	-	2	20	30	50
					30	**30**			**750**
Semester II									
General Education Component									
II	I	18BFSNL02/ 18BFSNLH02	Part I- Tamil–II/ Hindi – II	3	-	3	25	75	100
	II	18BFSNE02	Part II – Functional English Practical -II	2	2	3	40	60	100
	III	18BFSNC02	Core II- Food Processing I (Technology of Cereals, Pulses, Oilseeds and Spices)	3	-	3	25	75	100
	III	18BFSNA02	Allied II – Food Science and Chemistry –II Practical	1	2	2	40	60	100
	IV	18BFSNV02	Val.Edu. II – Environmental Studies	1	-	1	25	75	100
	IV	18BFSNTC01	Milling Techniques/ Sago Processing Techniques	1	-	2 (Extra)	20	30	50
	Skill Component								
	V	18BFSNSC02	Plant Baker (Level – 5)	10	4	12	-	100	100
	VI	18BFSNAS02	Plant Baker	-	-	2	20	30	50

			Internship						
	VII	18BFSNPF02	Plant Baker Portfolio	-	-	2	20	30	50
	VIII	18BFSNMP02	Plant Baker Mini Project	-	-	2	20	30	50
					30	**30**			**800**
Semester III									
General Education Component									
III	III	18BFSNC03	Core III – Food Processing II (Technology of Fruits and Vegetables, Sugar and Salt)	3	-	3	25	75	100
	III	18BFSNC04	Core IV – Food Processing III (Technology of Milk, Egg and Fleshy Foods)	3	-	3	25	75	100
	III	18BFSNA03	Allied III – Food Product Development and Marketing – I Practical	1	2	2	40	60	100
	III	18BFSNC05	Core V – Food Processing and Preservation – I Practical	1	2	2	40	60	100
	III	18BFSNEL01	Elective I –Nutritional Chemistry	2	1	2	25	75	100
	IV	18BFSNOC02	Online Course - SWAYAM	1	-	-	-	-	-
	Skill Component								
	V	18BFSNSC03	Quality Assurance Manager (Level - 6)	10	4	12	-	-	-
	VI	18BFSNAS03	Quality Assurance Manager Internship I	-	-	2	20	30	50
	VII	18BFSNPF03	Quality Assurance Manager Portfolio I	-	-	2	20	30	50

	VIII	18BFSNMP03	Quality Assurance Manager Mini Project I	-	-	2	20	30	50
					30	**30**			**650**
Semester IV									
General Education Component									
IV	III	18BFSNC06	Core VI – Food Quality Control	3	-	3	25	75	100
	III	18BFSNC07	Core VII – Instrumentation and Process Control	3	-	3	25	75	100
	III	18BFSNA04	Allied IV – Food Product Development and Marketing II - Practical	1	2	2	40	60	100
	III	18BFSNC08	Core VIII - Food Processing and Preservation - II Practical	1	2	2	40	60	100
	III	18BFSNEL02	Elective II – Food for Life	2	1	2	25	75	100
	IV	18BFSNTC02	Minimal Processing of Fruits and Vegetables/Meat Butchering Techniques	1	-	2 (Extra)	20	30	50
	Skill Component								
	V	18BFSNSC03	Quality Assurance Manager (Level - 6)	10	4	12	-	100	100
	VI	18BFSNAS03	Quality Assurance Manager Internship II	-	-	2	20	30	50
	VII	18BFSNPF03	Quality Assurance Manager Portfolio II	-	-	2	20	30	50

	VIII	18BFSNMP03	Quality Assurance Manager Mini Project II	-	-	2	20	30	50
					30	**30**			**800**
Semester V									
General Education Component									
	III	18BFSNC09	Core IX – Food Microbiology	3	-	3	25	75	100
	III	18BFSNC10	Core X – Food Packaging Technology	3	-	3	25	75	100
	III	18BFSNC11	Core XI - Food Microbiology Practical	1	2	2	40	60	100
	III	18BFSNC12	Core XII - Food Quality Analysis Practical	1	2	2	40	60	100
	III	18BFSNEL03	Elective III – Food for Disease	2	1	2	25	75	100
V	IV	18BFSNOC03	Online Course - SWAYAM	1	-	-	-	-	-
	Skill Component								
	V	18BFSNSC04	Food Production Manager (Level – 7)	10	4	12	-	-	-
	VI	18BFSNAS04	Food Production Manager Internship I	-	-	2	20	30	50
	VII	18BFSNPF04	Food Production Manager Portfolio I	-	-	2	20	30	50
	VIII	18BFSNMP04	Food Production Manager Mini Project I	-	-	2	20	30	50
					30	**30**			**650**
Semester VI									
General Education Component									
VI	III	18BFSNC13	Core XIII–Food Industrial by-products and Waste Management	3	-	3	25	75	100

	III	18BFSNC14	Core XIV – Food Trade and Business Management	3	-	3	25	75	100
	III	18BFSNC15	Core XV –Nutrition Assessment and Diet Planning Practical	1	2	2	40	60	100
	III	18BFSNC16	Core XVI –IT Application in Food Industry Practical	1	2	2	40	60	100
	III	18BFSNEL04	Elective IV – Nutrition and Physical Fitness	2	1	2	25	75	100
	IV	18BFSNTC03	FoSTAC Basic level (Manufacturing Sector)/HACCP level 1	1	-	2 (Extra)	20	30	50
	Skill Component								
	V	18BFSNSC04	Food Production Manager (Level – 7)	10	4	12	-	100	100
	VI	18BFSNAS04	Food Production Production Manager Internship II	-	-	2	20	30	50
	VII	18BFSNPF04	Food Production Manager Portfolio II	-	-	2	20	30	50
	VIII	18BFSNMP04	Food Production Manager Mini Project II	-	-	2	20	30	50
					30	**30**			**800**
			TOTAL	**180 Hrs**		**180**			**4450 Marks**

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/MOOC / FoSTAC Basic level/MTD/HACCP
Part V - NSDC (National Skill Development Corporation) / Skill Based Subjects

Part VI – Internship
Part VII – Portfolio
Part VIII – Mini Project

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 & VI will be in the month of April/May.

Candidates failing in any subject (both theory, practical) will be permitted to appear for such failed subjects in the same syllabus structure at subsequent examinations within the next 5 years. Failing which, the candidate has to complete the course in the present existing syllabus structure. Level completion certificates will be issued only after completing the respective QPs.

Scheme for Evaluation and Attainment Rubrics

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 7^{th} week, the second in the 11^{th} week, third in the 16^{th} week and the end – semester examination in the 19^{th} week. Evaluation may be by objective type questions, short answers, essays or a combination of these, but the end semester examination is a University theory examination with prescribed question paper pattern.

Attainment Rubrics for Theory Courses (K1, K2, K3, K4, K5 and K6)

Internal*(Max. Marks- 25)*

- Activity documents on K3, K4 and K5 level in CO1, CO2, CO3, CO4 and CO5- 05 Marks
- Communication skill + ppt. upload – 05 Marks
- Internal Tests (K1 and K2) and Problem Solving Exercises (K3 and K4) - 10 (Each 5 Marks)
- Attendance - 05 marks

External *(Max. Marks- 75)*

Question Paper Pattern (Theory)

Section	Approaches	Mark Pattern	K Level	CO Coverage
A	One word (Answer all questions)	20X1 = 20 (Multiple Choice Questions)	K1, K2	CO1 – 20%, CO2 – 20%, CO3 – 20%, CO4 – 20 % and CO5 – 20%
B	100 to 200 words (Answer any three out of five questions)	3X5 = 15 (Analytical type questions)	K3, K4, K5, K6	CO1 – 20%, CO2 – 20%, CO3 – 20%, CO4 – 20 % and CO5 – 20%
C	500 to 1000 words	5X8 = 40 (Essay type questions)	K1, K2	CO1 – 20%, CO2 – 20%, CO3 – 20%, CO4 – 20 % and CO5 – 20%

Attainment Rubrics for Lab Courses (K3, K4 and K5)

Internal *(Max. Marks-40)*

- Good Laboratory Practices - 05 Marks
- Standard Operating Procedure for one Equipment - 10 Marks
- Performance Evaluation - 10 Marks
- Internal Tests – 10 (Best two out of three tests: Each 05 Marks)
  Internal test components are
  - Principle and Procedure (5 marks)
  - Conduct of experiment (5 marks)
  - Result Analysis (5 marks)
  - Viva- Voce (5 marks)
- Attendance - 05 marks

External*(Max. Marks- 60)*

External test components are

- Principle and Procedure (5 marks)
- Conduct of experiment (10 marks)
- Result Analysis (10 marks)
- Viva- Voce (5 marks)

Student can perform two experiments (Each 30 marks)

Attainment Rubrics for On-the-Job Training Courses/Skill Component-Internship/Portfolio/Mini Project

Internal *(Max. Marks-20)*

For Portfolio/Internship/Mini Project of NSDC QPs, the continuous assessment can be through

- Report Submission (20 marks)

External *(Max. Marks- 30)*

Evaluation criteria for external assessment by respective Sector Skill Council can be on the basis of

- Subject knowledge (Technical skills) - 30% (9 marks)
- Analytical skills- 30% (9 marks)
- Generic skills- 20% (6 marks)
  - Communication skill – 20% (6 marks)

SEMESTER I

SEMESTER I

பாடம்	மொழிப்பாடம் 1 - தமிழ் 1	**Programme Name**	இளநிலைத்தொழிற்கல்வி - உணவு அறிவியல் மற்றும் ஊட்டச்சத்துத்துறை
பாடக்குறியீடு	**18BFSNL01**	கல்வியாண்டு	2018
பாட வகை	Theory	பருவம்	முதல் பருவம்

OUTCOME BASED EDUCATIONAL DETAILS -COURSE WISE

COURSE OUTCOMES:

On completion of the course, the students will be able to	
CO1:	உணவு அறிமுகம்
CO2:	திடவுணவும் நீருணவும்
CO3:	உணவின் பண்பாடும் உண்ணும் முறையும்
CO4:	தமிழ் சமுதாயத்தில் உணவு
CO5:	உணவின் சிக்கல்களும் தீர்வுகளும்

Mapping of COs with POs, PSOs

COs / POs&PSOs	PEO	PO1	PO1	PO3	PO4	PO5	PSO1	PSO2	PSO3
CO1	1	2	2	2	2	2	2	2	2
CO2	1	2	2	2	2	2	2	2	2
CO3	2	2	2	2	2	2	2	2	2
CO4	2	2	2	2	2	2	2	2	2
CO5	2	2	2	2	2	2	2	2	2

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

அலகு.ஃதொகுதி	நோக்கம்	கற்பித்தல் நேரம்
உணவுவிளக்கம்	காலங்காலமாக நம் தமிழினம் கடைபிடித்த உணவு முறையினையும், தமிழர்களின் நிலங்களான ஐவகை நிலம் மற்றும் அதன் காலச்சூழலுக்கு ஏற்றவாறு மனிதர்கள் உணவை எடுத்துக்கொண்ட விதத்தைப் பற்றியும் இப்பாடத்தில் அறிகின்றனர்.	11
திடஉணவுப்பொருட்கள்	தானியங்கள் (நெல், தினை, சாமை, கம்பு, கேழ்வரகு, சோளம்) மூலம் கிடைக்கின்ற உணவு பதார்த்தங்களும், காய்கறிகள், கிழங்குகள் மற்றும் கீரைகள் மூலம் கிடைக்கின்ற உடல் ஆரோக்கியம் பற்றியும், அசைவ உணவுகள் (ஊர்வன, பறப்பன, நடப்பன, நீந்துவன) மூலம் கிடைக்கும் ஊட்டச்சத்துக்கள் பற்றி நன்கு அறிகின்றனர்.	11
உணவின் பண்பாடுமற்றும் உண்ணும் முறை	□உணவே மருந்து□ எனும் தாரக மந்திரத்தை மாணவர்கள் அழுத்தமாகப் பதியும் விதமாக நேரத்திற்கேற்றவாறு அளவாகப் புசித்தல், மனிதன் உண்கின்ற பண்பு குறித்து (உண்பன, தின்பன, குடிப்பன, கொரிப்பன) போதிப்பதன் மூலம் உணவின் மீதான நேசிப்பையும், பொறுப்புணர்ச்சியும் கற்றுக்கொள்கின்றனர்.	11
தமிழ் சமுதாயத்தில் உணவுமுறை	தமிழ்ச்சமூகத்தில் ஒரு சில உணவு குறிப்பிட்ட இனத்தாருக்கு அடையாளப்படுத்தப்பட்டாலும் அவ்வுணவின் தன்மையும் ஆராக்கியத்தையும் கற்பித்து, அத்தகைய உணவினை எவ்வாறு எச்சூழலில் பதுகாக்கப்படவேண்டும் என்பதை வலியுறுத்துவதன் மூலம் இப்பாடத்தின் மதிப்பினை மாணவர்கள் நன்கு உணர்ந்து கொள்கின்றனர்.	11

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating

Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive

Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

உணவின் சிக்கல்களும் தீர்வுகளும்	கால மாற்றத்தினால் உணவிலும் மாற்றம் சந்திக்கின்றது சமூகம். இதனால் □உணவே மருந்து□ என்ற நிலை, □மருந்தே உணவு□ என்றானது. இதன் விளைவு □உணவு□ என்பதை இப்பாட வாயிலாக மாணவர்களுக்குப் பதிய வைப்பதன் மூலமாக விழிப்புணர்வு பெறுகின்றனர்.	10

COURSE PLAN:

S. No.	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
	அலகு 1 உணவு அறிமுகம்				
1	உணவுஎன்றசொல் விளக்கம், பொருள் விளக்கம்	CO1	K2, F		
2	உணவும் தமிழரும்	CO1	K2, C		
3	நிலஅடிப்படையில் உணவுப்பொருட்கள் (குறிஞ்சி,முல்லை,மருதம்,நெய்தல்,பாலை)	CO1	K2, C	ஐவகை நிலங்களில் காணப்படும் உணவு வகைகளைச் சேகரித்து காட்சிப்படுத்துதல்	
	அலகு 2 திடவுணவும் நீருணவும்				
4	தாவரஉணவில் முதற்கூலம்,துணைகூலம்,	CO2	K2, C	தானியங்கள், இலைகள்,காய்கள்,கனிகள்,பழங்கள் மற்றும் அசைவஉணவுகளைகாட்சிப்படுத்துதல்;	K4, S3
5	கூலமில் உணவில் இலைகள்,காய்கள்,கனிகள் மற்றும் பழங்கள் போன்ற வகைகள்	CO2	K2, C		
6	தாவரமில் உணவில் விலங்குகள்,பறவைகள் போன்ற வகைகள்	CO2	K2, C		
7	ஊர்வனமீன்கள்,கணுக்காலிகள் போன்ற வகைகள்	CO2			
	அலகு 3 உணவின் பண்பாடும் உண்ணும் முறையும்				
8	உண்ணும் உணவின் அளவு	CO3	K2, C	காலை,நண்பகல் மற்றும் மாலைநேரத்திற்கானஉணவுகளைஅட்டவணைப்படுத்துதல்	K1, S1
9	உண்ணும் நேரம் (காலை,நண்பகல்,மாலை)	CO3	K2, C		
1	உணவுபண்பாட்டில் தமிழரின் விருந்தோம்பல் பண்பு	CO3	K2, C		
1	உண்ணுதலின் பண்பு - உண்பன,தின்பன,கொரிப்பன,பருகுவன ,நக்குவனபோன்றவை	CO3	K2, C		K4, S2
	அலகு 4 தமிழ் சமுதாயத்தில் உணவு				
1	தமிழர் சமுதாயத்தில் நிலைக்கேற்பஉணவுகள் பற்றியபதிவுகளில் செல்வர் உணவு,வறியவர் உணவு,	CO4	K2, C	நாகரீக உணவு பழக்கத்தால் ஏற்படும் அதிக பாதிப்புகள் குறித்து மக்களிடம் நேர்காணல் செய்து காணொளியாக சமர்ப்பித்தல்	K4, S1
1	பெண்டிர் உணவு,அந்தணர் உணவு,கைம்மைப் பெண்டிர் உணவு,வீரர் உணவு,விரதஉணவு	CO4	K2, C		
1	உணவுசேமிந்தநிலை,பக்குவம் செய்யும் முறை,உணவுவிற்றலின் நிலை	CO4	K2, C		
1	உணவுபற்றியநம்பிக்கை	CO4	K2, C		
	அலகு 5 உணவின் சிக்கல்களும் தீர்வுகளும்				
1	உணவினால் அறியப்படும் தொழில் முன்னேற்றம்	CO5	K5, C	நாம் உண்ணும் உணவினை எவ்வாறெல்லாம் பாதுகாக்கலாம் (காணொளியாக தயார் செய்க)	K5, S4

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating

Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive

Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

1	உணவு விதிகள், உணவுப் பொய்கள்	CO5	K2, C	நாம் உண்ணும் உணவு உருவான வரலாறு, காலப்போக்கினால் அடைந்த மாற்றம் அதன் பின் ஒளிந்திருக்கும் பொய்கள் மறைக்கப்பட்ட உண்மைகள் விவாதித்தல்	
1	தமிழர்கள் என்ன சாப்பிட்டார்கள்	CO5	K2, C		
1	விவசாயத்தில் பன்னாட்டு நிறுவனங்கள்	CO5			
2	உணவின் சிக்கல்களும் தீர்வுகளும்.	CO5			

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Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

Course Name	Part I - HINDI -I प्राचीन भारतीय खाद्य प्रणाऱी और चचकित्सा िि गणु	Programme Name	B.Voc Food Science and Nutrition
Course Code	18BFSNLHO1	Academic Year Introduced	2018 - 2019
Type of Course	Theory	Semester	I

Unit/Module Title	Intended Learning Outcomes	Learning Outcomes	Hours of Instruction L+Tu+Te=To
इाई – 1	छह प्रकाय के स्वाददष्ट- भीठा- "*Tutari*"- पर- कटहर- के रा- गन्ना-शहद- नभक- तीखे- कड़वा- कसरे- खट्टा- बोजन के सभहु [illegible] त से ननऩटने भें उनकी बहू भका है- स्वाददष्ट बोजन-फेस्वाददष्ट- सभम की ववकृत स्वाद- भहत्वनर्ण छह खननज /	Able to understand the history of food items from ancient India. Able to understand the different types of food materials consumed by Indians. Able to understand the effect of foreign foods in Indian food. Able to understand the influence of climatic factors in the food habits of India.	4+4+4=12
इाई – 2	दबु नमा के नाौि नतत्व - जर र्ेणरमां- वषा जर- कूण के नानी- नानी- नदी के	Able to understand various food habits of Indians, such as sweets, appetizer, liquid items, leafy materials, vegetables, flowers, fruits, meat from animals, birds, fishes, crabs etc.,	4+4+2=10

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

	ऩानी- गगा नदीकाऩानी- मभनना नदी का ऩानी- गोदावयी नदी का ऩानी- *tunkapattira* नदी का ऩानी- नभदा नदी का ऩानी- मसधु नदी - चित्रा नदी-कावेयी नदी का ऩानी- थामभयाफयानी नदी का ऩानी- नदी को गर्/		
ड़िई – 3	रोटस नर को ऩानी- झीर का ऩानी- जर- यॉक ऩानी- ड्डान ऩानी- पॉल्स ऩानी- रार ऩानी- वसत स्पप्रग ऩानी- कारा ऩानी- धान के ऩानी- के कड़ा गड्ढे ऩानी- भॉस ऩानी-नीने का ऩानी-नभकीन के ऩानी -सागय के ऩानी-	Able to understand the availability of different types of vegetables in various regions of India. Able to understand the consumption of different food items in morning, noon, evening and night times. Able to understand various modesof food consumption like the items used for eating, used as snacks, used as drinks, consumed by licking etc., Able to understand the food items consumed by poor, used tooffer food to God.	4+4+2=10

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

	को रो को ऩानी- ऩानी-नारयमर- नारयमर ऩानी के प्रकाय/ आफनस		
<u>इिाई – 4</u>	गभंण ऩानी के प्रकाय औय -दध को प्रकाय औय -दही के प्रकाय- छाछ के प्रकाय- भक्खन के प्रकाय – गर् दगर् घी के प्रकाय- गोफय के प्रकाय - गड़ के प्रकाय- भदयु ा श्रेर्ी के प्रकाय- िीनी के प्रकाय- मभचश्र के प्रकाय - शयाफ के प्रकाय - शहद के प्रकाय- औषधीम के गर् /	Able to understand the different types of food spoilage. Able to understand the believes related to food and their consumption. Able to understand the food items consumed by various people like rich, poor, female, bramins, widows, soldiers, during fasting etc., Understanding the status food in day-to-day life.	4+4+2=10
<u>इिाई –5</u>	खाद्म रड़ाई- खाद्म ननमभ-कृ वष के □ेत्र भें फहुयाष्रीम को ऩननमों को-मात्रत्रमों का बोजन- खाद्म झ - नतर्ो के प्रकाय औय उऩमोग	Able to understand the various methods of food storage and food processing to prevent food from its spoilage.	4+4+4=12
Total Hours of Instruction			54 (18*3)

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

Course Name	Part II -Functional English Priactical -I	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNE01**	**Academic Year Introduced**	2018-19
Type of Course	Practical	**Semester**	I

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Use the basic language skills and vocabulary skills
CO2	Utilize vocabulary better and clarify unfamiliar text
CO3	Handle a situation with critical thinking
CO4	Present an idea ussing mind maps

Mapping of Cos with Pos, PSOs

Cos / Pos& PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	2	2	2	2
CO2	3	2	2	2	2	2	2	2	2
CO3	3	2	2	2	2	2	2	2	2
CO4	3	2	2	2	2	2	2	2	2

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	**Objectives**	**Hours of Instruction Tu+P+Te=To**
Art of Listening	To understand the basics (LSRW) of Language skills	3+8+3=14
Art of Reading	To exemplify ones reading skills	3+8+3=14
Art of Speaking	To express onself in a more effective way	3+8+3=14
Art of Vocabulary	To enrich their vocabulary	3+8+3=14
Art of Writing	To pen down ideas and thoughts into words	3+10+3=16
Total Hours of Instruction		72 (18*4)

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

COURSE PLAN

Module/Experiment No.	**Intended learning Chapters**	**CO(s) Mapped**	**Cognitive Level / KD**	**Psychomotor domain activity**	**Psychomotor domain level**
UNIT – I Art of Listening					
a)	Basics of Listening	CO1	K3P	Listening to audios, videos with subtitiles	P1
b)	Active Listening	CO2	K3P	Listening to day to day conversations	P2
c)	Kinds of Listening	CO1	K4P	Listening to audio books	P1
d)	Factors that hamper listeining	CO3	K3P	Listening to news and intrepreting it	P3
e)	Listening Tips	CO3	K4 P	Listening to english songs and speech	P1
UNIT –II Art of Reading					

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

a)	Reading is a Cognitive process	CO1	K3 P	Reading newspaper, magazines short stories & scrolling messages	P1
b)	Benefits of reading	CO1	K4 P	Reading comprehension	P2
c)	Different Types of Reading	CO3	K4 P	Reading sub titles and elucidating the meaning	P2
d)	Tips for effective reading	CO2	K5 P	Reading fictions	P1
e)	The SQ3R Techniques	CO5	K4 P	Jumbled sentences Paraphrasing a paragraph / sample / data	P3
UNIT –III Art of Speaking					
a)	Importance of communication	CO1	K4 P	Explaining informations/process of recipie	P1
b)	Barriers of Communication	CO1	K4 P	Self introduction Speech on a given topic	P4
c)	Tips for effective communication	CO2	K4 P	Complete a open end story Dialogue writing	P5
d)	Tips for Powerful Presentatin	CO4	K5 P	Conversing to a group about a topic	P3
e)	Explaining / Justifying / Giving Reasons	CO5	K6 P	Narrate a book that you have read	P3
UNIT-IV Art of Vocabulary					
a)	Vocabulary Enrichment:Synonyms, Antonyms, Homphones	CO2	K3 P	Phrasal verbs Daily activity – 5 words with synonyms, antonyms	P1
b)	Spelling rules	CO2	K3 P	Exercise on Homophones and homonhyms	P1
c)	Idioms and phrases	CO3	K3 P	Idioms Tongue twisters	P2
d)	Common errors	CO3	K3 P	Exercise to check spelling rules Apps to listen the pronunciation of words	P2
UNIT –V Art of Writing					
a)	Note Making	CO4	K5 P	Exercise on note making Journal writing	P3
b)	Precis Writing	CO4	K5 P	Preci writing a paragraph	P3
c)	Pharagraph writing	CO5	K5 P	Writing a paragraph about a topic Hints development	P3
d)	Creative writing	CO5	K5 P	Story writing Note taking	P4

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2	Heasley, Ben, Lyons, Liz Hamp. 2008. Writing: A Course in Writing Skills for Academic Purpose. Cambridge University Press: Cambridge
3	Murcia, Marianne Celce, Donna M. Brinton, Janet M. Goodwin. 2004. Teaching Pronunciation. Cambridge University Press: Cambridge
4	Redston, Chris &Gillie Cunningham. 2005. Face 2 Face. Cambridge University Press: Cambridge

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

Course Name	Core I-Science and Handling of Raw Materials	**Programme Name**	B.Voc Food Science and Nutrition
Course Code	**18BFSNCO1**	**Academic Year Introduced**	2018 - 2019
Type of Course	Theory	**Semester**	I

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1:	Identify the food raw materials and assess the quality of goods
CO2:	Differentiate the uses and learn harvesting practices
CO3:	Describe the uses and assess production trend
CO4:	Interpret techniques for storage and transportation
CO5:	Distinguish the types and compare storage conditions and inspection.

Mapping of COs with POs, PSOs

COs /Pos &PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	3	2	3	3	3	3	3	3	3
CO2	3	2	3	3	3	3	3	3	3
CO3	3	2	3	3	3	3	3	3	3
CO4	3	2	3	3	3	3	3	3	3
CO5	3	2	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	**Objectives**	**Hours of Instruction L+Tu+Te=To**
Cereals, Pseudo cereals, Millets andPulses	To identify types, production, storage and uses	7+1+1=9
Fruits and Vegetables	To identify types and learn post harvesting practises	7+1+1=9
Nuts & Oilseeds	To compare and distinguish the production trends and harvestingpractises	7+1+1=9
Spices & Condiments	To identify the uses and learn production trends and harvestingpractices	6+1+1=8
Milk & Egg	To learn about the production, storage, uses and transportation	6+1+1=8
Fleshy Foods (Meat, poultry & Sea foods)	To identify the types and compare the storage techniques	7+1+3=11
Total Hours of Instruction		54 (18*3)

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

COURSE PLAN

Unit/Chapters	**Intended learning Outcomes**	**CO(s) Mapped**	**Cognitive Level/KD**	**Psychomotor domain activity**	**Psychomotor domain level**
UNIT I: Cereals, Pseudo cereals, Millets and Pulses					
1.	Production trend, Classification Distribution channels	CO1	K1,F	Identify the types and assess the household purchasing trend and diversity	K3,S2

2.	Domestic and Industrial use	CO1	K1,C	Demonstrate the uses of Cereals by creating pamphlets/charts	K3, S3
3.	Structure and Nutritive value andComposition	CO1	K2,C	Create a dummy model of grains and display their parts	K6, S3
4.	Storage structure and methods; Government initiatives for food storage; Requirements for safe storage	CO1	K2,C	Visit any Food Corporation of India – grain Storage Godown	K5, S5
UNIT II: Fruits and Vegetables					
5.	Production trend, Classification, Domestic and Industrial uses; Structure and Nutritivevalue	CO2	K1,C	• Collect and display different types of fruits and vegetables • Identify the nutritive value of fruits and vegetables	K4,S3
6.	Harvesting practices, tools and containers	CO2	K2,C	Create a Model of Different harvesting tools and containers	K6,S3
7.	Storage conditions, structures and methods/ techniques, Government initiatives for foodstorage	CO2	K2,C	Draw the Layout of Different Storage area of Fruits and Vegetables	K6,S3
8.	Transport mode and methods; Distribution channels	CO2	K2,C	• Collect Pictures representing different modes of transport of fruits andvegetables • Visit a Government Distribution Centre (Uzhavar Santhai)and Submit a report	K5,S5
9.	Batch inspection and Quality checking of distributed goods	CO2	K2,C	Inspect the quality of Raw Materials and submit a Quality Analysis report	K5,S3
UNIT III: Nuts & Oilseeds					
10.	Production trend; Types; Structure and Nutritive value; Domestic and Industrialuses	CO3	K2,P	Collect and Identify samples of different nuts and oilseeds and display their nutritive value	K2,S2
11.	Collection Techniques/ Harvesting methods	CO3	K2,P	Create a model of different harvesting tools and containers	K6,S3
12.	Storage condition, structures and methods/ techniques	CO3	K2,P	Draw the layout of different storage area of nuts and oilseeds	K6,S3
13.	Transport mode and methods Distribution channels	CO3	K2,P	Collect pictures representing different modes of transport of nuts and oilseeds	K4,S3
14.	Batch inspection and Quality checking of distributed goods	CO3	K4,MC	Inspect the quality of raw materials and submit a quality analysis report	K5,S3
UNIT IV: Spices & Condiments					

16.	Production trend; Structure and Nutritive value; Classification of Spices & Condiments	CO4	K2,C	Collect and Identify samples of different Spices and Condiments and display it with their nutritive value (Model Display)	K2,S3
17.	Harvesting techniques/methods	CO4	K2,C	Create a Model of Different harvesting tools and containers	K6,S3
18.	Domestic and Industrial uses	CO4	K2,C	Collect paper cuttings/journal articles/Newsletters regarding the benefits of different spices and condiments	K4,S4
19.	Storage condition, structures and methods/ techniques	CO4	K2,C	Draw the Layout of different storage methods for Spices and Condiments	K3,S3
20.	Government initiatives for food storage; Transport mode and methods; Distribution channels	CO4	K2,C	• Illustrate the transportation methods and storage techniques of spices • Visit a farm or plantation region of any spice and report their harvesting, preprocessing, transportation and storageof Spice or Condiments	K5,S5
21.	Batch inspection and quality checking of distributed goods	CO4	K5,MC	Inspect the quality of raw materials and submit a quality analysis report	K5,S3
UNIT V: Milk & Egg					
22.	Production trend; types; composition and nutritive value	CO5	K2,C	Create a model for different types of eggs and display it.	K6,S2
23.	Domestic and Industrial uses	CO5	K2,C	Collect paper cuttings/journal articles/Newsletters regarding the benefits of Milk and Eggs	K3,S3
24.	Storage condition, structures and methods/ techniques	CO5	K2,C	• Draw the layout of different storage methods of eggs • Visit a milk collection and storage center and submit a report	K3,S3 and S5
25.	Transport mode and methods; distribution channels	CO5	K2,C	Draw a flow chart about the distribution channel of eggs and milk	K3,S3
26.	Batch inspection and quality checking of distributed goods	CO5	K2,MC	• Demonstrate the quality of eggs using different quality assessmentcriteria • Demonstrate the adulteration test formilk	K5,S3
UNIT VI: Fleshy Foods (Meat, Poultry & Sea foods)					
27.	Production trends; types; domestic and industrial uses; batch inspection and quality checking of distributed goods	CO6	K2,C	Draw a graph/pie chart on the recent production trends on the fleshy foods inIndia	K3,S3

28.	Structure and composition; nutritive value; cuts and grades	CO6	K2,C	Create a model of different cuts of fleshy foods (Meat, Poultry and Sea Foods)	K6,S3
29.	Storage condition, structures and methods/ techniques; transport mode and methods;distribution channels	CO6	K2,C	Draw the layout of cold storage of fleshy foods	K3,S3

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TEXTBOOKS	
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2	Potter, Norman N., Hotchkiss, Joseph H, Food Science, 5th Edition, Springer Publication.
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2	Sumati Rajagopal Mudambi, Shalini M. Rao, M. V. Rajagopal. (2015), Food Science, New Age International (P) Limited, Publishers.
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4	Swaminathan, M. 1988. Hand book of Food Science and Experimental Foods. Bappco publishers, Bangalore.
5	Vijay, K. 2001. Text Book of Food Sciences and Technology. ICAR, New Delhi.
JOURNALS AND DOCUMENTS	
1	Journal of Food Science and Technology, AFSTI Publication
2	Annals. Food Science and Technology, Valahia University Press
3	Food Science and Human Wellness, Beijing Academy of Food Sciences
4	Journal of Food, Agriculture and Environment, WFL Publisher Ltd.

Course Name	Allied I - Food Science and Chemistry Practical I	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNA01**	**Academic Year Introduced**	2018 - 19
Type of Course	Practical	**Semester**	I

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1:	Recognize different types of food items available
CO2:	Demonstrate physical verification tests for foods
CO3:	Perform quality estimation tests and assess selection criteria

Mapping of COs with POs, PSOs

COs / POs& PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	1	2	3	3	3	3	3	3	3
CO2	1	2	3	3	3	3	3	3	3
CO3	1	2	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
CO1:	To identify the types of foods	3+12+3=18
CO2:	To assess purchasing trend and selection criteria	3+12+3=18
CO3:	To interpret the raw material quality	3+12+3=18
Total Hours of Instruction		54 (18*3)

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

COURSE PLAN

Module/ Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
MODULE I Cereals, Pseudo cereals, Millets and Pulses					
1.	Identifying the types of raw materials	CO1	K4, P	Create a chart displaying cereals, pseudo cereals and millets with its scientific, colloquial and English names	S3
2.	Assessment of household purchasing trend and diversity	CO2	K4, P	Examine the consumption pattern of food commodities in their household and distinguish it using a bar chart	S2
3.	Quality analysis of raw material under storage: a. Physical examinationfor infestation	CO3	K4, P	Develop a video demonstrating the quality verification tests for food samples	S4

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

	b. Storage condition assessment, Temperature andRelative Humidity				
MODULE II Fruits and Vegetables					
4.	Assessment of household diversity in consumption of fruits and vegetables	CO2	K4, P	Examine the consumption pattern of food commodities in their household and distinguish it using a pie diagram	S2
5.	Identification of the types of fruits and vegetables	CO1	K4, P	Collect pictures of rarely available fruits and vegetables in our state and give a note on it	S1
6.	Maturity index determination	CO3	K4, P	Visit a nearby market and assess the reason for wastage of fruits and vegetables	S3
7.	Physical selection criteria for fresh fruits and vegetables	CO3	K4, P	Develop a video content interpreting selection criteria of fruits and vegetables	S3
MODULE III Nuts and Oilseeds					
8.	Assessment of household diversity in consumption of nuts and oilseeds	CO2	K4, P	Examine the consumption pattern of food commodities in their household and distinguish it using a graph	S2
9.	Quality checking of raw materials – Physical verification	CO3	K4, P	Prepare a document stating the advantages of using nuts and oilseeds in our diet	S1
MODULE IV Spices and Condiments					
10.	Assessment of household diversity in consumption of spices and condiments	CO2	K4, P	Examine the consumption pattern of food commodities in their household and distinguish it using a diagram	S2
11.	Quality checking of raw materials - Physical verification	CO3	K4, P	Collect and compile data on the usage of spices in our diet.	S2
MODULE V Milk and Egg					
12.	Determination of density and soluble solids in milk	CO3	K4, P	Visit nearby milk collecting booth and collect data on the quality estimation of milk	S2
13.	Assessment of household diversity in consumption of milk and egg	CO2	K4, P	Examine the consumption pattern of food commodities in households	S2
14.	Egg quality evaluation	CO3	K4, P	Visit a poultry farm and reproduce data on the quality estimation of	S2

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

				eggs	
MODULE VI Fleshy foods					
15.	Assessment of household diversity in consumption of fleshy foods	CO2	K4, P	Examine the consumption pattern of food commodities in households and distinguish it	S2
16.	Identification of types of meat	CO1	K4, P	Collect different varieties of meat and identify ways to distinguish it	S3
17.	Selection criteria of fleshy foods	CO3	K4, P	Demonstrate the selection criteria techniques for fleshy foods	S2

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2	Colin Wrigley, ian Batey, Diane Miskelly, (2017), Cereal grains: Assessing and Managing Quality, 2nd Edition, Woodhead Publishing, USA.
REFERENCE BOOKS	
1	Connie M.Weaver and James R Daniel (2017), The food chemistry laboratory: a manual for experimental foods, dietetics and food scientist, 2nd edition.
2	Ashim Kumar Biswas, Prabhat mandal, (2019), Meat Quality Analysis, 1st Edition, Academic Press.
3	Ronald Watson, Victor Preed, (2016), Fruits, Vegetables and Herbs, 1st Edition, Academic Press.
JOURNALS AND DOCUMENTS	
1	www.fao.org

Course Name	Val. Edu.I-Yoga and Fitness - Practical	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNV01**	**Academic Year Introduced**	2018 - 19
Type of Course	Practical	**Semester**	I

COURSE OUTCOMES:

On completion of the course, the students will be able to	
CO1:	Improve their concentration and breathing
CO2:	Integrate the moral values and ethics in their life
CO3:	Enhance the academic andco-curricular activities, heightened awareness and balanced attitude for social activities

Mapping of COs with POs, PSOs

COs / Pos& PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	1	2	2	2	2	2	2	2	**2**
CO2	1	2	2	2	2	2	2	2	2
CO3	1	2	2	2	2	2	2	2	2
CO4	1	2	2	2	2	2	2	2	2
CO5	1	2	2	2	2	2	2	2	2

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

S.No.	**Unit/Module**	**Objectives**	**Hours of Instruction L+Tu+Te= To**
1.	Unit – IStanding postures ofyoga	• Perform the different postures of yoga • Imbibe yoga work out lifestyle as a adjunct of Good health and Wellness	2+2+2=6
2.	Unit-II Sitting postures of yoga		2+2+2=6
3.	Unit-III Prone postures of yoga		2+2+2=6
4.	Unit-IV Supine postures of yoga		2+2+2=6
5.	Unit-V Breathing Exercises and Kiriyas		2+2+2=6
6.	Unit-VI Dharana and Meditation		2+2+2=6
Total Hours of Instruction			36(18*2)

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

OUTCOME BASED EDUCATIONAL ACTIVITIES FOR THEORY:

S.No.	**Name of the Activity**	**CO(s) Mapped**	**Cognitive Level / KD**	**Psychomotor domain activity**	**Psychomotor domain level**
Unit – I Standing Postures of yoga					
1.	Tadasana (Mountain Pose)	CO1,CO2, CO3	K3,P	1. Demonstration andpractise 2. Watch video	S1, S2,S3
2.	Arthakatti Chakrasana				
3.	Virabhadrasana III (Warrior III)				
4.	Padhakasthasana				
5.	Artha Chakrasana				

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

6.	Thirikonasana			prsentation	
7.	Parivirutha Thirikonasana				
8.	Ukattasana				
Unit-II Sitting Postures of Yoga					
1.	Vajrasana	CO1,CO2, CO3	K3,P	1. Demonstration andpractise 2. Watch video prsentation	S1, S2,S3
2.	Sasangasana				
3.	Pachimottanasaana				
4.	Baddhakonasana				
5.	Artha padmasana				
6.	Padmasana				
Unit-III Prone Postures of Yoga					
1	Maharasana	CO1,CO2, CO3	K3,P	1. Demonstration andpractise 2. Watch video presentation	S1, S2,S3
2	Dhanurasana				
3	Pujangasana				
4	Salabasana				
Unit-IV Supine Postures of Yoga					
1	Sethubanadasan	CO1,CO2, CO3	K3,P	1. Demonstration andpractise 2. Watch video presentation	S1, S2,S3
2	Sarvangasana				
3	Pavanamuktasan				
4	Halasana				
5	Matsyasana				
6	IRT				
7	QRT				
8	DRT				
9	Savasana				
Unit-V Breathing Exercises and Kiriyas					
1	Tiger Breathing	CO1,CO2,C03	K3,P	1. Demonstration andpractise 2. Watch video presentation	S1, S2,S3
2	Rabid Breathing				
3	Dog Breathing				
4	Nadi Suthi				
5	Kapabathi				
6	Basthirika				
7	OMM Chanding (AAA, UUUU, MMMM)				
Unit-VI Dharana and Meditation					
1	Yama niyama	CO1,CO2,C03	K3,K4,K5	1. Demonstration andpractise 2. Watch video presentation	S1, S2,S3
2	Dharana				
3	Dhiyana (Meditation)				

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2	Yoga Nidra (The Meditative Heart Of yoga), by ,Richard Miller, Published on November 30th 2005 by Sounds True Inc (first published November 28th 2005)
3	Medical Therapeutic Yoga, Biopsychosocial rehabilitation and wellness care, Ginger GARNER,
4	Yoga Therapy: A Guide to the Therapeutic Use of Yoga and Ayurveda for Health and Fitness – December 14, 2004, by A.G. Mohan (Author), Indra Mohan (Author), Ganesh Mohan (Author), Nitya Mohan (Author)
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2	Yadav Yogacharya Hansraj, „Yoga for Students', Bombay: Vhora & Co. Publishers, 1973.

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

4	PRINCIPLES AND METHODS OF YOGA THERAPY (Compilation), January 2007, Publisher: Dhivyananda Creations, Authors Ananda Balayogi Bhavanani
JOURNALS	
1	Broan, R.P,., et.al., "Sudarshan Kriya Yogic Breathing in the Treatment of Stress", Jounal of Alternative and Complement Medicine, 11.4 (2005): 711-7.
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3	Gajjar, Nilesh "Effect of Yoga Exercises on Achievement, Memory and Reasoning Ability", International Journal for Research in Education, December: 2012, 1:1, 34-53.

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

Course Name	Purchase Assistant -Mini Project	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNMP01**	**Academic Year Introduced**	2018 - 19
Type of Course	Mini Project	**Semester**	I

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1:	Procure and store the Raw materials as per the industry needs
CO2:	Design the storage area as per the industry norms

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Super Market	Analysis of raw materials procurement and storage techniques in the Super Market.	9
Hyper Market	Analysis of raw materials procurement and storage techniques in the Hyper Market	9
Mom and pop store	Analysis of raw materials procurement and storage techniques in the Mom and Pop store	9
Food Industry	Analysis of raw materials procurement and storage techniques in the Food Industry	9
Total Hours of Instruction		36(18*2)

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

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
MODULE I – Super Market					
1.	Analysis of Purchasing Techniques of Raw materials	CO1	K5 P	Direct visit to supermarket & Interview with authorities and prepare a report.	K4, K5
2.	Assess the Storage area and Explore Storage Techniques	CO2	K5 P		K4, K5
MODULE II – Hyper market					
1.	Analysis of Purchasing Techniques of Raw materials	CO1	K5 P	ect visit to Hypermarket & Interview with authorities and prepare a report.	K4, K5
2.	Assess the Storage area and Explore	CO2	K5 P		K4, K5

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

	Storage Techniques				
MODULE III – Mom and Pop Store					
1.	Analysis of Purchasing Techniques of Raw materials	CO1	K5 P	Direct visit to Mom-and-Pop Store & Interview with authorities and prepare a report.	K4, K5
2.	Assess the Storage area and Explore Storage Techniques	CO2	K5 P		K4, K5
MODULE III – Food Industry					
1.	Analysis of Purchasing Techniques of Raw materials	CO1	K5 P	Direct visit to a food industry & Interview with authorities and prepare a report.	K4, K5
2.	Assess the Storage area and Explore Storage Techniques	CO2	K5 P		K4, K5

REFERENCES

E. Learning Resources	
1	https://elearning.ficsi.in/s/store

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

Course Name	Purchase Assistant - Port folio	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNPF01**	**Academic Year Introduced**	2018 - 19
Type of Course	Practical	**Semester**	I

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1:	Compare and select the best quality of the raw materials for food processing industries
CO2:	Identify the vendors to procure the cheap and best quality raw materials for food processing Industries

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial										

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Perishable Foods	• To identify and purchase the best quality of food items • To select suitable vendors to procure the raw materials. • To determine the selection criteria for all the raw materials • To assess the production and procurement procedures for all raw materials	12
Semi-Perishable Foods		14
Non-Perishable Foods		12
Processed foods		16
Total Hours of Instruction		54 (18*3)

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

COURSE PLAN

Module/ Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
MODULE I -PERISHABLE ITEMS					
1.	Conductingmarket survey for the availability of raw materials	CO1	K6 P	Prepare a template for market survey Conduct market survey at different geographical location on the availability of perishable food items	S3, S5
2.	Identify the procurement procedures	CO2	K5 P	Visit a market place near-by and collect the procedures followed for receiving quotation and preparing the comparative quotation for procuring raw materials	S5, S3
3.	Assess the selection criteria for each raw	CO1	K4 P	Prepare a chart depicting the good and bad quality of raw	S3, S5

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

	material			materials	
MODULE II SEMI – PERISHABLE ITEMS					
4.	Conducting market survey for the availability of raw materials	CO1	K6 P	Prepare a template for market survey Conduct market survey at different geographical location on the availability of semi-perishable food items	S3, S5
5.	Identify the procurement procedures	CO2	K5 P	Visit a market place near-by and collect the procedures followed for receiving quotation and preparing the comparative quotation for procuring raw materials	S5, S3
6.	Assess the selection criteria for each raw material	CO1	K4 P	Prepare a chart depicting the good and bad quality of raw materials	S3, S5
MODULE III - NON – PERISHABLE ITEMS					
7.	Conducting market survey for the availability of raw materials	CO1	K6 P	Prepare a template for market survey Conduct market survey at different geographical location on the availability of non-perishable food items	S3, S5
8.	Identify the procurement procedures	CO2	K5 P	Visit a market place near-by and collect the procedures followed for receiving quotation and preparing the comparative quotation for procuring raw materials	S5, S3
9.	Assess the selection criteria for each raw material	CO1	K4 P	Prepare a chart depicting the good and bad quality of raw materials	S3, S5
MODULE III – PROCESSED FOODS					
10.	Conducting market survey for the availability of raw materials	CO1	K6 P	Prepare a template for market survey Conduct market survey at different geographical location on the availability of processed foods	S3, S5
11.	Identify the procurement procedures	CO2	K5 P	Visit a market place near-by and collect the procedures followed for receiving quotation and preparing the comparative quotation for procuring processed foods	S5, S3
12.	Assess the selection criteria for each raw material	CO1	K4 P	Collect samples of fresh and spoiled processed foods and exhibit	S3, S5

REFERENCES

E. Learning Resources	
1	https://elearning.ficsi.in/s/store

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

Contents

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

Qualifications Pack Code	**FIC/Q7005**		
Job Role	**Purchase Assistant – Food and Agricultural Commodities**		
Credits (NSQF)	**TBD**	**Version number**	**1.0**
Sector	**Food Processing**	**Drafted on**	**23/08/2015**
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**

Job Role	**Purchase Assistant – Food and Agricultural Commodities**
Role Description	A Purchase Assistant – Food and Agricultural Commodities handles purchase of food and agricultural commodities as per organization specifications and standards.
NSQF level **Minimum Educational Qualifications** **Maximum Educational Qualifications**	Level 4 Class 12 Not applicable
Training (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)
Minimum Job Entry Age	18 years
Experience	2-3 years experience in handling purchase of food and agricultural commodities
Applicable National Occupational Standards (NOS)	**Compulsory:** 1. FIC/N7013 Handle purchase requisitions 2. FIC/N7014 Raising and process purchase order and inventory management 3. FIC/N7015 Complete documentation and record keeping of purchases and inventory 4.FIC/N9001 Food safety, hygiene and sanitation for processing food products **Optional:** N.A.
Performance Criteria	As described in the relevant OS units

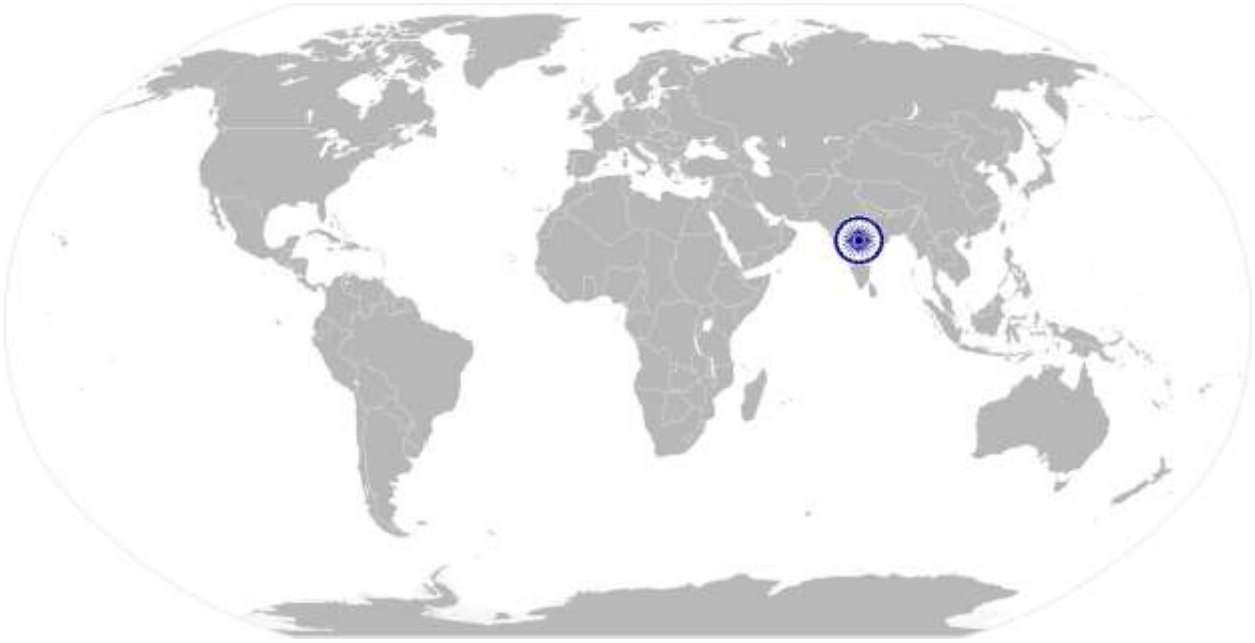
Definitions

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
QMS	Quality Management System

National Occupational Standard



Overview

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

National Occupational Standard

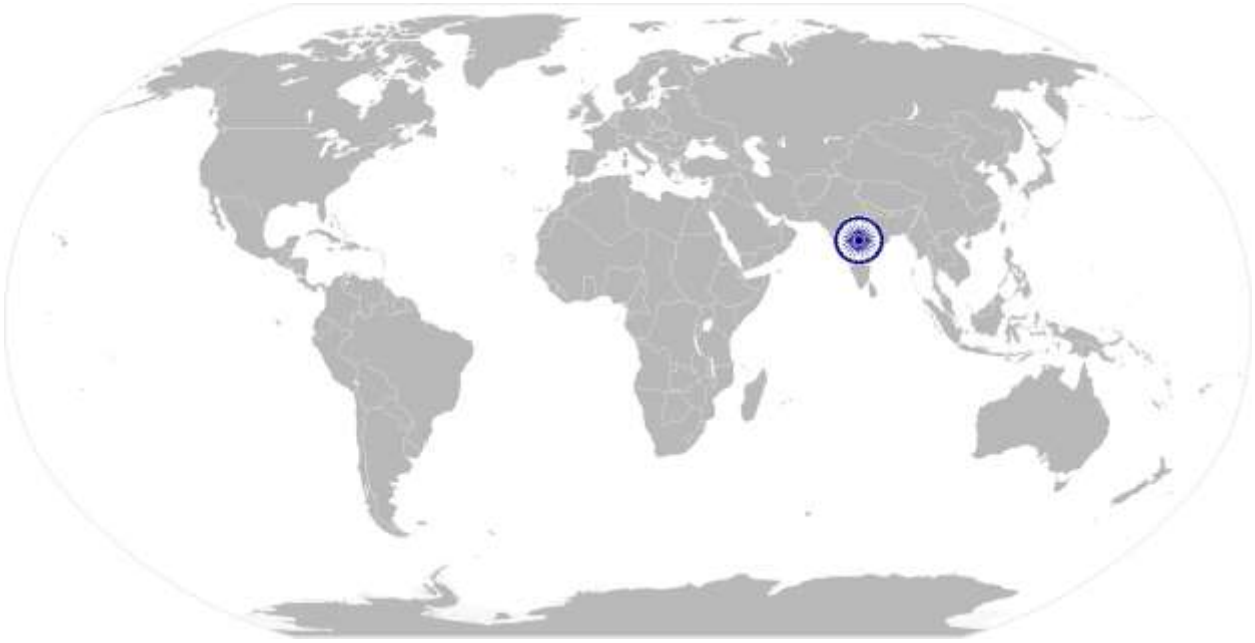
Unit Code	FIC/N7013
Unit Title (Task)	Handle purchase requisitions.
Description	This OS unit is about handling purchase requisitions obtained from various departments of the food processing unit.
Scope	This unit/task covers the following: • Prepare for raising the purchase order

Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Preparefor raising the purchase order	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

Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / 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 organisation KA2. types of products produced by the organisation KA3. code of business conduct 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. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. organisation work structure, various departments and its activity KB2. organisation approved materials KB3. purchase process KB4. organisation standards for purchase requisition process

Skills (S) [Optional]	
A. Core Skills/ Generic Skills	**Writing Skills**
	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
	Reading Skills
	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
	Oral Communication (Listening and Speaking skills)
	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 teams on the issues faced during process
B. Professional Skills	**Decision Making**
	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)
	Plan and Organize
	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)

	Customer Centricity
	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
	Problem Solving
	SB10. support supervisor in solving problems by detailing out problems SB11. discuss the possible solutions with the supervisor for problem solving
	Analytical Thinking
	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
	Critical Thinking
	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/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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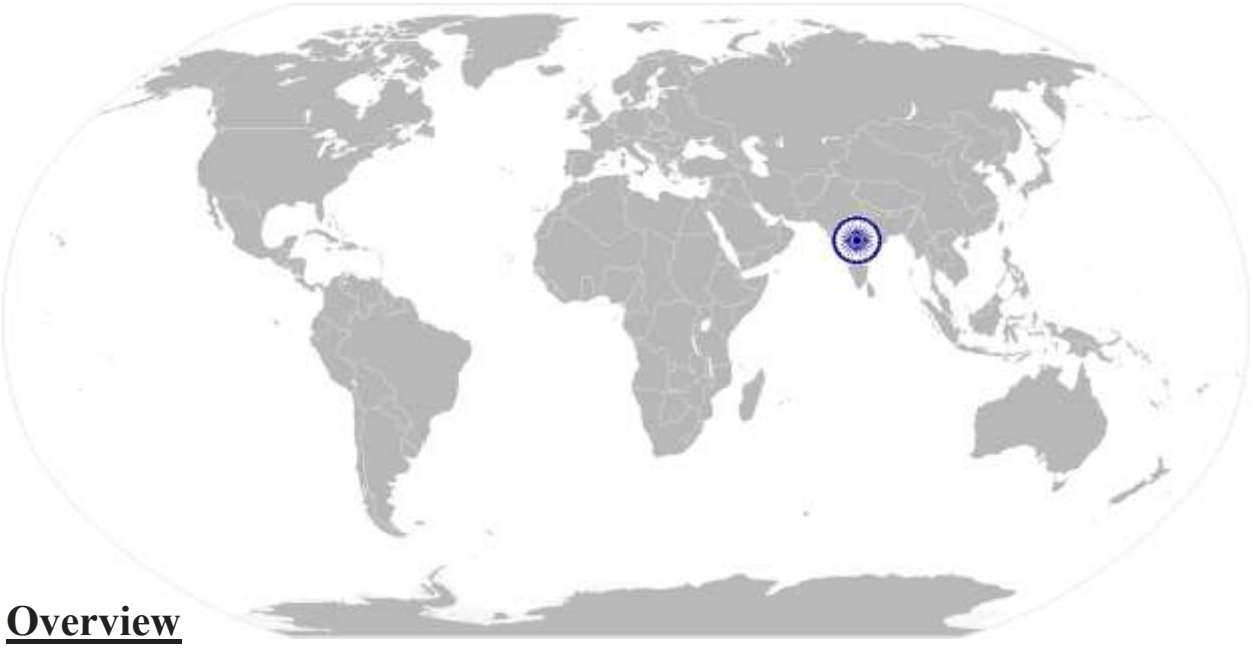

Overview

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

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, manging supplies from the vendor and manging the inventory of supplies.
Scope	This unit/task covers the following: • Raise the purchase order • Manage supplies from the vendor • Manage inventory of regular supplies

Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Raise the purchase order	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
Manage supplies from the vendor	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 of 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 orders conditions have been met

	PC21. co-ordinate with quality assurance department on quality report on the supplies PC22. verify quality report for conformance to organisation standards PC23. based on the quality report accept, reject or hold the supplies PC24. co-ordinate with vendor and internal department and resolve the issue to close the purchase order PC25. contact suppliers to resolve supply issues like shortage, missed or any other problems PC26. compare vendor invoice against purchase order to verify accuracy PC27. take proper approval of vendor invoice for payment process PC28. forward invoices to accounts department for payment PC29. prepare, maintain, and review purchasing files, reports and price lists PC30. monitor vendor performance and recommend contract modifications, if necessary
Manage inventory of regular supplies	PC31. maintain a record of all inventories and identify regular requirements and orders PC32. set and maintain minimum order level (pre-determined inventory levels) for regular orders PC33. take necessary pre-approvals for raising auto (system generated/manual) purchase order on inventory reaching minimum order level PC34. monitor in-house inventory movement (in ERP) and raise purchase order PC35. ensure minimum order level (pre-determined inventory levels) is maintained PC36. complete inventory transfer forms for bookkeeping purposes
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / 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 organisation KA2. types of products produced by the organisation KA3. code of business conduct 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. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. organisation work structure, departments KB2. organisation approved materials KB3. purchase process KB4. organisation work structure, various departments and their activity KB5. list of approved vendors KB6. developing new vendor KB7. vendor approval process KB8. vendor management KB9. purchase/supply chain management KB10. list or materials used in the organisation KB11. products produced and its process methods KB12. quality checks on the incoming supplies KB13. receiving and handling control substances hazardous to health KB14. receiving, handling, storage, disposal of hazardous materials KB15. procedure for acceptance and rejection of orders KB16. inventory management KB17. payment process KB18. mathematic calculations KB19. using computers, computer software on supply chain and ERP system used in the organisation KB20. food laws and regulations on materials, product and packaging materials KB21. food safety and hygiene KB22. GMP KB23. HACCP
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	**Writing Skills**
	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
	Reading Skills
	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
	Oral Communication (Listening and Speaking skills)

	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 teams on the issues faced during process
B. Professional Skills	**Decision Making**
	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)
	Plan and Organize
	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)
	Customer Centricity
	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
	Problem Solving
	SB10. support supervisor in solving problems by detailing out problems SB11. discuss the possible solutions with the supervisor for problem solving
	Analytical Thinking
	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
	Critical Thinking
	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/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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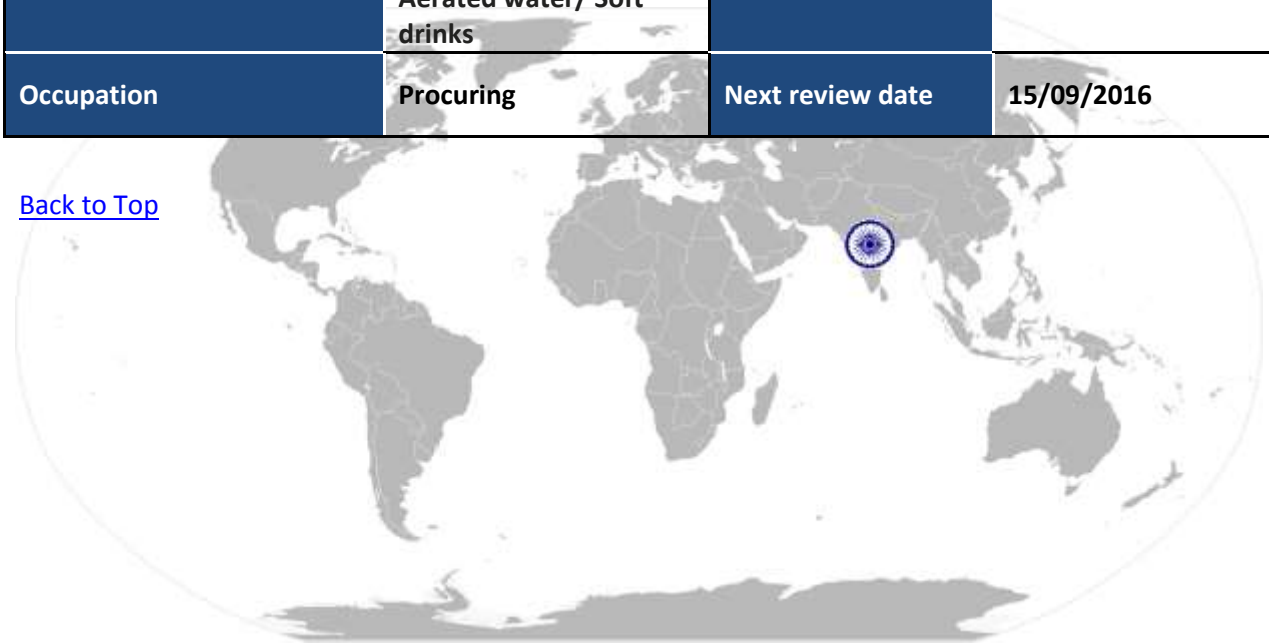
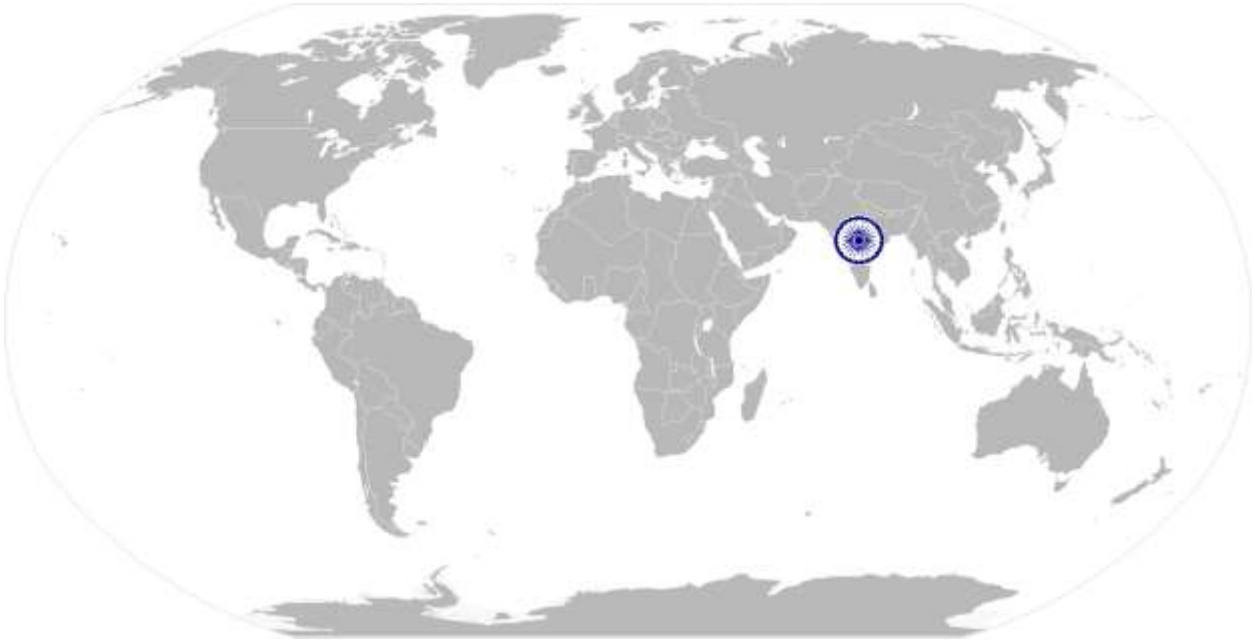


National Occupational Standard



Overview

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

National Occupational Standard

Unit Code	FIC/N7015
Unit Title (Task)	**Complete documentation and record keeping of purchases and inventory**
Description	This OS unit is about documenting and maintaining records of purchase and inventory.
Scope	This unit/task covers the following: • Document and maintain records of purchase of raw materials and packaging materials • Document and maintain records of purchase of machineries • Document and maintain records of inventory
Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Document and maintain records of purchase of raw materials and packaging materials	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
Document and maintain records of purchase of machineries	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
Document and maintain records of inventory	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
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company /	The user/individual on the job needs to know and understand: KA1. organization standards, process standards and procedures followed in the organisation KA2. types of products produced by the organization KA3. code of business conduct

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. Technical Knowledge	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
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	**Writing Skills**
	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
	Reading Skills
	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
	Oral Communication (Listening and Speaking skills)
	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 teams on the issues faced during process
B. Professional Skills	**Decision Making**
	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)
	Plan and Organize
	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)
	Customer Centricity
	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
	Problem Solving
	SB10. support supervisor in solving problems by detailing out problems SB11. discuss the possible solutions with the supervisor for problem solving
	Analytical Thinking
	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
	Critical Thinking
	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/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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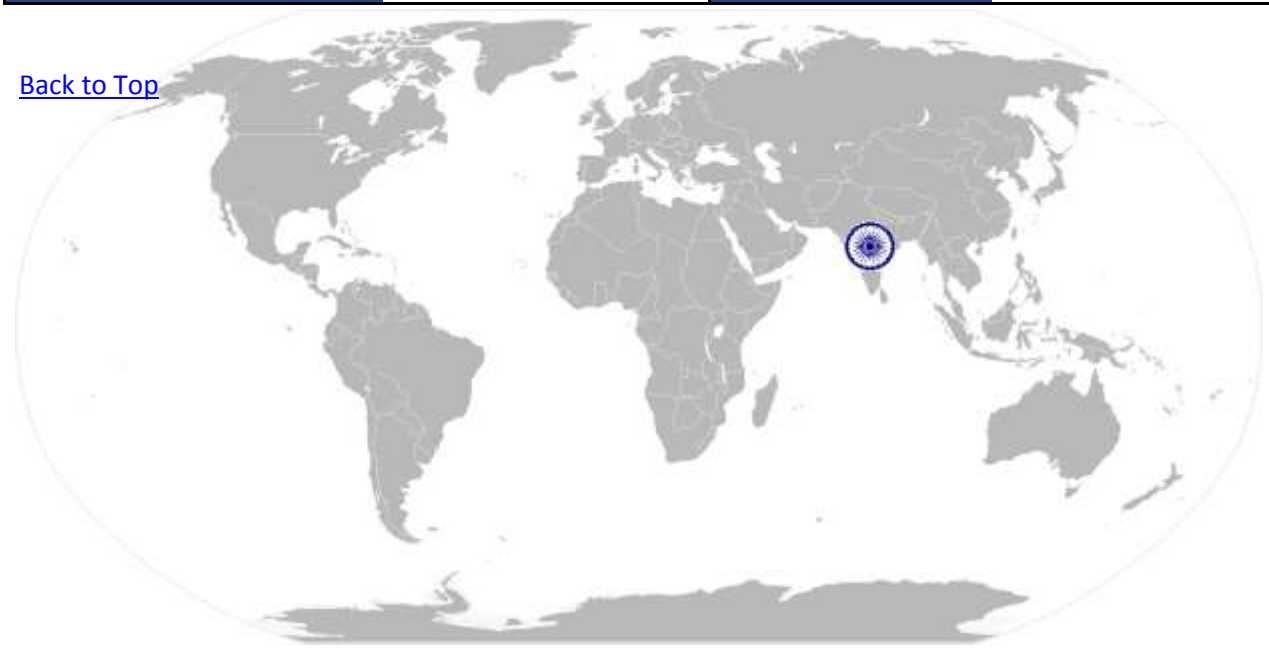
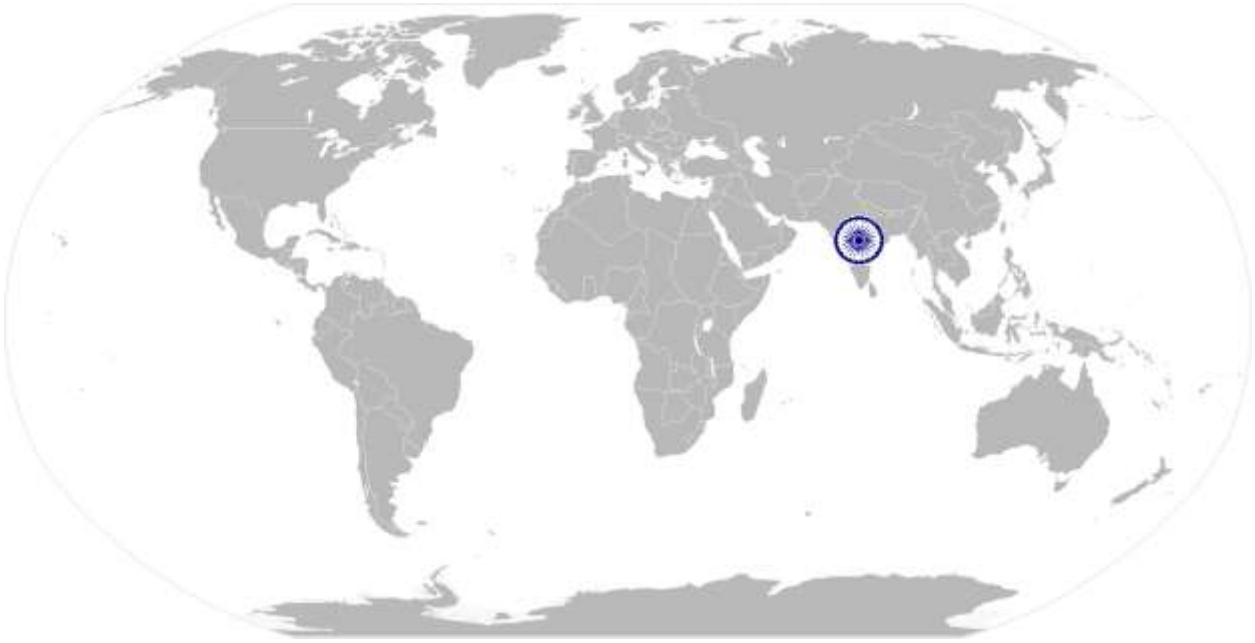


National Occupational Standard



Overview

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

National Occupational Standard

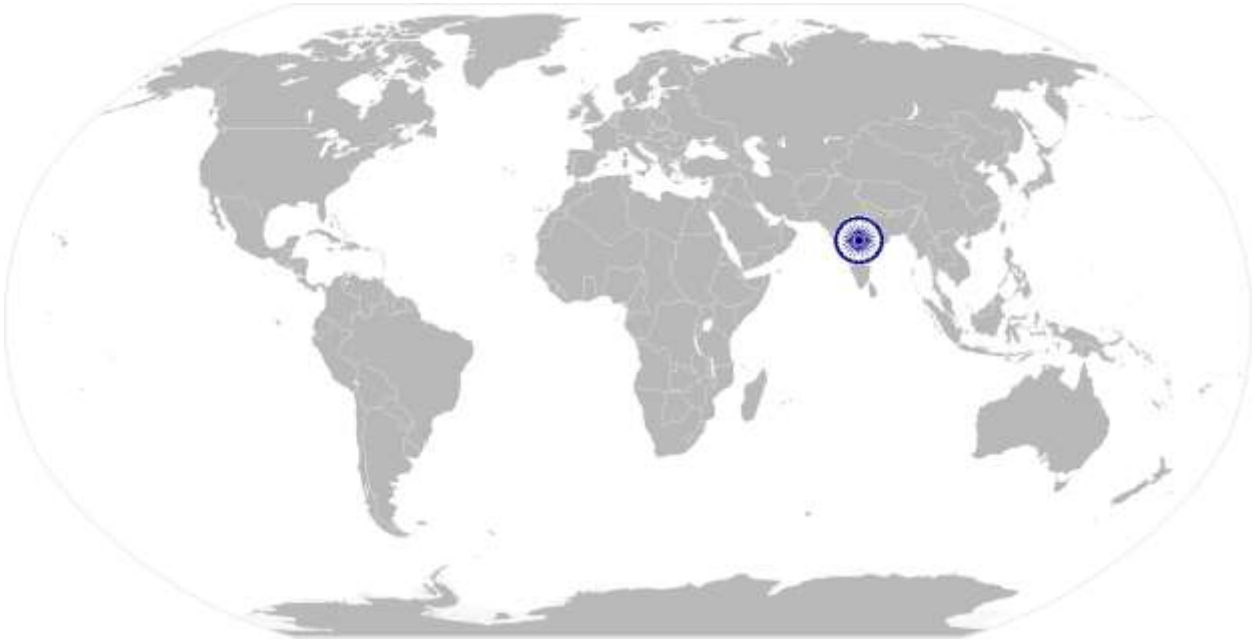
Unit Code	FIC/N9001
Unit Title (Task)	Food safety, hygiene and sanitation for processing food products
Description	This unit is about maintaining food safety, hygiene and sanitation in work area and processing unit for processing food products
Scope	The scope of this role will include: • Perform safety and sanitation related functions (for processing food products) • Apply food safety practices (for processing food products)

Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Perform safety and sanitation related functions (for processing food products)	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
Apply food safety practices (for processing food products)	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

	PC16. follow stock rotation based on FEFO/ FIFO
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / 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 organisation KA2. types of products produced by the organisation 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 organisation policy KA8. food safety and hygiene standards followed
B. Technical Knowledge	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/marking 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
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	**Writing Skills**
	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

	Reading Skills
	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
	Oral Communication (Listening and Speaking skills)
	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 teams on the issues faced during process
B. Professional Skills	**Decision Making**
	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)
	Plan and Organize
	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)
	Customer Centricity
	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
	Problem Solving
	SB10. support supervisor in solving problems by detailing out problems SB11. discuss the possible solutions with the supervisor for problem solving
	Analytical Thinking
	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
	Critical Thinking

	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/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 Assitant – 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 evaulations 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**
1. FIC/N7013 (Handle purchase requisitions)	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
			100	**35**	**65**
2. FIC/N7014 (Raise and process purchase order and inventory management)	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 of 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 orders 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
			100	**35**	**65**
3. FIC/N7015 (Complete documentation and record keeping of purchases and inventory)	PC1. Document and maintain records of the purchase requisitions, purchase order, vendor database, vendor documents for vendor approval process, documents on supplies like	**100**	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
			100	**60**	**40**
4.FIC/N9001 (Food safety, hygiene and sanitation for processing food products)	PC1. Comply with food safety and hygiene procedures followed in the organisation	**100**	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
			100	**35**	**65**

SEMESTER II

SEMESTER II

பாடம்	மொழிப்பாடம் I – தமிழ் II	**Programme Name**	இளநிலைத்தொழிற்கல்வி - உணவு அறிவியல் மற்றும் ஊட்டச்சத்துத்துறை
பாடக்குறியீடு	**18BFSNL02**	கல்வியாண்டு	2018
பாட வகை	Theory	பருவம்	இரண்டாம் பருவம்

COURSE OUTCOMES:

On completion of the course, the students will be able to	
CO1:	அறுசுவை
CO2:	ஐம்பூதங்களில் நீர்
CO3:	நீர் வகையும் குணமும்
CO4:	இன்சுவையும் பாலும்
CO5:	உணவு யுத்தம்

Mapping of COs with POs, PSOs

COs / Pos&PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	3	2	1	2	1	2	2	2	2
CO2	3	2	1	2	1	2	2	2	2
CO3	3	2	1	2	1	2	2	2	2
CO4	3	2	1	2	1	2	2	2	2
CO5	3	2	1	2	1	2	2	2	2

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

அலகு.ஃதொகுதி	நோக்கம்	கற்பித்தல் நேரம் L+Tu+Te=To
அறுசுவை	பாரம்பரிய உணவு முறைகளில் சுவை இன்றியமையாததாகும். இச்சுவைகளில் அறுசுவை, பழவகைகளிலிருந்து எவ்வாறு மாறுப்பட்டுள்ளன என்பதைப்பற்றியும் இதன் மூலம் உடலுக்கு ஏற்படுகின்ற ஆற்றலை பற்றியும் அறிய செய்தல்	11 Hrs
ஐம்பூதங்களில் நீர்	தமிழக நதிகள் மட்டுமின்றி இந்திய நதிகளின் வரலாறு, இன்றைய காலக்கட்டத்தில் நதிகள் மாசடைந்ததில் அதனை மீட்டெடுப்பதற்கானக் காரணிகளை தெளிவாக அறிய செய்வதோடு, நதிகளின் குணங்கள் மற்றும் பயன்களை அறிகின்றனர்	11 Hrs
நீர் வகையும் குணமும்	நீரின் வகைகளையும் அவை தோன்றுமிடம், சுவை மற்றும் வைட்டமீன்கள் குறித்த புரிதல்களை ஏற்படுத்த முடிகிறது	11 Hrs
இன்சுவையும் பாலும்	பால், வெல்லம், சர்க்கரை, தேன் போன்றவற்றின் தன்மையையும் அதன் மூலம் பெறப்படும் பயன்களையும் கற்றுக்கொள்கிறான்	11 Hrs
உணவு யுத்தம்	உணவு முறைக்கான விதிகள், பன்னாட்டு நிறுவனங்களின் ஒத்துழைப்பு மற்றும் பங்களிப்பு போன்றவற்றை அறிந்து கொண்டு அதன்படி நடைமுறை வாழ்க்கையோடு புரிந்து கொள்ளுதல்	11 Hrs

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

COURSE PLAN:

S. No.	Intended learning Outcomes	CO(s) Mapped	Cognitive Level/ KD	Psychomotor domain activity	Psychomotor domain level
	அலகு - 1 அறுசுவை				
1.	அறுசுவை	CO1	K2, F	உணவு பழக்கத்தால் ஏற்படும் அதிக பாதிப்புகள் குறித்து மக்களிடம் நேர்காணல் செய்து	K4, S3
2.	உணவுகளைப் படைக்கச் சுவைபயன்பட்டமை - சுவைப்பொருத்தம்	CO1	K2, C		

Cognitive Process: K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 – Evaluating K6 -Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

	- பொருந்தாச்சுவைகள் -			காணொளியாக சமர்ப்பித்தல்	
3.	சுவைமாறுபாடும் ஏற்பட்ட காலங்களும் - சுவைகளின் பட்டியல்.	CO1	K2, C		
	அலகு - 2 ஐம்பூதங்களில் நீர்				
4.	ஐம்பூதவகை - நீர்வகைக் குணங்கள் - மழைநீர் - ஆலங்கட்டி மழைநீர் - பனிநீர் -	CO2	K2, C	நதிகளை இன்றைய காலச்சூழலில் எவ்வாறெல்லாம் மீட்டெடுக்கலாம் என்பதற்கான செயல் திட்ட வரைவை உருவாக்குதல்	K4, S3
5.	தண்ணீர் - ஆற்றுநீர் - கங்கை, யமுனை, கோதாவரி,	CO2	K2, C		
6.	துங்கபுத்திரை, நர்மதா, சிந்து,	CO2	K2, C		
7.	சித்திரா, காவிரி, தாம்பிரபரணி பச்சையாற்று போன்ற நதிகளின் தன்மை	CO2	K2, C		
	அலகு - 3 நீர் வகையும் குணமும்				
8.	குளத்துநீர் - தாமரைக் குளத்துநீர் - அல்லிக் குளத்துநீர் - ஏரிநீர் - சுனை நீர் - கிணற்றுநீர் - ஊற்றுநீர் - -	CO3	K2, C	நீரின் வகைகளைக் கண்முன்னேநிறுத்தம் விதத்தில் காட்சிப்படுத்துதல்	K1, S1
9.	பாறைநீர் - சுக்கான் பாறைநீர் - கரும்பாறைநீர் - அருவிநீர் - காட்டுப்பகுதிநீர்	CO3	K2, C		
10.	சிவந்தநீர் - கறுத்தநீர் - வயல் நீர் - நண்டுக்குழிநீர் - பாசிநீர் - நீராகாரநீர் - காடி நீர் -	CO3	K2, C		
11.	உப்புநீர் - சமுத்திரநீர் - நாவல் நீர் - வாழைநீர் - கருங்காலிநீர் - இலவுநீர் - இளநீர்வகைகளும் பயன்களும்	CO3	K2, C		
	அலகு - 4 இன்சுவையும் பாலும்				
12.	வெந்நீர்வகையும் குணமும் - -	CO4	K2, C	வெல்லம், பால், சர்க்கரை, தேன் உணவு வகைகளைச் சேகரித்து காட்சிப்படுத்துதல்	K4, S1
13.	பால் வகையும் குணமும் தயிர்வகை - மோர்வகை - வெண்ணெய் வகை - நெய் வகை -	CO4	K2, C		
14.	சாணவகை - பாகின் வகை - மதுரவகை - வெல்லத்தின் வகை - சர்க்கரைவகை - கற்கண்டின் வகை - மதுவின் வகை	CO4	K2, C		
15.	தேனின் வகையும் மருத்துவப் பயனும்.	CO4	K2, C		
	அலகு - 5 உணவு யுத்தம்				
16.	உணவு யுத்தம் - உணவுவிதிகள்	CO5	K5, C	நாம் உண்ணும் உணவினை எவ்வாறெல்லாம் பாதுகாக்கலாம் (காணொளியாக தயார் செய்க)	K5, S4
17.	விவசாயத்தில் பன்னாட்டுநிறுவனங்கள் - பயணியின் உணவு -	CO5	K2, C	நாம் உண்ணும் உணவு காலப்போக்கினால் அடைந்த மாற்றம் அதன் பின் ஒளிந்திருக்கும் பொய்கள் மறைக்கப்பட்ட உண்மைகள் விவாதித்தல்	K5, S4
18.	தமிழர்கள் என்னசாப்பிட்டார்கள் - உணவுப் பொய்கள்	CO5	K2, C		

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2.	எஸ்.இராமகிருஷ்ணன்,உணவு யுத்தம்,விகடன் பிரசுரம்,சென்னை, 2014
3.	சு.வித்தியானந்தன்,தமிழர் சால்பு,குமரன் புத்தக இல்லம்,சென்னை, 2003

Cognitive Process: K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 – Evaluating K6 -Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

Course Name	Part I - Hindi II	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18BFSNLH02	Academic Year Introduced	2018-2019
Type of Course	Theory	Semester	II

प्राचीन भारतीय खाद्य प्रणारी और चचकित्सा ि गणु COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
ड़िाई – 1	छह प्रकाय के स्वाददष्ट- भीठा-"Tutari"- पर- कटहर- के रा- गन्ना-शहद- नभक- तीखे- कड़वा- कसैरे- खट्टा- बोजन के सभुचित से ननऩटने भें उनकी बमू भका है- स्वाददष्ट बोजन-फेस्वाददष्ट- संभम की ववकृ त स्वाद- भहत्वऩ ण छह खननज /	4+4+2=10
ड़िाई – 2	दनु नमा के ऩाॉि तत्व - जर श्रेणर्माॉ- वषाण जर- फपण के ऩानी- ऩानी- नदी के ऩानी- गोगा नदी का ऩानी- मभुना नदी का ऩानी- गोदावयी नदी का ऩानी- tunkapattira नदी का ऩानी- नभदा नदी का ऩानी- मसध नदी के गुर्/ ु नदी - चित्रा नदी-कावेयी नदी का ऩानी-थामभयाफयानी नदी का ऩानी-	4+4+2=10
ड़िाई – 3	योटस ऩ के ऩानी- झीय का ऩानी- वसोत ऩानी- स्पस्प्रोग जर- यॉक ऩानी- ि्टान ऩानी- पॉल्स ऩानी- रायऩानी- कारा ऩानी- धान के ऩानी- के कड़ा गड्ढे ऩानी-भॉस ऩानी-ऩीने का ऩानी-नभकीन के ऩानी -सागय के ऩानी- के रे के ऩानी- आफन के प्रकाय/ ऩानी-नारयमर-नारयमर ऩानी आफन के प्रकाय/	4+6+2=12
ड़िाई – 4	गभण ऩानी के प्रकाय औय गुर्-दध के प्रकाय औय गर्ु -दही के प्रकाय- छाछ के प्रकाय- भक्खन के प्रकाय - घी के प्रकाय-गोफय के प्रकाय - गुड़ के प्रकाय- भदया श्रर्ीे के प्रकाय- ि्ीनी के प्रकाय- मभचश्र के प्रकाय - शयाफ के प्रकाय - शहद के प्रकाय- औषधीम के गुर् /	4+4+2=10
ड़िाई – 5	खाद्य रड़ाई- खाद्य ननमभ-कृ वष के □ेत्र भें फहुमाप्रीम को ऩननमों को- मात्रत्रमों का बोजन- खाद्य झ -नतर्ो के प्रकाय औय उऩमोग	4+6+2=12
Total Hours of Instruction		54 (18*3)

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

Course Name	Functional English Priactical –II	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNE02**	**Academic Year Introduced**	2018-19
Type of Course	Practical	**Semester**	II

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1:	**Build a positive working atmosphere**
CO2:	**Influence clients with their out of the box ideas**
CO3:	**Excel in their carrier with effective communication**

Mapping of COs with POs, PSOs

COs / POs& PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	2	2	2	2
CO2	3	2	2	2	2	2	2	2	2
CO3	3	2	2	2	2	2	2	2	2
1 – Slight, 2 – Moderate, 3 – Substantial									

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
CO1:	To communicate better to improve employee engagement	3+8+3=14
CO2:	To improve their internal communication with colleagues	3+8+3=14
CO3:	To ameliorate the leadership skills	3+8+3=14
CO4:	To fulfill business and social obligations	3+8+3=14
CO5:	To create a unique place in the field of work	3+10+3=16
Total Hours of Instruction		**72 (18*4)**

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

COURSE PLAN

Module/ Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
UNIT – I Basics of Communication					
a)	Verbal and Non-verbal communication	CO1	K2	• Describing a person/place or an event • Dumb Charades	S3
b)	The communication process	CO3	K3	Group disucssion on a given topic	S2
c)	Barriers to effective communication	CO2	K2	• Naratting a story • Proverb expansion	S2
d)	Types of Communication (inter Vs intra communication)	CO3	K3	Describe one's experience	S4
UNIT –II Official communication					
a)	Kinds of Business Letters	CO1	K3	Drafting official letter	S3
b)	Importance of internal communication	CO1	K4	• Writing report about an internal event • Intrepreting non verbal communication	S3

Cognitive Process: K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 – Evaluating K6 -Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

c)	Using Visual aids in communication	CO3	K3	Group activities	S5
d)	Reports – Definitions, types and structure	CO2	K5	Drafting a report	S3
UNIT –III Presentation Skills					
a)	Self Introduction	CO3	K3	Giving self introduction	S3
b)	Extrempore Speech	CO2	K6	Essay/ speech on 'on the spot topics'	S4
c)	Pair Intrepretation of Visuals	CO3	K3	Explaining ideas using visual aids	S3
d)	Telehonic interview	CO3	K3	• Improving telephonic conversation skills • Demo interview	S3
e)	Job interview	CO3	K3		
UNIT-IV Bussiness and Social Correspondence					
a)	Purpose and Structure	CO1	K2	e-mail drafting	S3
b)	Qualities	CO3	K4	Note making	S3
c)	Types of Correspondence	CO1	K2	• Appointment letter • Invitation letter • Congratulation letter	S4
d)	Social correspondence	CO2	K		
UNIT –V Expression and Attitude					
a)	Creative expression – Copy writing – creative advertisemnt – writing captions and slogans	CO2	K6	• Creating advertisment and slogan • Capturing a photograph and giving captions for it	S5
b)	Non-verbal –person appearence – Gestures – Eye contact	CO3	K3	• PPT presentation • Intrepreting non verbal communication	S4
c)	Team building – Team work – Developing Positive Attitude	CO1	K6	Enacting a group skit	S5
d)	Career Plans – jobs –description of Dream Jobs and Company	CO1	K4	• Describing a dream job • Preparing an effective Resume	S3

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2	Sinha R.P., Current English Grammar and Usage with Composition, Oxford University Press, New Delhi, 2018.
3	Prakash C.L., **An Advanced Course in communication and Media Awareness,** Cambridge University Press, New Delhi, 2007
4	Mohan, Krishna &Meera Banerji, **Developing Communication Skills,** Macmillan, India, 2009.
5	Sasikumar V., et.al., **Oral Communication Skills, Foundations Books**, Cambridge University Press, New Delhi, 2009.

Course Name	Core-II-Food Processing I	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNC02**	**Academic Year Introduced**	2018-2019
Type of Course	Theory	**Semester**	II

COURSE OUTCOMES:

On completion of the course, the students will be able to	
CO1:	Summarize and understand the processing techniques available for food items and utilization of by-products
CO2:	Differentiate milling techniques and describe fermented products
CO3:	Describe the extraction methods and identify the uses of hydrogenated products
CO4:	Interpret microencapsulation techniques

Mapping of COs with POs, PSOs

COs / Pos&PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	3	3	2	3	3	2	3	3	**3**
CO2	3	3	2	3	3	2	3	3	3
CO3	3	3	2	3	3	2	3	3	3
CO4	3	3	2	3	3	2	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	**Objectives**	**Hours of Instruction L+Tu+Te=To**
Cereals	To identify the processing techniques and utilization of by products	4+4+2=10
Millets	To distinguish the milling methods	4+4+2=10
Pulses and Legumes	To recall the utilization of fermented food products	4+6+2=12
Nuts and oilseeds	To interpret the usage of by products	4+4+2=10
Spices and Condiments	To understand the manufacturing of spice oil and its utilization	4+6+2=12
Total Hours of Instruction		54 (18*3)

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

COURSE PLAN:

S. No.	**Intended learning Outcomes**	**CO(s) Mapped**	**Cognitive Level/ KD**	**Psychomotor domain activity**	**Psychomotor domain level**
	UNIT I –Cereals				
1.	Paddy and its handling – cleaning, drying and equilibrium moisture content	CO1	K2, F	Visit any rice processingindustry and submit the report	K2, S2
2.	Rice – milling, parboiling, polishing and ageing	CO1	K2, C		
3.	Byproducts of milling and grades of rice	CO1	K2, C		
4.	Rice products **–** quick cooking rice, parched rice, instant rice, canned and frozen rice, puffed rice and extruded rice, shredded rice	CO1	K2, F	Visit to a super market and gather information on the availability of rice products and present the data	K4,S2
5.	Baby foods, rice cake, rice crispies and rice starch	CO1	K1, F		
6.	Wheat – milling, by-products of milling – atta,	CO1		Collect pictures or	K1, S1

	maida, rava, bran and germ		K2, C	videos about milling of wheat and display it in the class room	
7.	Wheat products – bread, biscuits, cookies, pasta and noodles	CO1	K2, F	Visit to a super market and gather information on the availability of wheat products and present the data	K4, S2
8.	Corn, oats and barley – milling, by-products and flaked products	CO1	K2, F		
9.	Malting of cereals	CO1	K2, C		
	UNIT II –Millets				
10.	Millets – milling	CO1	K2, C	Conduct a survey on the awareness and utilization of millets in your locality	K4, S3
11.	By-products of milling	CO1	K2, C		
12.	Processed products from millets	CO1	K2, C		
	UNIT – III Pulses and Legumes				
13.	Milling – wet & dry milling; commercial milling	CO2	K2, C	Pictorial representation of milling techniques	K1, S1
14.	Dehulling – methods; pretreatment – wet treatment, soaking, chemical treatment, dry treatment, oil and heat treatment	CO2	K2, C		
15.	Germination, fermentation, roasting, parching, extrusion, parboiling, agglomeration	CO2	K2, C		
16.	Fermented products – idli, dosa, soya curd, textured vegetable protein, soya sauce, tempeh, natto and miso; quick dhal and instant dhal	CO2	K2, C	Assess the frequency of purchase of fermented products in your house	K4, S2
	UNIT – IV Nuts and oilseeds				
17.	Post harvest technology – handling, drying, storage, grading, pretreatments – cleaning, dehulling, size reduction and flaking, heat treatment	CO3	K2, C	Industrial visit to oil processing mill and collect data on modern milling techniques and traditional milling techniques	K4, S1
18.	Oil extraction- rendering, traditional methods – ghani, power ghani, hydraulic press, expellers	CO3	K2, C		
19.	Solvent extraction – principle, pretreatment, extraction and desolventisation	CO3	K2, C		
20.	Refining of oil – degumming, neutralization, bleaching, filtration, deodorization and winterization	CO3	K2, C	Conduct a survey in the housing area or your college or dept to assessconsumer's awareness on by products and its utilization	K4, S2
21.	Hydrogenation and products based on hydrogenation	CO3	K2, C		
22.	High protein products – oilseed cakes, protein concentrated and isolates	CO3	K2, C		
	UNIT – V Spices and Condiments				
23.	Cleaning, grading and milling of spices	CO1	K2, C	Visit a market and collect pictures of spice products. Identify the uses of spice oil in Indian cookery	K5, S4
24.	Preparation of spice powders and spice oil	CO1	K2, C		
25.	Oleoresins and microencapsulated products	CO4	K2, C		

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TEXTBOOKS	
1	Srilakshmi B, Food Science, New Age International P Limited Publishers, New Delhi, 2018
2	Chakraverty, Post Harvest Technology of Cereals, Pulses and Oilseeds, Oxford and lbh Publishing, 2019
3	Avanita Sharma, Textbook of Food Science and Technology, CBS Publication, 2017
REFERENCE BOOKS	
1	The Complete Book on Spices and Condiments (with Cultivation, Processing and Uses), Asia Pacific Business Press Inc. 2013
2	Richard P Hamilton and Wolf Hamm, Edible Oil Processing, Oxford University Press, 2004
JOURNALS AND DOCUMENTS	
1	Journal of Food Processing and Preservation,
2	International Journal of Food Properties
3	Journal of Spices and Aromatic Crops
4	Ecoursesonline.iasri.res.in
5	www.fao.org

Course Name	Allied-II-Food Science and Chemistry Practical II	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	18BFSNA02	**Academic Year Introduced**	2018 - 19
Type of Course	Practical	**Semester**	II

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1:	Infer the benefits of physical and functional properties of cereals
CO2:	Analyze the cooking quality of foods items and the physio chemical changes behind it
CO3:	Summarize the benefits of pre preparation techniques like soaking, marinating etc.

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3	PSO4
CO1	1	3	3	3	3	3	3	3	3	3
CO2	1	3	3	3	3	3	3	3	3	3
CO3	1	3	3	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
CO1:	To outline the important properties of food items	18
CO2:	To recognize the science behind the cooking methods of foods	18
CO3:	To assess different components in food items and its role	18
Total Hours of Instruction		54

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

COURSE PLAN

Module/ Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
MODULE I Cereals, Pseudo cereals, Millets and Pulses					
18.	Physical properties I. Bulkdensity II. Determination of sedimentation power offlour III. Determinationof gluten content of wheat flour	CO1	K2, P	Prepare a scrapbook depicting the uses of gluten	S2
19.	Functional Properties I. Water Absorption capacity II. Oilabsorption capacity	CO1	K2, P	Interpret the benefits of performing functional properties tests in food items with a supporting	S3

				document	
MODULE II Fruits and Vegetables					
20.	Effect of cooking on pigments offruits and vegetables	CO2	K2, P	Develop a chart work or word wheel showing the pigments responsible for characteristics colour in fruits andvegetables	S4
21.	Prevention of browning reaction in fruits and vegetables	CO3	K3, P	Collect pictures in your household showing the development and prevention of browning in fruits and vegetables	S4
MODULE III Nuts and Oilseeds					
22.	Effect of soaking and cooking quality of nuts and oil seeds	CO2	K2, P	Identify the benefits of soaking of nuts and oil seeds	S1
MODULE IV Milk and Egg					
23.	Determination of casein content of milk	CO3	K2, P	Compare the components - SNF, fat, water in different types of milk	S2
24.	Effect of cooking time on egg protein coagulation	CO2	K2, P	Examine the benefits of cooking egg and different cooking methods adopted	S1
MODULE V Fleshy foods					
25.	Effect of marinating and enrobing on cooking quality of meat	CO2	K2, P	Point out the advantages of marination	S1

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1	Srilakshmi.,B. (2018), Food Scieence, 7th edition, New Age International (P) Ltd, Punishers, New Delhi.
2	Avantina Sharma (2017), Textbook of Food Science and Technology, 3rd edition, CBS Publications.
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1	Sergio O.Serna Saldivar (2010), Cereal Grains – Properties, Processing and Nutritional Attributes, 1st edition, CRS Press.
2	Atherton HV, Newlander JA, (2003), Chemistry and Testing of Dairy Products, 4th edition, CBS Publishers and Distributors
JOURNALS AND DOCUMENTS	
1	International journal of Food Science
2	Journal of Food Science and Technology, Springer
3	Journal of Agricultural and Food Chemistry

Course Name	Val.Edu.-II-Environmental Studies	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNV02**	**Academic Year Introduced**	2018-2019
Type of Course	Theory	**Semester**	II

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1:	Gain the Knowledge about the Scope and Need of public awareness onenvironment
CO2:	Identify the Renewable and Non-Renewable Resources and use the resources for sustainable lifestyles.
CO3:	Practice the ecological Waste Management in their Industry
CO4:	Gain knowledge about the Biodiversity and its Conservation
CO5:	Identify the major/Minor Pollutant about the different Ecosystem

Mapping of COs with POs, PSOs

COs / POs& PSOs	PO(T)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	3	2	1	2	1	2	2	2	2
CO2	3	2	1	2	1	2	2	2	2
CO3	3	2	1	2	1	2	2	2	2
CO4	3	2	1	2	1	2	2	2	2
CO5	3	2	1	2	1	2	2	2	2
1 – Slight, 2 – Moderate, 3 – Substantial									

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
The Multidisciplinary Nature of Environmental Studies	Gain the Knowledge about the Scope and Need of public awareness of the Environmental Studies	7
Natural Resources Renewable and Non-renewable Resources	Identify the Renewable and Non- Renewable Resources and use the resources forsustainable lifestyles.	7
Ecosystems: Concept of an ecosystem	Identify the major/Minor Pollutant about the different Ecosystem	7
Biodiversity and Its Conservation	Gain knowledge about the Biodiversity and its Conservation	7
Environmental Pollution	Handle and Mange the Different types Pollution in their Industry	8
Total Hours of Instruction		36

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

COURSE PLAN

Unit/ Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level

UNIT-I - Multidisciplinary Nature of Environmental Studies:					
1.	The Definition, scope and importance Need for public awareness	CO1	K2,F	Draw a mind map for the multidisciplinary nature of environmental studies	K3 S1
Unit- II Natural Resources Renewable and Non-renewable Resources					
2.	Natural resources and associated problems - Role of an individual in conservation of natural resources - Equitable use of resources for sustainable lifestyles.	CO2	K2,F	Prepare a chart depicting the natural resources Differentiate between renewable and non-renewable resources	K6 S1
Unit-III Ecosystems					
3.	Structure and function of an ecosystem	CO3	K1,K2,K3, P	Create a model for different ecosystem and exhibit it	K6 S2
4.	Producers, consumers and decomposers. Energy flow inthe ecosystem. Ecologicalsuccession				
5.	Food chains, food webs and ecological pyramids.				
6.	Introduction, types, characteristic features, structure and function of the following ecosystem: (a) Forest ecosystem				
7.	(b) Grassland ecosystem				
8.	(c) Desert ecosystem				
9.	(d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estauries)				
Unit- IV- Biodiversity and Its Conservation:					
10.	Introduction, definition:genetic, species and ecosystemdiversity	CO4	K2,K3, F	Collect newspaper cutting and Journal cuttings on biodiversity and its conservation	K4 S1
11.	Bio geographical classification of India..				
12.	Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values				
13.	Hot-spots of biodiversity.				
14.	Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India				
Unit-V- Environmental Pollution					
15.	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	CO5	K2,K3,K4	Debte on the use of plastics in creating environmental pollution	K5 S2

REFERENCES

TEXTBOOKS	
1	Environmental Studies, Dr.A.Ifthaikarudee et.al , Sooraj Pubilication, Thiruvanmiyur, Chennai,First Edition, September 2015

2	Environmental Studies , Dr.Santhakumar Kannappan, Balaji Pubilishers, Vaniyampadi, Vellore, 2009
3	Environmental Studies , K.Kumarasamy et.al, Bharathithasan University, Thiruchirapalli, 2004
4	Ref: file:///C:/Users/Admin/Downloads/UGCsyllabusforEnvironmentalStudies.pdf
REFERENCE BOOKS	
1	Bio-Energy and the Environment, Janos Pasztor and lars A.Kristoferson. USA Westview Press, Oxfors, 1990
2	Environmental Studies, Dr.S.kalavathy, Bishop Heber College, Thiruchirapalli,December 2009,
3	Ecosystem of India, J.R.B.Alfred, A.k.Das, ENVIS Centre Zoological Survey of India, March 2001
4	Introduction to Environmental Studies, Second Edition, Jonathan Truk, PhD, Saunders College Publication,Philadelphia-19105
5	Essential Environmental Education, Centre for Environmental Studies , Dr. R.Gunaseeli .et.al, Lady Doak College, Madurai -2, 2014
JOURNALS	
1.	14th International Conference on Renewable & NonRenewable Energy Woodrow Clark University of California, USA, E-mail: wwclark13@gmail.com, Clark W, J Biodivers Manage Forestry 2020, 9:3
2.	Offshore Floating Renewable Energy and the Future of Power to Fuel Technology Roy Robinson* and Georg Engelmann Excipio Energy Inc., Houston, Texas, USA , Robinson and Engelmann, Expert Opin Environ Biol 2020, 9:2 DOI: 10.37532/eoeb.2020.9(2).160
3.	Potentially toxic elements pollution, source apportionment and ecological risk assessment in soils of agricultural and industrial areas, Bandar Abbas -J Pollut Eff Cont 2018, Volume: 06 10.4172/2375-4397-C1- 012, South of Iran, 5th Global Summit and Expo on Pollution Control, October 25-27, 2018.

Course Name	Sago Processing Techniques	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNTC01**	**Academic Year Introduced**	2018 - 19
Type of Course	Training Course	**Semester**	II

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Manage sago processing and production in the sago industry
CO2	Start a sago production enterprise as an entrepreneur

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Purchasing techniques of raw materials and equipment for the sago production	1. To train the students to check the required quality and variety for the selection of raw material. 2. To train the students on purchasing techniques of the raw materials and equipment for the sago pearl production.	2+2+2=6
Pretreatment of tapioca and maintenance of work area and equipment	1. To train the students to prepare and maintain work areas for the production of sago pearl 2. To train the students to prepare and maintain the processing machineries and tools for the production of sago pearl	2+2+2=6
Processing of Tapioca & Production of Sago	1. To train the students on processing steps of tapioca. 2. To train the students in the production of sago pearls	3+3+1=7
Quality control and Quality Assurance of the product	1. To train the students to check the quality in every step of tapioca processing and sago production 2. To train the students in the aspect of quality control and quality assurance of sago production	3+3+1=7
Documentation and Record Keeping	1. To train the students in the documentation and recordkeeping of sago production from raw materials to final sale.	3+3+1=7
Start-up guidelines for entrepreneurs	1. Providing guidelines for students to assist them in understanding the new strat-up. 2. To provide training to becoming a successful entrepreneur	3+3+1=7
Total Hours of Instruction		40 hrs

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

COURSE PLAN

Module/ Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
MODULE I - Purchasing techniques of raw materials and equipment for the sago production					
1	Selection of Vendors	CO1	K3,K5, P	Market Survey & Training in the Industry	S3

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

2	Selection of raw materials as per the specification of industry norms	CO1	K3, K4,P	1. Industrial Visit cum training. 2.Design the template with tapioca picture truth s and its specification. 3. Develop protocol for selection procedures in order to identify the best variety of tapioca for the production of sago pearl.	S3
3	Quality parameters of the raw materials and equipment.	CO1	K4, K5, MC	1. Make the Template for the quality parameter for the selection of raw materials for the sago production after the Industrial Visit 2. Identify the equipment for the tapioca processing. 3. Make the description about purchasing processes and techniques of sago industry	S1
MODULE II- Pretreatment of tapioca and maintenance of work area and equipment					
1	Preprocessing steps and its procedures	CO1	K1, K2, P	Pictorial representation of Sago Processing	S1
2	Equipment's and its functions and maintenance services	CO1	K2, K3,P	Industrial Visit to Sago Production Industry and Collecting the images of the equipment and its functions	S1
3	Layout and design of the industry.	CO1	K1,P	Draw the layout of Sago Industry	S4
4	Working area and its maintenance	CO1	K2,P	Industrial visit and submit the exposure report	S1
MODULE III - Processing of Tapioca & Production of Sago pearl					
1.	Processing steps of Tapioca and its procedures	CO1	K3,P	Schematize the processing of tapioca in conventional method and traditional Method	S1
2.	Description of the steps involved in producing Sago pearls	CO1	K3,P	Schematize the production of different types of sago products	S1
MODULE IV- Quality control and Quality Assurance of the product					
1.	FSMS Plan for Sago processing	CO1	K3,P	Create the FSMS model plan for a Sago production Industry	S4,S5
2.	Quality parameters that need to be evaluated during tapioca processing	CO1	K3,K4,MC		
3.	Quality parameters that need to be evaluated during tapioca processing	CO1	K3, K4,MC		
4.	Selection of packaging materials	CO1	K5,P		
5.	Pre and post-packaging quality analysis of sago	CO1	K4,P		

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

	products.				
6.	Food Safety and Standards for sago processing as per the FSSAI	CO1	K1,P		
7.	Quality Control measures for tapioca processing and saga production	CO1	K2,P		
8.	The steps to follow for quality assured sago products	CO1	K3,P		
MODULE V- Documentation and Record Keeping					
1.	Documents to be followed in the organization – Production chart, Processing chart and finished product chart	CO1	K1,P	1. Industrial Visit and Submit the report about complete Documentations of Sago Industry 2. Training about the ERP Softer in the Industry	S1
2.	Details to be recorded on raw materials and finished product				
3.	Details to be recoded and maintained on production plan and quality parameters of raw materials and finished products				
4.	Details of Equipment and its Maintenance				
5.	Detailed documentation about the employers and employee				
6.	Details to be recoded about the vendors and their transactions				
7.	Accounts Details, (Production, profit, expenditure. Tracking back the record)				
8.	ERP and its details				
MODULE VI – Start Up Guidelines for Entrepreneurs					
1	Guidelines and procedures to start the industry	CO2	K2,F	1. Special Lecture on Start up 2. Industrial Visit cum Training	S1
2	Problems and Market Identification	CO2	K3,MC		
3	Solution and Product Development	CO2	K3,MC		
4	Legal Compliances & opportunities from Government and Non-Government Entrepreneurial Ecosystem	CO2	K3,F		
5	Strategy & Execution in Market	CO2	K2,P		

REFERENCES

E. Learning Resources

1	https://elearning.ficsi.in/s/store

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

Course Name	Plant Baker Portfolio	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNPF02**	**Academic Year Introduced**	2018 - 19
Type of Course	Practical	**Semester**	II

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Pinpoint the baking raw materials, tools, equipments and its applications
CO2	Analyze the working principles of different baking equipments

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Baking Ingredients, Tools, Equipments	To Justify the utilization and application of raw materials used in baking	4+4+4=12
	To identify the types of baking tools and use them wisely	4+4+4=12
	To use baking equipments precisely and develop innovative products	4+4+4=12
Total Hours of Instruction		36(18*2)

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

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
MODULE – BAKING INGREDIENTS, TOOLS AND EQUIPMENTS					
1.	Classification of equipment's – Measuring tools, preparatory tools, mixing tools, cutting tools, baking tools and heavy equipments	CO1	K2P	Create a scrap book using canva online application by compiling pictures of baking equipment's	K6 S4
2.	Uses of baking ingredients	CO1	K1P	Prepare a chart depicting the uses of raw materials in baking	K6S1
3.	Working principle of the classified equipment's and its applications	CO2	K2P	Visit to a nearby baking industry and submit the exposure visit report	K4 S1
4.	pes of baking products available in the market	CO2	K4C	Collect pictures and report of uniquely baked product uploaded in social medias	K6 S1

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

REFERENCES

TEXTBOOKS	
1	Wayne gisslen (2009) 5th edition, Professional baking, Published by John Wiley & Sons
REFERENCE BOOKS	
1	https://elearning.ficsi.in/s/store
JOURNALS AND DOCUMENTS	
1	Journal of nutritional science
2	Trends in food science and technology

Course Name	Plant Baker - Mini Project	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNMP02**	**Academic Year Introduced**	2018 - 19
Type of Course	Project	**Semester**	II

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Execute baking techniques
CO2	Generate and perform sensory evaluation methods

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Module I - Development of innovative baked product	To experiment baking techniques and design new innovative product	54
Total Hours of Instruction		54(18*3)

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

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
MODULE I – DEVELOPMENT OF NEW BAKING PRODUCT					
1.	Idea generation	CO1	K6C	Formulate a nutritious innovative product	K6S3
2.	Raw materials	CO1	K2P	Justify the ingredients used in the innovative product	K5S2
3.	Process flow	CO1	K6P	Sequence the product's manufacturing protocol	K4S2
4.	ganoleptic evaluation	CO2	K5P	Assess the consumer's preference of the innovative product using sensory evaluation methods	K5S1
5.	chno economic feasibility	CO2	K4P	Calculate the cost of the product	K4S1

REFERENCES

TEXTBOOKS	
1	Wayne gisslen (2009) 5th edition, Professional baking, Published by John Wiley & Sons
REFERENCE BOOKS	
1	https://elearning.ficsi.in/s/store
JOURNALS AND DOCUMENTS	
1	Journal on Innovative food science and emerging technologies
2	Journal of food science and technology

Cognitive Process : K1 - Remembering K2 - Understanding K3 - Applying K4 - Analyzing K5 - Evaluating K6 - Creating
Knowledge Dimension : F - Factual C - Conceptual P - Procedural MC - Meta Cognitive
Psychomotor Domain : S1-Imitation S2-Manipulation S3-Precision S4-Articulation S5-Naturalization

QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR FOOD PROCESSING

Contents

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 – 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 **Minimum Educational Qualifications** **Maximum Educational Qualifications**	5 Preferably Class 12 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)	**Compulsory:** 1. FIC/N5001 Prepare and maintain work area and process machineries for producing baked products in industrial units 2. FIC/N5002 Prepare for production of baked products in industrial units 3. FIC/N5003 Produce baked products in industrial units 4. FIC/N5004 Complete documentation and record keeping related to production of baked products in industrial units 5. FIC/N9001 Food safety, hygiene and sanitation for processing food products **Optional:** Not Applicable
Performance Criteria	As described in the relevant OS units

Definitions

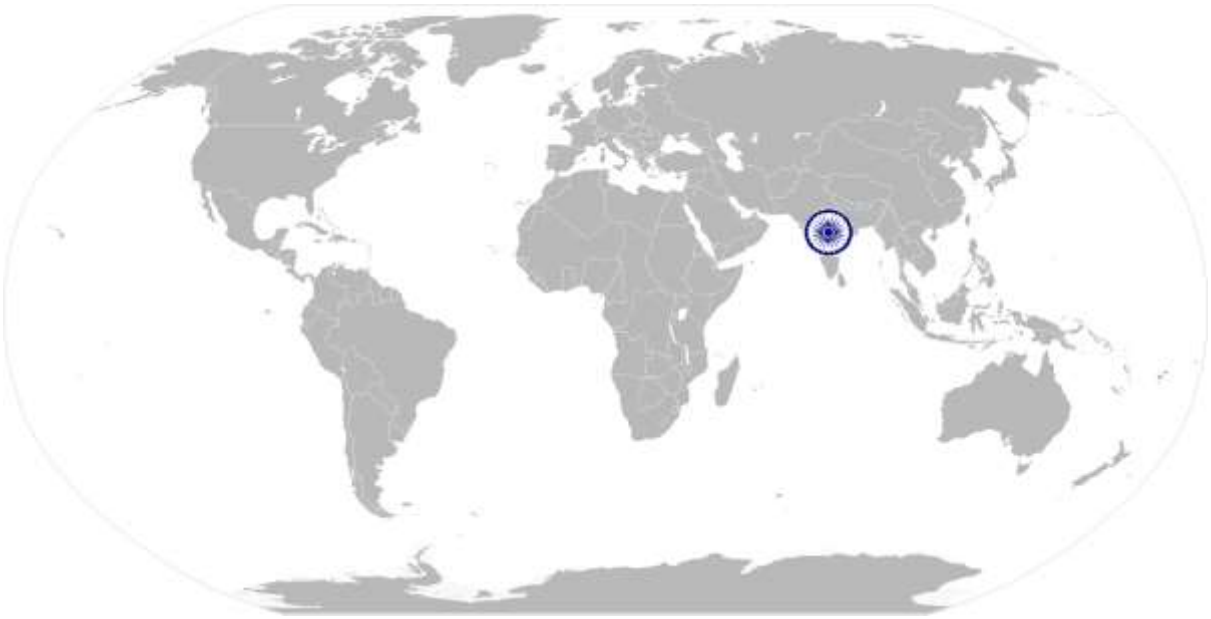
Keywords /Terms	Description
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further 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**

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

Unit Code	**FIC/N5001**
Unit Title(Task)	**Prepare and maintain work area and process machineries for producing baked products in industrial units**
Description	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.
Scope	This unit/task covers the following: • Prepare and maintain work area (for production of baked products in industrial units) • Prepare and maintain process machineries and tools (for production of baked products in industrial units)

Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Prepare and maintain work area (for production of baked products in industrial units)	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
Prepare and maintain process machineries and tools (for production of baked products in industrial units)	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

Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the organization and its processes)	The user/individual on the job needs to know and understand: KA1. organization standards, storage standards and procedures followed in the organization KA2. types of food stored by the organization KA3. code of business conduct KA4. dress code to be followed KA5. job responsibilities/duties and standard operating procedures KA6. internal departments and its functions KA7. provision of wages, working hours as per organization policy KA8. food safety and hygiene standards followed
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. types of chemicals, materials and equipment required for cleaning and maintenance KB2. cleaning process to disinfect equipment/ tools KB3. supplier/manufacturers instructions related to cleaning and maintenance

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

	KB4. knowledge on Food Safety Standards and Regulations (as per FSSAI 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.
Skills (S)	
A. Core Skills/ Generic Skills	**Writing Skills**
	The user/ individual on the job needs to know and understand how to: SA1. note the information communicated by the supervisor SA2. note the details of food stored, storage parameters and provide necessary information to fill the storage chart SA3. note the details of the refrigeration system and components, maintenance and service reports SA4. note down observations (if any) related to the storage SA5. write information documents to internal departments/ internal teams SA6. note down the data for erp or as required by the organization
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA7. read an interpret design, drawings and construction of the storage facility SA8. read and interpret the storage methods and conditions for storing all types of food SA9. read and interpret storage parameters for storing various food SA10. read equipment manuals and storage documents to understand the equipments operation and storage requirement SA11. read internal information documents sent by internal teams
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to : SA12. discuss task lists, schedules and activities with the supervisor SA13. effectively communicate with the team members SA14. question the supervisor in order to understand the nature of the problem and to clarify queries SA15. attentively listen and comprehend the information given by the speaker SA16. communicate clearly with the supervisor and cross department team on the issues faced during storage process
B. Professional Skills	**Decision Making**
	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)
	Plan and Organize
	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

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

	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)
	Customer Centricity
	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
	Problem Solving
	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
	Analytical Thinking
	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
	Critical Thinking
	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/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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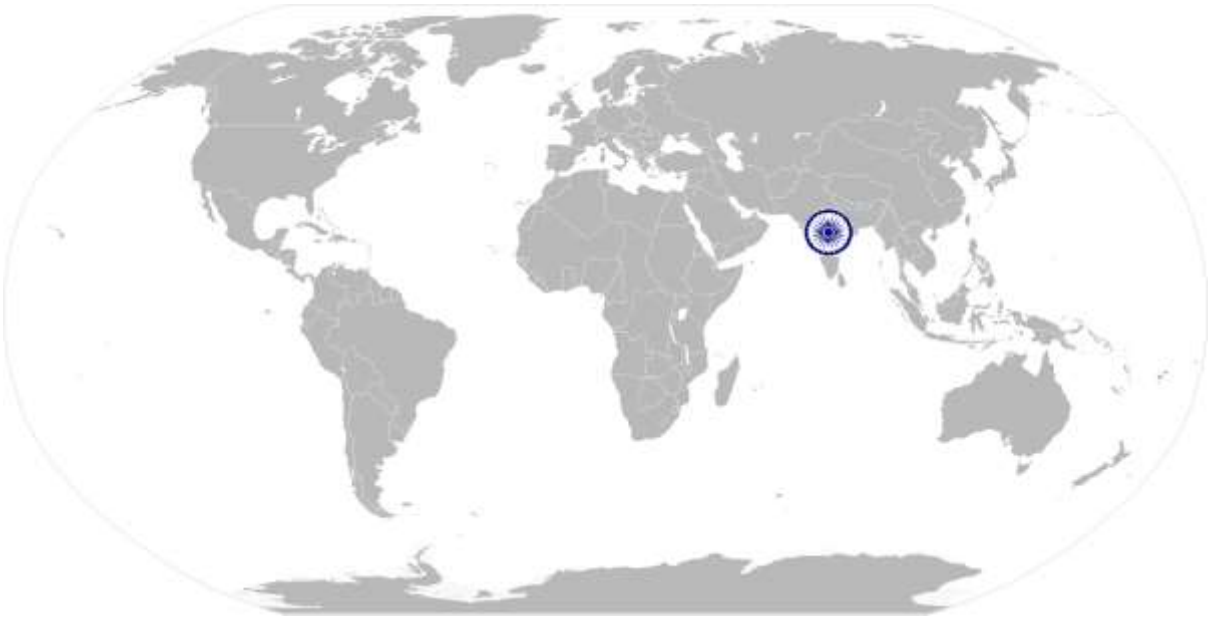
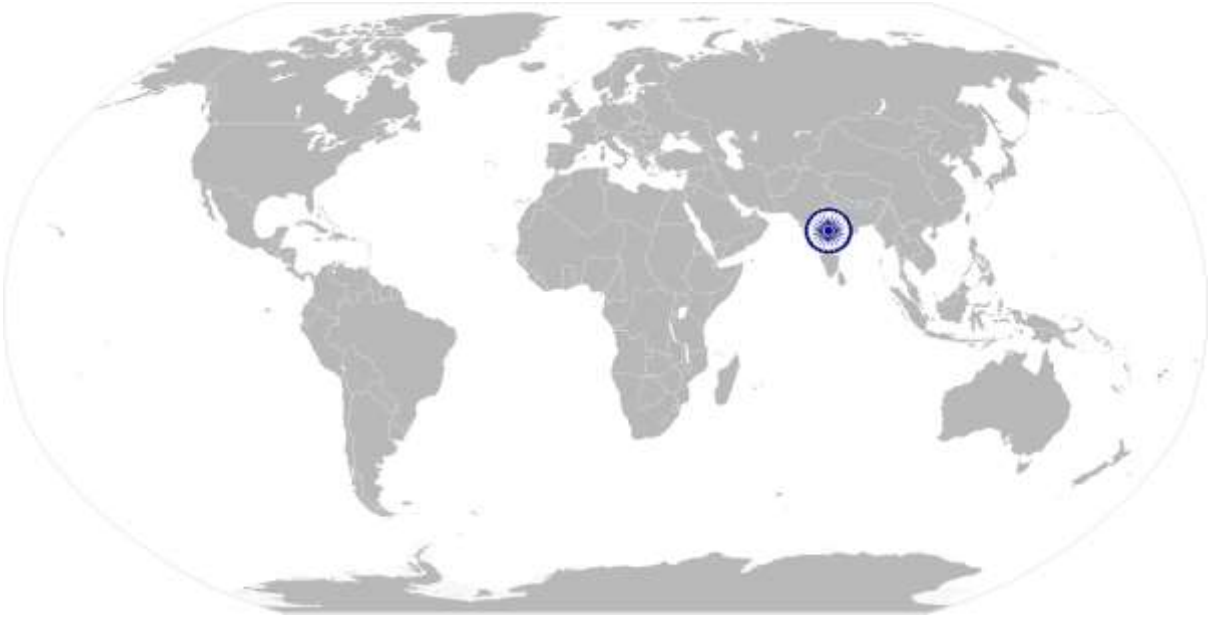


National Occupational Standard



Overview

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

National Occupational Standard

Unit Code	FIC/N5002
Unit Title(Task)	**Prepare for production of baked products in industrial units**
Description	This unit is about preparation of raw materials and machineries for production of various baked products in industrial units.
Scope	The scope of this role will include: • Prepare raw materials for production (for baked products in industrial units) • Prepare machineries for production (for baked products in industrial units)
Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Prepare raw materials for production (for baked products in industrial units)	PC1. read and understand the production order from the supervisor PC2. refer to the process chart/ product flow chart/formulation chart for the product(s) to be produced PC3. organize raw materials and ingredients required for production of products in the work order 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 PC5. check the quality of raw materials and ingredients through physical parameters such as appearance, colour, aroma texture, etc.
Prepare machineries for production (for baked products in industrial units)	PC6. check and ensure the cleaning and maintenance of the machineries required for production PC7. calibrate equipments such as weighing scale following methods defined by the organization PC8. change dies, moulds, blades and other parts of machineries, if required PC9. start each machine and check and ensure its working and performance PC10. make minor adjustments or repairs (if required) PC11. keep tools accessible to attend repairs/faults in case of breakdown PC12. allot responsibilities/ work to the assistants and helpers
Knowledge and Understanding (K)	
B. Organizational Context (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. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. technology and methods for production of various types of baked products KB2. types of raw materials and ingredients used in various baked products KB3. methods for baking various types of baked products

	KB4. types of machineries used for baking various products and machineries used in the organization KB5. maintenance of baking machineries and equipment KB6. supplier/manufacturer instructions related to machineries KB7. basic mathematics KB8. calculation of raw material for required quantity of finished product KB9. quality parameters and quality assessment based on physical parameters KB10. food safety and hygiene KB11. knowledge on Food Safety Standards and Regulations (as per FSSAI) KB12. GMP KB13. HACCP
Skills (S)	
Core Skills/ Generic Skills	**Writing Skills**
	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
	Reading Skills
	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
	Oral Communication (Listening and Speaking skills)
	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. Professional Skills	**Decision Making**
	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)
	Plan and Organize
	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)
	Customer Centricity
	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
	Problem Solving
	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
	Analytical Thinking
	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
	Critical Thinking
	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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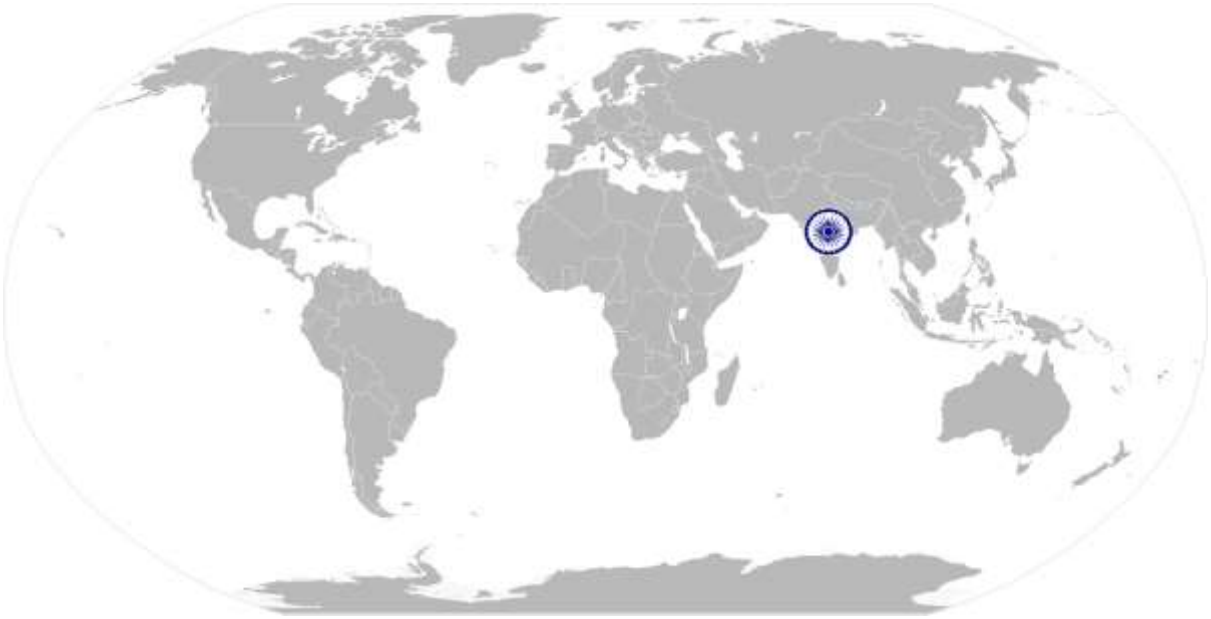
National Occupational Standard



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	The scope of this role will include: • Weigh and mix ingredients • Fermentation, moulding and proofing dough(for bread) • Roll, shape and cut dough (for biscuits) • Mould cake batter • Bake and pack baked products • Post production cleaning and regular maintenance of equipments
Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Weigh and mix Ingredients	PC1. refer the production order and formulation for the product/SKU, and organize all the ingredients required for the product/batch PC2. check the quality of each ingredient through physical parameters such as appearance, colour, odour, texture etc. for its conformance to standards and specifications 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 PC4. start flour sifter and pre-mixer to blend ingredients 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 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 PC7. check and feel the dough/batter to ascertain its consistency meets the standard, and unload dough/ batter in the trough/ hopper
Fermentation,moulding and proofing dough(for bread)	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 PC9. check the fermented dough at regular intervals for required consistency 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 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 PC12. set and control the speed of the divider conveyor that pass the dough

FIC/N5003	Produce baked products in industrial units
	through the line that shapes the dough into balls, dust with flour and transport the shaped dough to the moulder conveyor without sticking PC13. weigh the dough balls at regular intervals to check its conformance to standards 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 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 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 PC17. monitor the proofed dough passing out of the proofer to confirm it has rise to specified height
Roll, shape and cut dough (for bsicuits)	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) PC19. set the controls of each roller of the laminator machine and start the machine to produce continuous sheet of dough 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 PC21. observe operation of laminator, rotary cutter and separating machine, and remove malformed biscuit shapes and control scrap return 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
Mould cake batter	PC23. prepare the baking pans by placing the paper liners in the moulds of the baking pans PC24. adjust controls of the batter depositor machine to fill measured quantity of batter into the moulds of baking pans 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 PC26. start machine to pump measured quantity of batter into the moulds of the baking pans 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 PC28. check the weight of the filled moulds at regular intervals to ensure its conformance to standards
Bake and pack baked products	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) PC30. observe baking of products through the observation window of the tunnel oven and monitor the oven parameters during the entire baking process PC31. observe the product coming out the oven for its quality through physical parameters such as colour, aroma, texture etc. to detect burning /over

FIC/N5003	Produce baked products in industrial units
	baking/under baking and accordingly control oven parameters to achieve finished product of uniform quality, and remove the non-conforming products from the conveyor 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 PC33. control the vacuum system that remove the baked product from the baking moulds/ pans through suction 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 PC35. check the weight of finished product periodically and ensure its conformance to standards PC36. adjust controls of the conveyor and slicer to allow the bread loaves/cakes to pass though slicer and ensure it is cut to required thickness PC37. adjust controls to allow the finished products to move to the automatic packaging machine PC38. sample the packed product and transfer to quality lab for analysis PC39. report discrepancies/concerns in each stage of production to department supervisor for immediate action
Post production cleaning and regular maintenance of equipments	PC40. clean the work area, machineries, equipment and tools using recommended cleaning agents and sanitizers PC41. attend minor repairs/faults of all machines (if any) PC42. ensure periodic (daily/weekly/monthly/quarterly/half yearly/annual) maintenance of all machines and equipment following the SOP or following suppliers instructions/manuals
Knowledge and Understanding (K)	
C. Organizational Context (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. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. types of raw materials, ingredients and finishing materials required for making various baked products KB2. production process, process parameters and formulation of all types of baked products KB3. types of machineries used for baking various products and machineries used in the organization KB4. handling and maintenance of baking equipment KB5. hand-in machine safety

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

	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
Skills (S)	
B. Core Skills/ Generic Skills	**Writing Skills**
	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
	Reading Skills
	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
	Oral Communication (Listening and Speaking skills)
	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. Professional Skills	**Decision Making**
	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**

	Plan and Organize
	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)
	Customer Centricity
	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
	Problem Solving
	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
	Analytical Thinking
	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
	Critical Thinking
	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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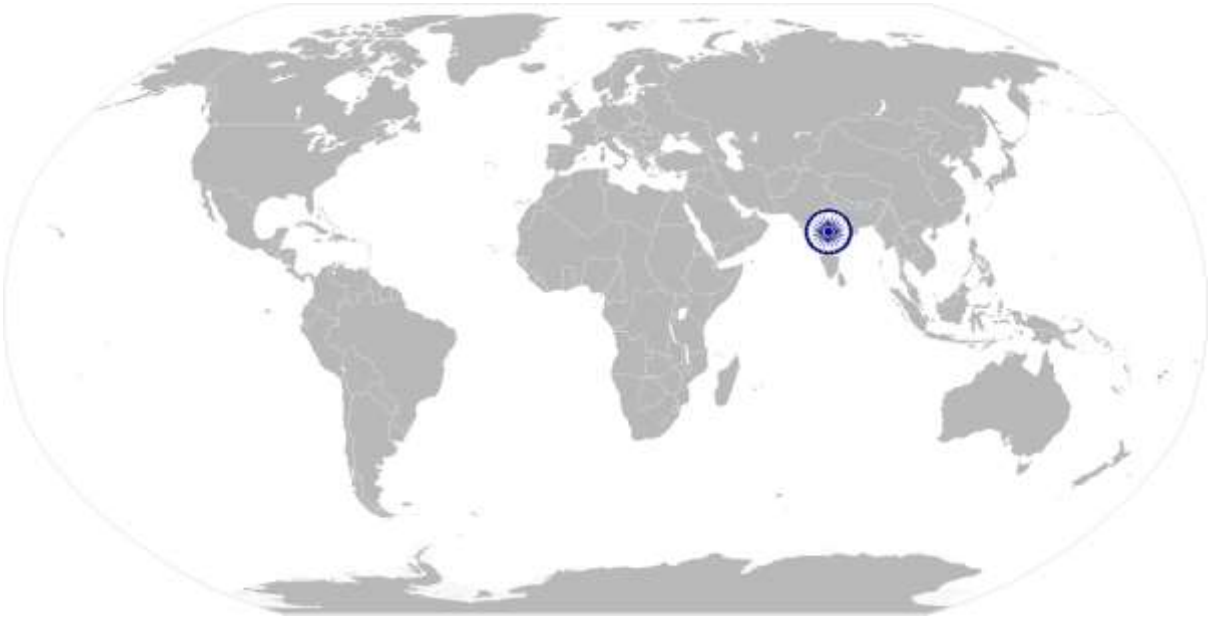
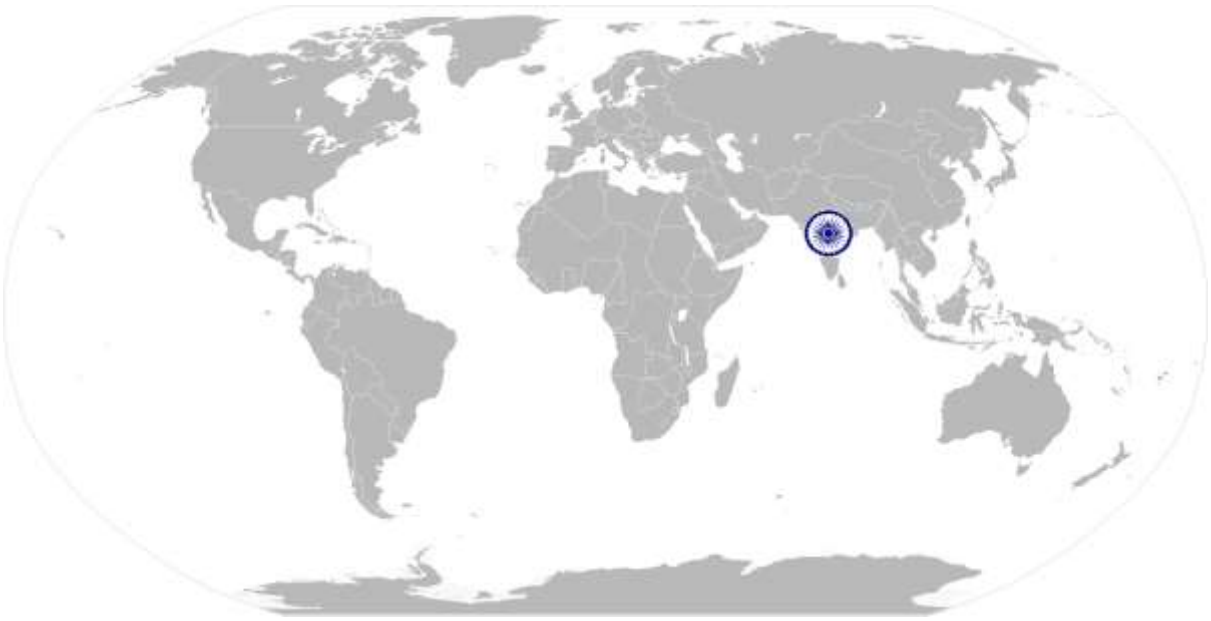


FIC/N5004 **Complete documentation and record keeping related to production of baked products in industrial units**

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

Unit Code	FIC/N5004
Unit Title(Task)	**Complete documentation and record keeping related to production of baked products in industrial units**
Description	This unit is about documenting and maintaining records of raw materials, process and finished products for baked products in industrial units.
Scope	This unit/task covers the following: • Document and maintain records of raw materials (for production of baked products in industrial units) • Document and maintain record of production schedule and process parameters (for production of baked products in industrial units) • Document and maintain record of finished products (for production of baked products in industrial units)

Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Document and maintain record of raw material (for production of baked products in industrial units)	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 PC2. maintain record of observations (if any) related to raw materials and packaging materials PC3. load the raw material details in computer or in the erp system followed by the organization for future reference PC4. verify the documents and track from finished product to raw materials, in case of quality concerns and during quality management system audits
Document and maintain record of production schedule and process parameters (for production of baked products in industrial units)	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. 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 PC7. document and maintain record of batch size, raw material used, yield 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 PC9. load the production and process parameter details in computer or in the ERP system followed by the organization for future reference PC10. verify documents and track them from finished product to raw materials, in case of quality concerns, and during quality management system audits
Document and maintain records of the finished products(for	PC11. document and maintain records of the types of finished products produced 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

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

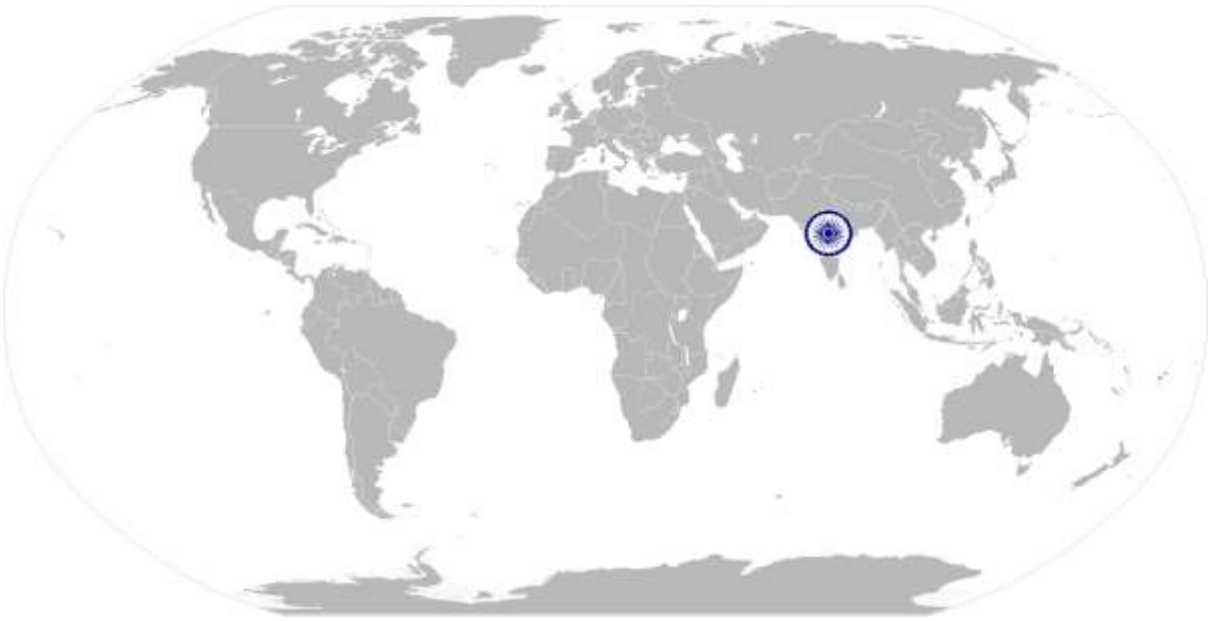
production of baked products in industrial units)	finished products, storage conditions, etc., as per organization standards PC13. maintain record of observations or deviations (if any) related to finished products PC14. load the finished product details in computer or in the ERP system followed by the organization for future reference PC15. verify the documents and track them from finished product to raw materials, in case of quality concerns, and during quality management system audits
Knowledge and Understanding (K)	
D. Organizational Context (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. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. documentation system followed in the organization such as production chart, process chart and finished goods chart KB2. details of raw materials and finished products to be recorded KB3. details of production plan and process parameters to be recorded KB4. methods to record and maintain record of observations (if any) related to raw materials, process and finished products KB5. method to track back the record from finished product to raw material KB6. knowledge on Food Safety Standards and Regulations (as per FSSAI) KB7. enter details in ERP system followed by the organization
Skills (S)	
C. Core Skills/ Generic Skills	**Writing Skills** 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
	Reading Skills 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

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

	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
	Oral Communication (Listening and Speaking skills)
	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. Professional Skills	**Decision Making**
	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)
	Plan and Organize
	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)
	Customer Centricity
	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
	Problem Solving
	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
	Analytical Thinking
	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
	Critical Thinking
	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

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



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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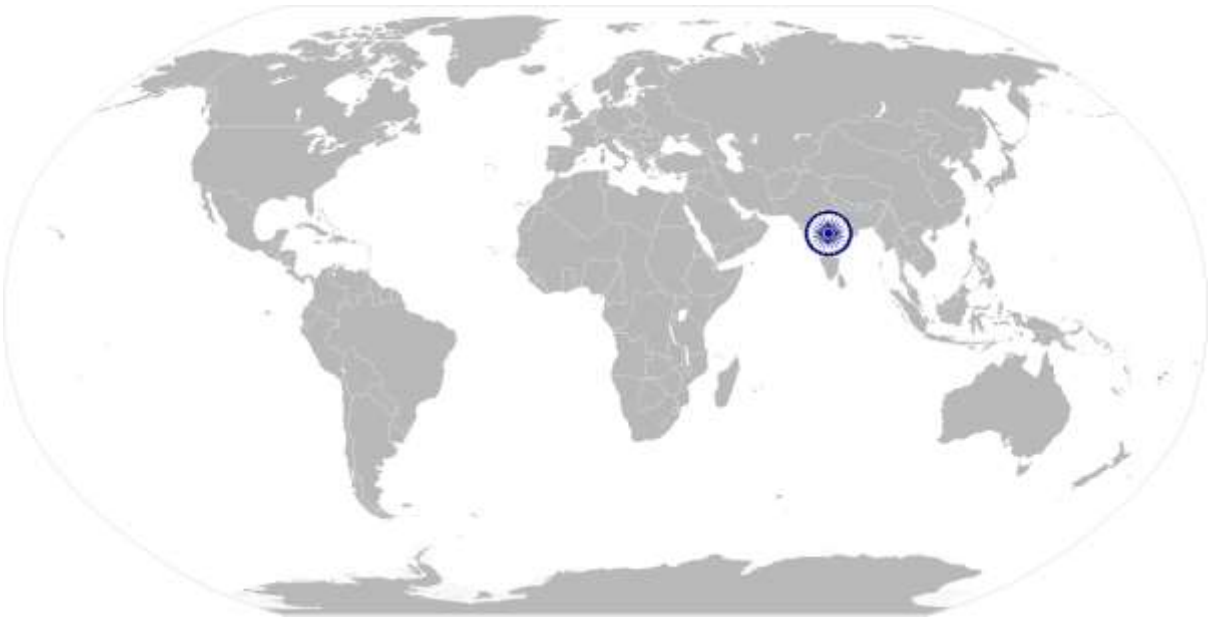

National Occupational Standard

Overview

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

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	The scope of this role will include: • Perform safety and sanitation related functions (for processing food products) • Apply food safety practices (for processing food products)
Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Perform safety and sanitation related functions (for processing food products)	PC1. comply with food safety and hygiene procedures followed in the organization 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
Apply food safety practices (for processing food products)	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 designated storage areas according to safe food practices PC16. follow stock rotation based on FEFO/ FIFO
Knowledge and Understanding (K)	

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

E. Organizational Context (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. Technical Knowledge	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/marking 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
Skills (S)	
D. Core Skills/ Generic Skills	**Writing Skills** 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
	Reading Skills 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
	Oral Communication (Listening and Speaking skills)
	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. Professional Skills	**Decision Making**
	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)
	Plan and Organize
	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)
	Customer Centricity
	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
	Problem Solving
	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
	Analytical Thinking
	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
	Critical Thinking
	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/N9001		
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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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 evaulations 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**
1. FIC/N5001 (Prepare and maintain work area and process machineries for producing baked products in industrial units)	PC1. Clean and maintain the cleanliness of the work area using approved sanitizers and keep it free from dust, waste, flies and pests	**100**	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
			100	**35**	**65**
2. FIC/N5002 (Prepare for production of baked products in industrial units)	PC1. Read and understand the production order from the supervisor	**100**	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
			100	**35**	**65**

Assessment Criteria

3. FIC/N5003 (Produce baked products in industrial units)	PC1.	Refer to the production order and formulation for the product/SKU, and organize all the ingredients required for the product/batch	**100**	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

	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 though 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

	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
			100	**35**	**65**
4. FIC/N5004 (Complete documentation and record keeping related to production of baked products in industrial units)	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	**100**	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

		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
			100	**60**	**40**
5. FIC/N9001 (Food safety hygiene and sanitation for processing food products)	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		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	**100**	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, packaging material, process and finished products for the credibility and effectiveness of the food safety control system		4	1	3
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		5	2	3

Assessment Criteria

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

SEMESTER III

SEMESTER III

Course Name	Core III - Food Processing- II (Technology Of Fruits And Vegetables, Sugar AndSalt)	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNC03**	**Academic Year Introduced**	2018 - 19
Type of Course	Theory	**Semester**	III

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1:	Associate the moisture content with processed and minimally processed product
CO2:	Categorize the types of preservation
CO3:	Analyse different drying and dehydration techniques adapted in food processing
CO4:	Identify the types of preservatives used in food processing

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	3	3	3
CO2	3	2	3	2	3	2	3	3	3
CO3	3	2	3	2	3	2	3	3	3
CO4	3	2	3	2	3	2	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Fruits and Vegetables	To illustrate the impact of moisture content on the processing of fruits and vegetables	6+2+2=10
Preservation Methods	To compare the types ofcanning and preservation techniquesby the variedtemperature	6+2+2=10
Preservation by Drying and Dehydration	To identify the types, methods and Differentiate by drying and Dehydration	9+1+2=12
Preservation by Sugars and salts	To apply the technique of perservation using natural preservatives – Sugar and Salt	9+1+2=12
Preservation by Chemicals, Salts and Acids	To apply the technique of perservation using artificial preservatives – chemicals, salts and acids	6+2+2=10
Total Hours of Instruction		54 (18x3)

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

COURSE PLAN

Unit/ Module	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domainlevel
UNIT 1: Fruits and Vegetable Processing					
1.	Water activity and fruit spoilage	CO1	K1, F	Exemplify the water content and water activity of foods in our routine diet	K5, S1
2.	Intermediate moisture fruits and vegetables – principle, methods and products.	CO1	K1, F	List out the Intermediate moisture fruits and vegetables	K5, S1

3.	Minimally processed fruits and vegetables-Selection criteria, Temperature, Storage Period	CO1	K2, P	Display Minimally processed fruits and vegetables and determine its Selection criteria, Temperature and Storage Period	K3, S1
UNIT 2: Preservation Methods					
4.	Preservation by use of high temperature- Pasteurization, sterilization, canning – principles, steps involved and advantages, defects in canning and spoilage of canned foods.	CO2	K2, C	Collect and display some canned foods and identify the selection criteria for purchasing canned foods	K6, S3
5.	Preservation by use of low temperature - Refrigeration – principles, refrigerants, changes in refrigerated food, factors affecting the quality of refrigerated products, spoilage of refrigerated productsand maintenance of refrigerator.	CO2	K2, C	Draw and label a refrigerator and report on different types of refrigerators	K4, S3
6.	Preservation by use of very low temperature- Freezing – principle and steps in freezing, methods and types of freezing, advantages and disadvantages, frozen products.	CO2	K2, C	Prepare a scrap book of Preservation process by using very low temperature	K6, S3
UNIT 3: Preservation by Drying and Dehydration					
7.	Preservation by drying and dehydration – difference between drying and dehydration,	CO2	K2, C	Differentiate drying and dehydration with suitable examples	K4, S2
8.	preparation of food for drying, methods of drying, types of drier, methods of dehydration,	CO2	K2, C	Prepare dried or dehydrated product using fruits and vegetables	K4, S2
9.	Dried and dehydrated products.	CO2	K2, C	Exemplify the use of dried foodsin our routine diet	K5, S1
UNIT 4: Preservation by Natural Preservatives – Sugar and Salt					
10.	Preservation by sugar – principle of gel formation, method of preparation,FSSAI,AGMARK, and ISO standards for different preserved foods using sugar	CO3	K2, P	Differentiate the Preservation of sugar products by using variousstandards	K4, S2
11.	Sugars- types and sources	CO3	K1, F	Tabulate the kinds of sugar as per its sources	K3, S3
12.	Methods of preparation of sugars, jaggery, khandsari, raw and refined sugar, principles of sugar cookery.	CO3	K2, P	Differentiate the methods of sugar	K4, S2
13.	Confectionery - history, types, classification, role of sugar in confectionery, role of chemical additives in confectionery.	CO3	K1, F	Differentiate the role of sugar in confectionery, role of chemical additives in confectionery	K4, S2

14.	Preparation of caramel, toffee, candy, chewing gum, bubble gum and chocolates.	CO3	K2, P	Infer about the crystalline and non-crystalline candies in the market	K4, S3
15.	Unfermented fruit beverages – Squash, RTS beverages, cordial, syrup, fruit Juice concentrate.	CO3	K2, P	Design the pamphlet for preparation methods of Unfermented fruit beverages	K5, S4
16.	Types of salt, uses of salt	CO3	K1, C	Interpret on each type of salt	K5, S4
17.	Brine, preparation of brines	CO3	K1, C	Demonstrate the preparation of brine Solution	K3, S1
18.	Composition of brines used in canning, pickling and curing.	CO3	K1, C	Demonstrate the any one product Preservation by salts and acids	K3, S1
UNIT 5: Preservation by Chemicals, Salts and Acids					
19.	Preservation by chemicals – principle, permitted chemical preservative in food processing, clarification offruit Juices	CO4	K2, P	Systematic literature review presentation on permitted chemical preservative in food processing	K2, S2
20.	Application in value addition of fruits and vegetable products.	CO4	K2, P	Criticize on value added foods items availabe in the market	K4, S4
21.	Preservation by salts and acids – principle, pickle, sauce and ketch up.	CO4	K2, P	Collect the types of pickles, sauces and ketch up available in the market and display	K3, S1

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3	Panda H (2013), The complete book on Fruits, Vegetales and Food processing, First Edition, NIIR Project Consultancy service
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2	Manay, S. & Shadaksharaswami, M. (2004), Foods: Facts and Principles, New Age Publishers.
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7	W B Crusess. (2004), Commercial Unit and Vegetable Products, W.V. Special Indian Edition, Pub: Agrobios India
JOURNALS AND DOCUMENTS	
1	Journal of Food Processing and Preservation, Wiley- Blackwell
2	Journal of Food Process Engineering, Wiley- Blackwell
3	Trends in Food Science and Technology, Elsevier
4	Fruits and Vegetable journals- OMICS International

CourseName	Core IV- Food Processing- III (Technology of Milk, Egg and Fleshy Foods)	**Programme Name**	B.Voc. Food Science and Nutrition
CourseCode	**18BFSNC04**	**Academic Year Introduced**	2018 - 19
Typeof Course	Theory	**Semester**	III

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1:	Define the raw milk handling process, types of milk and its by products
CO2:	Appraise the knowledge on preservation, cleaning and various treatment of egg processing
CO3:	Understand the concepts, preservation techniques involved in the processing of fleshy foods and its products
CO4:	Infer the handling process, chemical treatment and Value added Fish and marine products

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	3	3	3
CO2	3	2	3	2	3	2	3	3	3
CO3	3	2	3	2	3	2	3	3	3
CO4	3	2	3	2	3	2	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial									

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	**Objectives**	**Hours of Instruction L+Tu+Te=To**
Milk	To familiarize with different equipments and technologies applied in a dairy plant from the point of reception of milk till it is packed, stored and its products	12+1+3=16
Egg	To learn about processing and preservation technology of egg and its products	10+2+1=13
Fleshy foods	To illustrate the concepts, preservation techniques involved in the processing of fleshy foods and its products	10+1+2=13
Fishes and Marine products	To provide learning on process, chemical treatment and Value added Fish and marine products	09+1+2=12
Total Hours of Instruction		54 (18x3)

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

COURSE PLAN

Unit/ Module	**Intended learning Outcomes**	**CO(s) Mapped**	**Cognitive Level / KD**	**Psychomotor domain activity**	**Psychomotor domain level**
Unit-1 Milk					
1.	Raw Milk handling – Buying and collection of milk, cooling and transportation of milk, receiving, preheating, filtration, clarification, cooling and storage of rawmilk.	CO1	K2 F	Systematic literature review presentation on Raw Milk handling process	K2, S2
2.	Milk processing – standardization, pasteurization vacuum	CO1	K2 C	Visit a dairy industry and prepare a report	K3, S2

	pasteurization, homogenization, ultra filtration and reverseosmosis.				
3.	Milk products – cream, butter, butter oil	CO1	K2 P	Develop a milk basedsnack and Standardize the recipe	K6, S5
4.	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, caseinpowder (edible) and milk powder.	CO1	K2 P	Schematize the production of different dairy products	K4, S2
UNIT :2 Egg					
5.	Preservation of shell eggs, egg cleaning, oil treatment, cold storage, thermo stabilisation, immersion in liquids, preservation of albumin and yolk powder production.	CO2	K2 P	Demonstrate the cleaning of egg and preparation method of egg powder	K3, S1
UNIT :3 Fleshy foods					
6.	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.	CO3	K2 P	Sketch out slaughtering of meat	K5, S1
7.	Post mortem examination of carcass, grading and packaging of meat, post mortem changes in meat, methods of tenderization and factors affecting tenderization.	CO3	K2 P	Demonstrate the methods of tenderization used in fleshy foods	K3, S1
8.	Meat preservation – chilling, freezing, curing, smoking, canning, dehydration, irradiation and hurdle concept.	CO3	K2 P	Prepare a scrap book of various Preservation process of meat by using different temperature	K6, S3
9.	Meat and poultry products – meat emulsion, sausage, patties, roll, loaves, luncheon meats, meat balls, nuggets, fermented sausages, ham and bacon	CO3	K2 P	Prepare and display any one meat and poultry products in yourprocessing laboratory	K3, S2
10.	Indigenous meat products, cured meats, canned products, restrictedmeat	CO3	K2 P	Schematize the production of different Meat products	K4, S2

	products, sectioned and formed meat products, intermediate moisture meat product.				
UNIT 4: Fishes and Marine products					
11.	Onboard handling – Handling, washing, sorting, Evisceration, removal of gills, bleeding icing, bulking, shelving andboxing	CO4	K2 P	Demonstrate the handling process of fishes and Marine products	K3, S1
12.	Processing – post mortern changes, drying, dehydration, smoking, marination, salting, canning, fermentation, freezing,	CO4	K2 P	Demonstrate the any one processing methods of fish	K3, S1
13.	chemical treatments, low dose irradiation, high pressure treatment, MAP, vaccum packaging, gas packaging, hurdle concept	CO4	K2 P	List out examples of food packaging materials in our daily life	K5, S1
14.	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.	CO4	K2 P	Criticize on different value added Fishes and Marine products	K4, S4

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2	Joseph P. Kerry, (2002), Meat Processing, first Edition, ISBN: 9781855735835, Woodhead Publishing
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2	Meat science, Elsevier
3	Journal of Food Process Engineering, Wiley- Blackwell

Course Name	Allied-III-Food Product Development and Marketing Practical I	Programme Name	B.Voc Food Science and Nutrition
Course Code	**18BFSNA03**	Academic Year Introduced	2018 - 19
Type of Course	Practical	Semester	III

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1:	To identify the raw material availability and market trend of the new product ideas
CO2:	To develop innovative food product based of locally available raw materials
CO3:	To define the proof of concept and generate the technoeconomic feasibility report for the innovative product
CO4:	To evaluate the sensory attributes of the developed product

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	1	3	3	3	3	3	3	3	3
CO2	1	3	3	3	3	3	3	3	3
CO3	1	3	3	3	3	3	3	3	3
CO4	1	3	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Survey	To do a market analysis of the existing novel products and availability of the raw materials	10
Product Formulation and Standardisation	To enable the students to develop new product	15
Product assessment	To assess the innovative and feasible aspects of the product	15
Sensory Evaluation	To educate the sensory aspects of the product using hedonic scale	14
Total Hours of Instruction		54

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

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
Module 1: Survey					
1.	Market survey of existing various products	CO1	K4P	Conduct a Market analysis of ready to serve, ready to cook, ready mix and health mix powders using questionnaire	S3
2.	Raw material availability survey	CO1	K4P	To determine and assess the Availability of raw materials for a	S3

				new product	
Module II: Product Formulation and Standardisation					
3.	Product formulation	CO2	K6P	i. Aim of theproduct ii. Product formula iii. Equipments and utensilsrequired iv. Manufacturing protocol v. Nutritivevalue calculation vi. Discussion	S5
4.	Product standardisation	CO2	K5P	To Standardise the finished product in terms of portion size and number of servings	S3
Module III: Product assessment					
5.	Assessment on innovative concept in product	CO3	K5C	To appraise the i. Innovative conceptin product formula ii. Innovative concept in manufacturing protocol	S4
6.	Assessment of product feasibility	CO3	K5C	To assess theFinancial, technical and marketing perspective by cost calculations and marketstatus	S4
Module IV: Sensory Evaluation					
7.	Sensory evaluation of the new developed product	CO4	K5P	To perform the Subjective and Objective sensory evaluation of the developed product	S3

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1	Sri Lakshmi, B. (2018), Food Science, New Age International [P] Limited, New Delhi, Seventh Edition
2	Grunert, Klaus Gunter, Traill, Bruce (1997), Products and Process Innovation in the Food Industry, Springer
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1	Charis Galanakis (Ed.), (2016), Innovation Strategies in the Food Industry, Academic Press, First Edition.
2	Fuller, G. W. (2016). New food product development: from concept to marketplace. CRC Press.
3	Carpenter, R. P., Lyon, D. H., & Hasdell, T. A. (2012). Guidelines for sensory analysis in food product development and quality control. Springer Science & Business Media.
4	MacFie, H. (Ed.). (2007). Consumer-led food product development. Elsevier.
5	Usha Chandrasekhar, 2002, Food science and application in Indian Cookery, 1st Edition.
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1	Zeing Lei ,PDMA Handbook of New Product Development (3rd Edition)
2	Kenneth.B.Kahn,(2013), PDMA Handbook of New Product Development.John Wiley & Sons Inc(3rd

	Edition)
3	Kemp, Sarah & Hollowood, T. & Hort, Joanne. (2013). Sensory Evaluation: A Practical Handbook. 10.1002/9781118688076.
4	Innovative andFood Science and Emerging Technology,Elsevier

Course Name	Food Processing and Preservation Practical I	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNC05**	**Academic Year Introduced**	2018 - 19
Type of Course	Practical	**Semester**	III

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1:	Assess and compare the preparation and quality of non perishable food items available
CO2:	Recognize the benefits of enrobing and marinaiton of fleshy foods

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	1	3	3	3	3	3	3	3	3
CO2	1	3	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Module I Non – perishable items	To illustrate the techniques involved in the preparation of non perishable food items	24
Module II Semi – perishable items	To develop innovative products	30
Total Hours of Instruction		54

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

COURSE PLAN

Module/ Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
MODULE I - NON – PERISHABLE ITEMS					
1.	Preparation of puffed and popped cereals; papads	CO1	K3 P	Interpret the culinary uses of puffed and popped cereals	K5 S2
2.	Preparation of health mixes	CO1	K3 P	Perform organoleptic evaluation for prepared products using hedonic scale	K5 S3
3.	Preparation of ice cream cone	CO1	K3 P	Identify the cost effective methods for preparing ice cream cones	K2 S1
4.	Preparation of masala powders	CO1	K3 P	Summarize the best packing and storage	K2 S2

				method	
5.	Preparation of ready mixes	CO1	K3 P	Conduct paired comparison test for prepared ready mixes	K3 S3
6.	Preparation of extruded products	CO1	K3 P	Collect pictures of extruded products consumed worldwide and display it	K6 S1
MODULE II SEMI – PERISHABLE ITEMS					
7.	Preparation of enrobed mix for fleshy foods	CO2	K3 P	Examine the benefits of enrobing flesh foods	K4 S2

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2	Theodore Reynolds (2016), The Ice Cream Cone of Learning, Mind Tree Exponential LLC Publications
REFERENCE BOOKS	
1	Handbook on Manufacture of Indian Kitchen Spices (Masala Powder) with Formulations, Processes and Machinery Details (2020), NPCS Board of Food Technologist
2	Extruded Foods (2019), Essen Rivesta - Entwine World and Nutrition, TNAU, Coimbatore.
3	Cunningham FE (1995) Development in Enrobed Products IN: Mead GC (eds), Processing of Poultry, Springer - Ebook
JOURNALS AND DOCUMENTS	
1	Journal of Meat Science and Technology
2	Journal of Grain Processing and Storage

Course Name	Elective- I- Nutrition Chemistry	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNEL01**	**Academic Year Introduced**	2018 - 19
Type of Course	Theory	**Semester**	III

COURSE OUTCOMES:

On completion of the course, the students will be able	
CO1:	Understand the overall commonalities and differences in structure, function, action and metabolism of macronutrients
CO2:	Understand the overall commonalities and differences in structure, function, action and metabolism of micronutrients
CO3:	Identify the physiochemical characteristics and interaction of the different nutrients
CO4:	Outline the role of water in the maintenance and regulation of the different nutrients and total body function

Mapping of Cos with Pos, PSOs

Cos / Pos&PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	**Objectives**	**Hours of Instruction L+Tu+Te=To**
Colloids and Water	To learn about the physiochemical characteristic	3+3+3 = 9
Carbohydrate	To impart the knowledge of physio-chemical properties and metabolism of Carbohydrates	3+3+3 = 9
Protein	To learn the concept of physio-chemical properties and Metabolism of Proteins	3+3+3 = 9
Fat	To learn the concept of physio-chemical properties and Metabolism of fats	3+3+3 = 9
Vitamins	To impart the knowledge of physio-chemical properties and functions of Vitamins	3+3+3 = 9
Mineral, Phytonutrients and Bioactive compound	To impart the knowledge of physio-chemical properties and functions of Minerals, Phytonutrients and Bioactive Compound	3+3+3 = 9
Total Hours of Instruction		54

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

COURSE PLAN

Unit/Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
UNIT I Colloids and Water					
1.	Colloids- definition, types & properties & uses in food system.	CO1	K1,K2,K3,F	Classify (with video presentation)the types of Colloids and articulate its uses	K2,S3,S4
2.	Water- Structure, Functions of water, Hydrogen bonding, Types of water in foods, Water content in foods	CO1	K1,K2,K3,F	Make a power point presentationthe functional properties of water	K2,S3,S4
3.	Water activity in foods. Effect of water activity on food safety, Analysis of water and water activity.	CO1	K1,K2,K3,F	Design a poster about the functions and activity of the water Demonstrate the analysis of the water and water activity in the food	K2,K3K4,S4
UNIT II: Carbohydrate					
4.	Classification, Sources, Structure, Functions and its metabolism	CO2	K2,K3, C	With actual samples, give a factual demonstration of the different types of Carbohydrates and use a powerpoint to explain the structure, functions and metabolism	K2,K3,K5,S4
5.	Physio-chemical reactions - Hygroscopicity & Solubility, Optical rotation, Maillard reaction, Caramelization, Gelatinization, Dextrinization and Retrogradation	CO2	K2,K3,P	Using actual food samples and PPT to demonstrate the different characteristics of carbohydrates	K2,K3,K6,S3,S4
6.	Fibre - Classification, Sources, Functional Properties andUses.	CO2	K2,K3,C	Using powerpoint, actual food samples and infographics, explain the different types of fibre and its uses in the diet	K2,F,S3,S4
UNIT III: Protein					
7.	Classification, Sources, Structure, Functions and Metabolism of Proteins,	CO3	K2,K3,C	Using powerpoint, actual food samples and infographics, explain the different sources, composition and classification of the types of protein and its uses in the diet	K2, F,K4,S4
8.	Physio-chemical reactions of protein in food system-Dissociation, Denaturation, Hydration, Swelling, foam formation &Stabilization.	CO3	K2,K4,P		
9.	Emulsification, Amino acid in Maillard reaction	CO3	K3,C	Powerpoint presentation and discussion of the reactivity and nature of	K3,S3,S4

				proteins.	
UNIT IV: Lipids					
10.	Classification, Sources, Functions and Metabolism of Lipids	CO4	K2,P	Powerpoint presentation and discussion of the classification, physical characteristics, nature and functions of fatty acids	K2, F,K4,S4
11.	Fatty acid – Classification, physical Structure and properties	CO4	K2,P		
12.	Physio-chemical reactions –Isomerisation, Hydrogenation, Unsaturation, Inter-esterification, Emulsification, Auto–oxidation andRancidity.	CO4	K3,C		
UNIT V: Vitamins					
13.	Classification, Sources and functions of Fat solublevitamins in food.	CO5	K2,P	Powerpoint presentation and discussion of the classification, physical characteristics, nature and functions of fat-soluble vitamins	K2, F,K4,S4
14.	Classification, Sources and functions of water solublevitamins in food.	CO5	K2,P	Powerpoint presentation and discussion of the classification, physical characteristics, nature and functions of water-soluble vitamins	K2, F,K4,S4
UNIT VI: Minerals and Phytonutrients					
15.	Classification, Sources and Functions of Minerals infood.	CO6	K2,P	PowerPoint presentation and discussion of the classification, physical characteristics, nature and functions of minerals	K2 F,K4,S4
16.	Classification, Sources and Functions of phyto-nutrients and Bioactive compounds in food.	CO6	K2,P	PowerPoint presentation and discussion of the classification, physical characteristics, nature, uses and functions of phyto-nutrients and Bio-active compounds in foods	K2 F,K4,S4

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2	The Journal of Nutritional Biochemistry, Volume 77, March 2020, 108240
3	Journal of Agricultural and Food Chemistry 2015, 63, 46, 10161-10169 (Article), Publication Date (Web):October 27, 2015DOI: 10.1021/acs.jafc.5b03807
4	Phytochemical Stability in Dried Tomato Pulp and Peel As Affected by Moisture Properties Vera Lavelli*,William Kerr, and P. S. C. Sri Harsha Journal of Agricultural and Food Chemistry 2013, 61, 3, 700-707 Publication Date (Web):December 21, 2012DOI: 10.1021/jf303987v

Course Name	Quality Assurance Manager Portfolio I	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNPF03**	**Academic Year Introduced**	2018 - 19
Type of Course	Portfolio	**Semester**	III

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Compare and contrast different types of equipment's used in food testing laboratories
CO2	Exemplify the uses of equipment's

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Module I Food Testing Equipments	To gain practical knowledge about the equipment's used in food testing laboratories	36
Total Hours of Instruction		36(18*2)

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

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
MODULE I – FOOD TESTING EQUIPMENTS					
1.	Classification of equipment's – measuring equipment's, microbial equipments, thermogenic equipment's, advanced equipments	CO1	K2P	Compile the pictures of all the equipment's and project it	K6 S1
2.	Infer the working principle of the classified equipment's	CO1	K2P	Visit any food testing laboratory and record the working video of available equipment's	K4 S4
3.	pplications of the equipment's	CO2	K3C	Illustrate the working of equipment's in a food testing laboratory	K3 S3

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1	Pooja Bhagwan (2009), A Handbook of Chemical Analysis, International Scientific Publishing Academy.
REFERENCE BOOKS	
1	Khetarpaul N, Jood S, Punia D (2016), Food Analysis, Daya publishing house
JOURNALS AND DOCUMENTS	
1	Journal of Food control
2	Journal of Food and drug analysis

Course Name	Quality Assurance Manager- Mini project I	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNMP03**	**Academic Year Introduced**	2018 - 19
Type of Course	Project	**Semester**	III

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Formulate a new product and its process flow
CO2	Quality estimation of raw materials and finished product

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3	PSO4
CO1										
CO2										

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Module I - Quality estimation of innovative product	To examine the quality estimation of innovative new product	54
Total Hours of Instruction		54(18*3)

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

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
MODULE I – QUALITY ESTIMATION OF INNOVATIVE PRODUCT					
1.	Idea generation	CO1	K6C	Develop an innovative new product	K3S2
2.	Process flow chart	CO1	K6C	Plan the innovative new product process flow	K6S4
3.	Quality estimation - raw materials	CO2	K4C	Inspect the quality of raw materials used for the innovative product	K4S3
4.	ality estimation – finished product	CO2	K4C	Estimate the quality of innovative finished product	K4S3

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1	Khetarpaul N, Jood S, Punia D (2016), Food Analysis, Daya publishing house
REFERENCE BOOKS	
1	Mark Clutr (2017), Food Industry Quality Control Systems, CRC Press
JOURNALS AND DOCUMENTS	
1	Journal of Food Chemistry
2	Journal of Nutrients

SEMESTER IV

SEMESTER IV

Course Name	Core VI- Food Quality Control	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNC06**	**Academic Year Introduced**	2018-2019
Type of Course	Theory	**Semester**	IV

COURSE OUTCOMES:

On completion of the course, the students will be able to	
CO1	Identify different food safety hazards and its control methods
CO2	Describe and explain food quality concepts
CO3	Assess the quality of all the food items in the food group
CO4	Identify various food safety management tools used in food service operations
CO5	Summarize different national and international food regulations and standards

Mapping of COs with POs, PSOs

COs / POs&PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	**Objectives**	**Hours of Instruction L+Tu+Te=To**
Introduction to Food Safety andSanitation	To understand hazards and identify waste disposal methods	12
Introduction to Food Quality	To infer different assessment parameters	10
Food Quality Assessment	To demonstrate the quality estimation of foods	10
Food Quality Management	To frame SOPs and adopt GHP, GMP in industries	12
Food Laws and Legislations	To predict the role of food licensing agencies	10
Total Hours of Instruction		54

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

COURSE PLAN :

S. No.	**Intended learning Outcomes**	**CO(s) Mapped**	**Cognitive Level/ KD**	**Psychomotor domain activity**	**Psychomotor domain level**
	Unit – I Introduction to Food Safety and Sanitation				
1.	Definition of food safety and hazards	CO1	K1, F	Assess the food items for hazards and identify the removal method	K3, S2
2.	Types of hazards and its management	CO1	K2, F		
3.	hygiene and sanitation in food industries – physical and chemical contaminants in food chain	CO1	K2, C		

4.	Waste disposal methods	CO1	K2, C	Identify the waste disposal method followed in your college canteen	K4, S3
5.	Pest and rodent control	CO1	K2, C	Assess the effectiveness of pest management in your home/locality	K4, S4
6.	Personal hygiene practices	CO1	K2, C	List the hygiene practices followed in an industry	K1, S1
	Unit II Introduction to Food Quality				
7.	Definition of food quality, quality concepts, quality perception	CO2	K1, F	Group discussion about the importance of quality assurance personal in an industry	K2, S1
8.	Objectives of quality control and quality assurance	CO2	K1, F		
9.	Importance of quality control and quality assurance	CO2	K2, C		
10.	Functions of quality control and quality assurance	CO2	K2, F		
11.	Physical properties employed to assess food item's quality	CO2	K2, C	Performing quality estimation tests for food items while performing practical session	K2, S1
12.	Chemical properties employed to assess food item's quality	CO2	K2, C		
13.	Sensory properties employed to assess food item's quality	CO2	K3, C		
	UNIT – III Food Quality Assessment				
14.	Quality assessment of cereals and legumes	CO3	K4, P	Visit nearby industry and collect data regarding the quality assessment methods they follow andpresent it in theclass	K5, S3
15.	Quality assessment of fruits and vegetables	CO3	K4, P		
16.	Quality assessment of dairy products	CO3	K4, P		
17.	Quality assessment of meat and poultry	CO3	K4, P		
18.	Quality assessment of egg and processed food items	CO3	K4, P		
19.	Definition of panel screening and selection of panel members	CO3	K1, C	Demonstrating different types of sensory evaluation methods in the class room	K3, S2
20.	Definition of sensory evaluation and its types	CO3	K3, P		
21.	Types of consumer survey and the factors influencing it	CO3	K1, F	Collect information show casing the importance of consumer survey	K2, S2
22.	Comparison of laboratory panels with consumer panels	CO3	K5, C		
23.	Limitations of consumer survey	CO3	K2, F		
	UNIT – IV Food Quality Management				
24.	Quality management systems in India	CO4	K1, C	Prepare a HACCP and GHP plan for a food product	K6, S4
25.	Food safety management tools – GHP, GMP	CO4	K2, C		

26.	Food safety management tools – HACCP	CO4	K2, C	which you have developed	
27.	International Organization for Standardization and Accreditation and auditing	CO4	K1, C	Identify the recent developments in food industrial sector and discuss on it	K2, S1
28.	Total Quality Management	CO4	K1, C		
29.	Recent development in food quality management systems	CO4	K2, C		
	UNIT – V Food Laws andLegislations				
30.	Indian food regulations, standards and certification – FSSAI	CO5	K2, C	Prepare a note on the benefits of food standards andcertifications. Identify the licensing procedure	K2, S1
31.	BIS and Agmark	CO5	K2, C		
32.	Fruit Product Order and Meat Food Products Order	CO5	K2, C		
33.	Milk and Milk Product Order and Prevention of Food Adulteration Act	CO5	K2, C		
34.	International food regulations and certifications – ISO and FAO	CO5	K2, C	How far national standard is different from international standards.Identify it	K4, S2
35.	WTO and Codex Alimentarus Commission	CO5	K2, C		

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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
JOURNALS AND DOCUMENTS	
1	Journal of Food Quality, Wiley Publishers
2	Journal of Food Composition and Analysis, Elsevier
3	Food Quality and Preference, Elsevier
4	www.fao.org

Course Name	Core- VII- Instrumentation and Process Control	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNC07**	**Academic Year**	2018 - 2019
Type of Course	Theory	**Semester**	IV

COURSE OUTCOMES:

On completion of the course, the students will be able to	
CO1	understand the concept of unit operations of food processing, transport and storage equipments
CO2	spelt the principle and applications of processing and separation equipments in food industry
CO3	distinguish the principle and applications of the various heat transfer equipments used in food operation
CO4	comprehend the technical operation of the food processing equipments used in mass transfer process
CO5	twig the application of high end novel food processing and packaging equipments with quality assurance

Mapping of COs with POs, PSOs

COs / Pos&PS Os	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO 1	PSO 2	PSO 3	PSO 4
CO1	3	3	2	2	1	1	2	1	1	2
CO2	3	3	2	2	1	1	3	2	2	2
CO3	3	3	2	2	1	1	3	2	2	2
CO4	3	3	2	2	1	1	3	2	2	2
CO5	3	3	3	3	2	1	3	2	2	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module Title	Objectives	Hours of Instruction L+Tu+Te=To
Unit Operations, Transport and Storage Equipments	To learn the food processing operations, transport and storage of perishable, non-perishable and semi perishable foods	12
Processing and Separation Equipments	To understand the role of processing and separation equipments in a food business operation	10
Heat Transfer Equipments	To study the different type of heat transfer equipments and its functions	10
Mass Transfer Equipments	To learn the importance and operating procedure of the mass transfer equipments	12
Equipments for Novel Food Processes and Packaging	To familiarize the role of novel equipments in advanced food processing and packaging technology	10
Total Hours of Instruction		54

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

COURSE PLAN:

Unit/Chapters	Intended Learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activities	Psychomotor domain level
UNIT I: Unit Operations, Transport and Storage Equipments					

1	Classifications; design and selection of food processing equipments	CO1	K2, C	Enlist the equipments used in various units of processing of any onefood product	K2, S1
2	Mechanicaltransport equipments - pumps, process pipingand valves, conveyors	CO1	K2, C	Solicit the equipments used to transport products in continuous operation of a food processing unit	K3, S1
3	Food storage equipments – solid and liquid food storage equipments	CO1	K2, C	Prepare a video presentation on food storage equipments in any one food operation	K6, S1
UNIT II: Processing and Separation Equipments					
4	Processing equipments - peelers, dehullers / dehuskers, size reduction- slicers/ dicers, mincers, cutters, crushers and grinders; size enlargement- agglomerators, homogenizers and mixers	CO1	K2, C	Develop a e-content on principle, application and ISI technical specifications of any one food processing equipment	K3, S1
5	Separation equipments – sorters, separators – solid /solid separators, solid / liquid separators.	CO1	K2, C	Conduct a systematic literature review on various models of separation equipments used in any one food processing operation	K5, S4
UNIT III: Heat Transfer Equipments					
6	Heat transfer equipments – heat exchangers	CO2	K2, C	Prepare and display the SOP for the operation of any one heat transfer equipments	K3, S2
7	Heat generation equipments- microwave oven, omhic heating system, infrared emitters	CO2	K2, C		
8	Food evaporation equipments- evaporators	CO2	K2, C		
9	Thermal processing equipments – blanchers, sterilizers and pasteurizers	CO2	K2, C		
Unit-IV Mass Transfer Equipments					
10	Distillers, extraction and leaching equipments, gas and liquid absorption equipments, adsorption and ion exchange	CO3	K2, C	Define the role of any one mass transfer equipments in various food operations through interactive video presentation	K5, S1

	equipments, crystallizers				
11	Food dehydration equipment- dryers	CO3	K2, C		
12	Refrigeration and freezing equipments – refrigerators, freezers, thawers, freeze driers or lyophilizers	CO3	K2, C		
Unit-V Equipments for Novel Food Processes and Packaging					
13	Membrane separation equipment, irradiation system, extruders, fermenters	CO4	K2, C	Select an equipment and describe the manufacturing protocol to prepare any one value added product	K5, S4
14	Pulse electric field processing equipment, high pressure processing equipment, pulsed light processing equipment	CO4	K2, C	Find the feasible application of any one novel processing equipment in a medium scale industry	K5, S1
15	Instrumentation and control for food quality assurance	CO4	K2, C	Design a process flow for a quality assurance in a food production unit	K6, S3
16	Fillers, closures, sealers, wrappers, aseptic packaging equipment and palletizers	CO5	K2, C	Exhibit the upgradation to be made in a food packaging equipment according to the packaging material	K6, S5

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1.	Fellows, P.J. (2000), Food Processing Technology: Principles and Practice, second edition, CRC Woodhead Publishing ltd., Cambridge.
2.	Kress-Rogers, E. and Brimelow, C.J.B. (2001), Instrumentation and Sensors for the Food Industry, 2nd Edition, Woodhead Publishing
3.	Tarleton, S., & Wakeman, R. (2006), Solid/liquid Separation: Equipment Selection and Process Design, Elsevier.
4.	Tothill (Editor), (2003), Rapid and On-line Instrumentation for food Quality Assurance (Woodhead Publishing Series in Food Science, Technology and Nutrition), First Edition, Woodhaed Publishing.
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2.	Peter Zeuthen and LeifBogh – Sorensen, (2003), Food Preservation Techniques, Woodhead publishing ltd.
3.	George D. Saravacos and Athanasios E. Kostaropoulos (2002), Handbook of Food Processing Equipment, Kluwer Academic /Plenum publishers.
4.	Erika Kress-Rogers and Christopher J.B. Brimelow (2001), Instrumentation and Sensors for the Food Industry, A volume in Woodhead Publishing Series in Food Science, Technology and Nutrition.
5.	Zeuthen, P., & Bøgh-Sørensen, L. (Eds.). (2003). Food Preservation Techniques. Elsevier.
JOURNALS AND DOCUMENTS	
1.	Food Control, Elsevier
2.	Critical Reviews in Food Science and Nutrition, Taylor & Francis

Course Name	Allied IV- Food Product Development and Marketing Practical – II	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNA04**	**Academic Year Introduced**	2018 - 19
Type of Course	Practical	**Semester**	IV

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Justify the role of raw materials and its uses
CO2	Interpret the step involved Process line standardization of food product
CO3	Analyze the product in different laboratory principles
CO4	Choose the appropriate packaging material for developed food product
CO5	Infer the procedure for getting license of the product

Mapping of COs with POs, PSOs

COs, POs& PSOs	PO(T)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO 1	PSO 2	PSO 3	PSO 4
CO1	1	2	3	3	3	3	3	3	3	3
CO2	1	2	3	3	3	3	3	3	3	3
CO3	1	2	3	3	3	3	3	3	3	3
CO4	1	2	3	3	3	3	3	3	3	3
CO5	1	2	3	3	3	3	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial										

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Raw material	To Justify the raw materials used for developed product	1+5+3 = 9
Process line standardisation	To exemplify the application of various process line standardization of developed food product	5+10+=18
Product quality control	To estimate the quality of the developed food product	5+10+3 = 18
Packaging and labelling	To find out the suitable packaging material for developed product	1+4+1 = 6
FSSAI licence	To steps in applying for FSSAI licensing	1+2+0 = 3
Total Hours of Instruction		54 (18x3)

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

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
Raw material					
1.	Justification for the raw materials used	CO1	K6,C	Identify the uses and role of the raw	K2, S1

				materials	
2.	CCP (critical control points) and GHP (good hygienic practices)	CO1	K4,F	Appraise the sanitary practices and controlledconditions for processing, handling of raw materials	K3,S3
Process line standardization					
3.	Analyse the CCP,GHP and GMP followed during product formulation	CO2	K4,P	Exemplify the health hazard, additives and sanitary practices for developed food product	K5,S3
Product quality control					
4.	Standard Operating Procedure for the developed product	CO3	K6,P	Infer the standard operating procedurefor the developed product	K6,S4
Packaging and labelling					
5.	Types of packaging materials used	CO4	K3,C	Collect different types of packaging materials used invarious products	K3,S1
6.	Parts of labelling	CO4	K3,C	Identify the parts of labelling involved in the various food products	K5,S1
7.	Creation of new label for the developed product	CO4	K6,C	Create a new label for the developed food product	K6,S4
FSSAI licence					
8.	FSSAI Licensing procedure	CO5	K1,C	Generate a model online process stepsfor applying FSSAI Licensing	K5,S1

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TEXTBOOKS	
2	Ranganna, S. (2004), Handbook of analysis and quality control for fruit and vegetable products Tata McGraw Hill publishing co.Ltd., New Delhi
3	*Richard Bonne et all (2005)*, A comprehensive hand-book to assess your hygiene practices and HACCP system, Guidelines on HACCP, GMP and GHP for ASEAN Food SMEs, Asia/2003/069-236.
4	GMP And HACCP Handbook For Small And Medium Scale Food Processing Enterprises, published by the Ceylon Chamber of Commerce , Isbn: 978-955-604-037-1
JOURNALS	
1	Journal of Food Science and Technology, AFSTI publications.
2	International journal of Food science and technology, Edited by: Charles Brennan,Vol-55, ISSN:1365-2621
3	Journal of Food Quality, Published by Wiley, ISSN-0146-9428

Course Name	Food Processing and Preservation Practical II Practical	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNC08**	**Academic Year Introduced**	2018 - 19
Type of Course	Practical	**Semester**	IV

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1:	Apply various drying and dehydration techniques for preserving fruits, vegetables, fleshy foods and milk.
CO2:	Prepare preserved foods using salt and sugar as a natural preservatives for extending the shelf life of perishable foods

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	1	3	3	3	3	3	3	3	3
CO2	1	3	3	3	3	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial									

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Module I Preservation Using Drying, dehydration and concentration Techniques	To preserve the perishable foods like fruits, vegetables, fleshy foods and milk using drying and dehydration techniques	6+6+6=18
Module II Preservation Using Salt	To apply salt as a natural preservative for extending the shelf life of perishable foods	6+6+6=18
Module III Preservation using Sugar	To apply sugar as a natural preservative for extending the shelf life of perishablefoods	6+6+6=18
Total Hours of Instruction		54

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

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
Module I Preservation Using Drying Techniques					
1.	Osmotic dehydrated fruit – preserve	CO1	K3 P	Demonstrate the different drying techniques	K5 S2
2.	Preparation of dried and dehydrated vegetables	CO1	K3 P	Perform organoleptic evaluation for prepared products	K5 S3

				using hedonic scale	
3.	Preparation of salted and dried meat and dried fish	CO1	K3 P	Evaluate the shelf life of dried fleshy foods	K4 S1
4.	Preparation of cream, butter and ghee and paneer	CO1	K3 P	Use the prepared milk products for the preparation of other recipes	K1 S1
Module II Preservation Using Salt					
5.	Preparation of pickle using Vegetables (Lemon, Mango, Mixed Vegetables, Tomato, Greens, etc)	CO2	K3 P	Perform organoleptic evaluation for prepared products using hedonicscale	K4 S2
6.	Preparation of pickle from prawn, fish and meat	CO2	K3 P		
Module III Preservation using Sugar					
7.	Preparation of Fruit Jam (Apple, Pineapple, Grape, Mixed Fruits, etc)	CO2	K3 P	Perform organoleptic evaluation for prepared products using hedonicscale	K4 S2
8.	Preparation of Squash and fruit juice concentrate	CO2	K3 P	Examine the parameters of Squash and Fruit Juice concentrate, Sauce, Ketchup as perFSSAI Standards	K4 S2
9.	Preparation of sauce and ketchup	CO2	K3 P		
10.	Preparation of ice-cream and custard	CO2	K3 P	Perform organoleptic evaluation for prepared products using hedonicscale	K4 S2

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1	Norman W. Desroseier amd James N.Desroseier. (2004). The technology of Food Preservation. Fourth Edition. CBS Publishers and Distributors.
2	Getachew Osei. Processing and Preservation of Dairy Products. (2010). Agri Horti Press.
JOURNALS AND DOCUMENTS	
1	Journal of Food Science and Technology
2	Journal of Fruit Processing and Preservation

Course Name	Elective- II- Food for Life	**Programme Name**	B.Voc Food Science and Nutrition
Course Code	**18BFSNEL02**	**Academic Year Introduced**	2018-2019
Type of Course	Theory	**Semester**	IV

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	To implement the concept of food pyramid, balanced diet in planning a menu
CO2	To recommend the dietary guidelines for Indians
CO3	To analyse and evaluate the factors affecting currents trend,food purchase and consumption pattern
CO4	To develop innovative ideas to assure food equity in all the situations
CO5	To analyse the factors affecting dietary habits and requirements different stages of life cycle

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Principles of meal planning	To highlight the principles of menu planning	12
Dietary Guidelines for Indians	To exhibit the current view on dietary guidelines for Indians	10
Food preparation, selection andconsumption	To discuss the Food preparation, selection, consumption trend	10
Food Equity	To review the Food equity and factors influencing it	12
Diet in different stages of life cycle	To understand the Nutritional requirements in different stages of life cycle	10
Total Hours of Instruction		54

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

COURSE PLAN

Unit/Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level /KD	Psychomotor domain activity	Psychomotor domain level
UNIT I Principles of meal planning					
1.	Food groups and Food exchange list	CO1	K1C	Do a model of food pyramid/my plate and present it (Group activity)	K2S2
2.	Factors affecting meal planning and food related behaviour	CO1	K2C		
3.	Methods of assessment of nutrient requirements	CO1	K3P		

4.	Steps in planning balanced diet	CO1	K3P	Identify the steps in diet planning followed by a dietitian	K3S1
UNIT II: Dietary Guidelines for Indians					
5.	Current diet and nutrition scenario	CO2	K2C	Find out the merits and demerits of various trending diets	K5S2
6.	Dietary goals and 15 dietary guidelines for Indians	CO2	K2F		
7.	Energy cost for exercise and physical activity	CO2	K2C	Estimate a days energy cost for the specified age groups.	
8.	Menu planning considerations for special occasions	CO2	K3P	Do a presentation on each type of catering services and types of hotel	K2S3
9.	Menu planning considerations in catering and service operations	CO2	K3P		
UNIT III: Food preparation, selection and consumption					
10.	Food preparation – preparation of food, methods of cooking, medium of cooking and changes during cooking	CO3	K3P	Take one method of cooking and explain about nutritionalchanges during cooking	K2S2
11.	Criteria for selection and purchase of nutritious food	CO3	K3P	Choose one food item and formulate a selection criteria for the food item	
12.	Role of nutritional labelling in selection and purchase of food	CO3	K2C	A packed product with nutritional claim and highlight the ingredient responsible for the claim	
13.	Transition in food consumption pattern	CO3	K2C	Prepare a questionnaire regarding food consumption pattern	K6S4
14.	Factors affecting food consumption pattern – social, economic, nutritional and environmental	CO3	K2C	Collect different types of cuisines and foods across the world (South indian/Punjabi/mediterranenan/oriental/continental/western/Italian/French) in the form of chart /ppt/scrap book	K2S2
15.	Past and present food trends	CO3	K4C		
UNIT IV: Food equity					
16.	Definition of food equity and inequity 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	CO4	K2C	Collect a report on emergency situations all over the world and nutritional problems occurred during such situations	K1S2

17.	Influences on food availability and distribution 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	CO4	K2C	Prepare a write up on 1 Programmes and policies carried out by Governmental and Non Governmental agency towards food equity and supply of safewater and food during emergencies	K2S3
18.	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	CO4	K2C	Prepare a poster or pamphlet for access to food by different types of people	K3S5
19.	Food production practices – cash cropping and subsistence farming	CO4	K2C		
20.	Government and voluntary support networks for food equity	CO4	K1C		
UNIT V: Diet in different stages of life cycle					
21.	RDA, nutritional requirements and balanced diet planning for pregnancy, lactation, infancy,childhood, adolescence, adulthood and aged	CO5	K3C	Enlist the problem occurring during each stage of lifecycle anddevise a nutritional managementplan for eachproblem	K6S4
22.	Factors influencing food habits in different stages of life	CO5	K2C		

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2	Sri Lakshmi, B. (2018), Nutrition Science , New Age International [P] Limited, New Delhi, Sixth Edition
3	Shakuntalamanay, N. & Shadakcheraswamy, M, (2004), Foods, Facts and Principles, Wiley Easterd Ltd.
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3	Sunetra Roday (2012), Food Science and Nutrition, Second Edition, Oxford University Press, India.
4	Joshi, S. A. (1995). Nutrition and dietetics. McGraw-Hill Education.
5	Escott-Stump, S., & Mahan, L. K. (Eds.). (2000). Krause's food, nutrition, & diet therapy. WB Saunders.
6	Bamji,M.S., Krishnaswamy, K., & Brahmam, G. N. V. (Eds.). (2016). Textbook of human nutrition. Oxford & IBH.
JOURNALS AND DOCUMENTS	
1	American Journal of Clinical Nutrition, American Society for Nutrition, 29165
2	Journal of Human Nutrition and Dietetics,Blackwell Publishing Inc.
3	Journal of Nutrition,Health and Ageing ,Springer Paris
4	Advances in Nutrition , American Society of Nutrition

Course Name	Quality Assurance Manager Portfolio II	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNPF03**	**Academic Year Introduced**	2018 - 19
Type of Course	Practical	**Semester**	IV

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Illustrate food analysis techniques for the finished food product
CO2	Perceive knowledge about food standards and laws

Mapping of COs with POs, PSOs

COs / POs & PSOs	PO(T)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3	PSO4
CO1										
CO2										

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Module I - Food quality assurance	To identity food analysis and food standards used in food industries	36
Total Hours of Instruction		36(18*2)

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

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
MODULE I – FOOD QUALITY ASSURANCE					
1.	List out the food analysis tests performed for estimating the quality of finished food products	CO1	K4P	Replicate food analysis for any finished food products	K6 S2
2.	Differentiate national and international food laws	CO2	K2P	Apply for any food licensing procedure, record and submit it	K3 S1

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TEXTBOOKS	
1	Pooja Bhagwan (2009), A Handbook of Chemical Analysis, International Scientific Publishing Academy.

REFERENCE BOOKS	
1	Mark Clutr (2017), Food Industry Quality Control Systems, CRC Press
JOURNALS AND DOCUMENTS	
1	Journal of Food Quality and Preference
2	Journal of Food Composition and Analysis

Course Name	Quality Assurance Manager- Miniproject II	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNMP03**	**Academic Year Introduced**	2018 – 19
Type of Course	Project	**Semester**	IV

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Rectify identified hazards in the process flow
CO2	Distinguish auditing and documentation methods

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Module I - Food Safety Management System plan	To review the food safety management system for the developed product	54
Total Hours of Instruction		54(18*2)

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

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
MODULE I – FOOD SAFETY MANAGEMENT SYSTEM PLAN					
1.	Introduction	CO1	K1P	Innovative product formulated in miniproject I	K3S2
2.	FSMS process model	CO1	K2P	Hazzard Analysis Critical Control Points, GHP, GMP	K3S2
3.	Decision tree	CO1	K6C	Identification and rectification of hazards	K5S3
4.	diting procedures	CO2	K2P	Document maintenance	K4S1

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1	Mark Clutr (2017), Food Industry Quality Control Systems, CRC Press
JOURNALS AND DOCUMENTS	
1	Journal of Food control
2	Journal of Food Safety and Hygiene

QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR FOOD PROCESSING

Contents

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 – 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 **Minimum Educational Qualifications** **Maximum Educational Qualifications**	6 Masters degree in science, preferably Not applicable
Training (Suggested but not mandatory)	1. Total Quality Management 2. Occupational Health & Safety Advisory Services 3. Environmental Management System 4. Food Safety Standards and Regulations (as per FSSAI)
Minimum job entry age	30 years
Experience	8-10 years in a food processing unit
Applicable National Occupational Standards (NOS)	**Compulsory:** 1. FIC/N7021 Lead quality function in food processing units 2. FIC/N7022 Manage quality in food processing units 3. FIC/N7023 Manage audit and implement health and safety system in food processing unit **Optional:** N.A.
Performance Criteria	As described in the relevant OS units

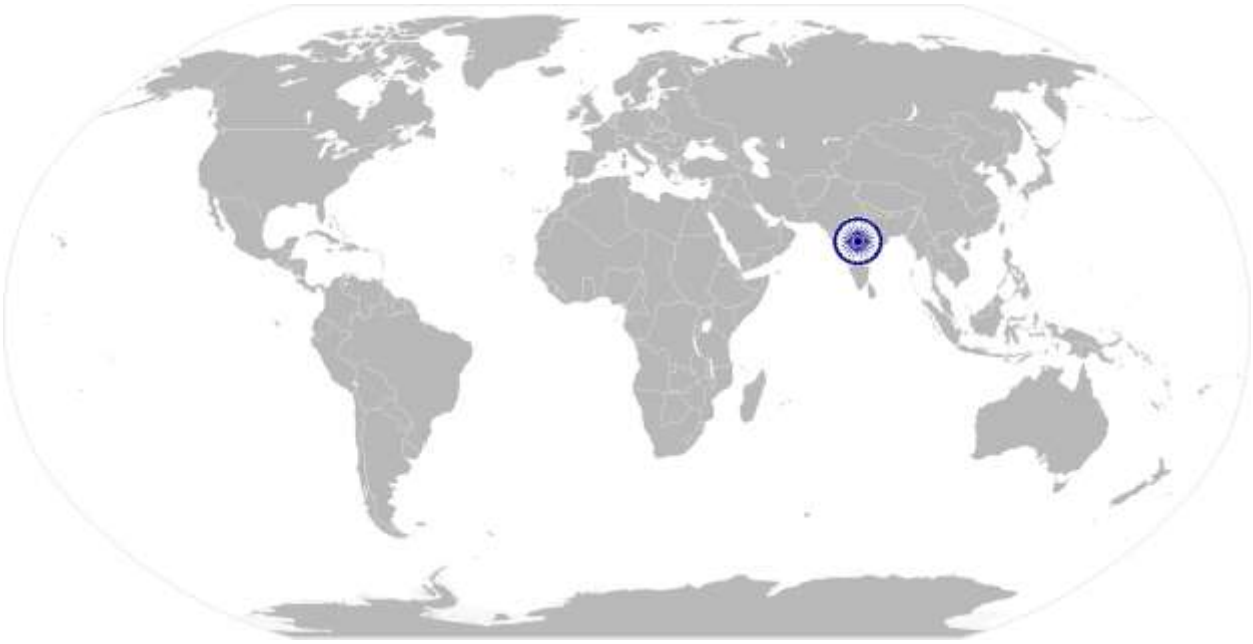
Definitions

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

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.

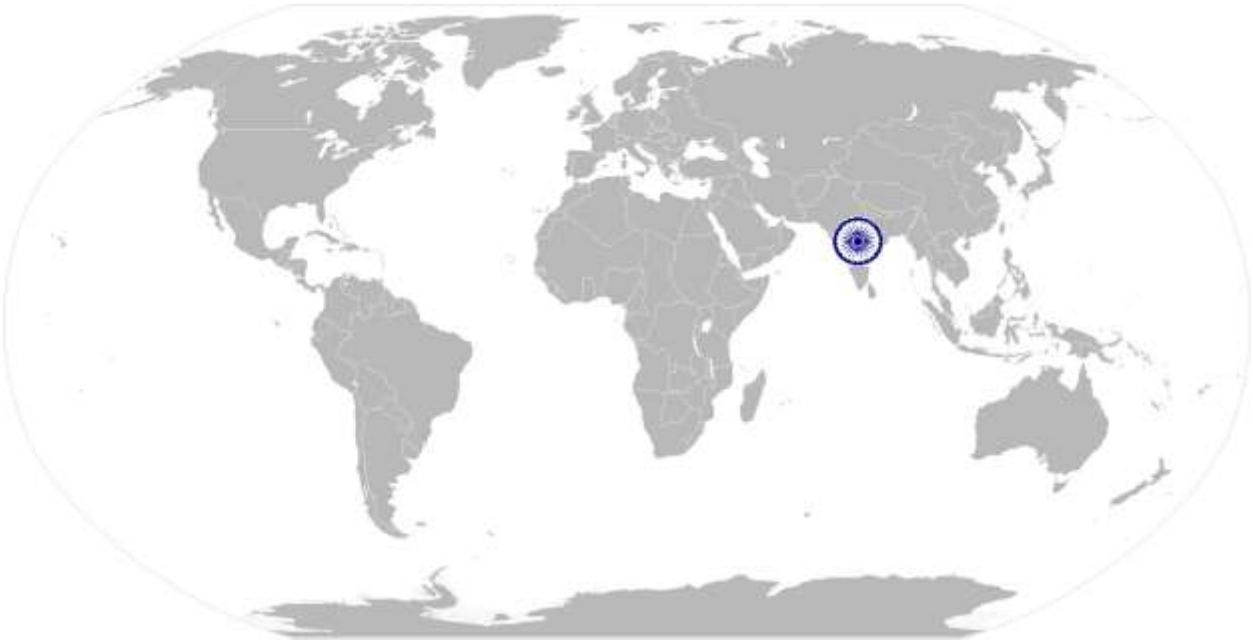
National Occupational Standard

Unit Code	FIC/N7021
Unit Title (Task)	Lead quality function in food processing units
Description	This OS unit is about leading quality function in food processing units.
Scope	This unit/task covers the following: • Develop and implement operational plans for quality function • Provide leadership to the quality team • Manage Budget
Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Develop and implement operational plans for quality function	To be competent, the user/individual must be able to: PC1. develop operational plans for the quality department that is consistent with the objectives and goals of organisation 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 PC3. develop operational plan for managing environmental issues PC4. set demanding but achievable objectives and targets for quality function and assign responsibilities to all employees of quality team PC5. implement plan, evaluate periodically, analyze and recommend changes PC6. monitor and control the operational plan to achieve its overall objectives PC7. design new work processes, procedures, systems, structures and roles for the changes implemented in the organisation, quality system, and legal regulations PC8. review and ensure implemented changes are effective and meets the requirements of the organisation
Provide leadership to the quality team	To be competent, the user/individual must be able to: PC9. communicate clearly and enthusiastically the organisation vision and values, make employees understand and commit their energy and expertise to achieve organisation goals PC10. understand the organisation and employees, develop a leadership style and apply them appropriately to achieve department targets and organisation goals 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 PC12. motivate and support employees to achieve their work and development objectives, and provide recognition when they are successful 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 PC14. initiate personnel actions, such as promotions, transfers, discharges or disciplinary measures PC15. lead quality department and team successfully through difficulties and challenges

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

	against budgets
Skills (S)	
A. Core Skills/ Generic Skills	**Writing Skills**
	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
	Reading Skills
	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
	Oral Communication (Listening and Speaking skills)
	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. Professional Skills	**Decision Making**
	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)
	Plan and Organize
	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)
	Customer Centricity

	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
	Problem Solving
	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
	Analytical Thinking
	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
	Critical Thinking
	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/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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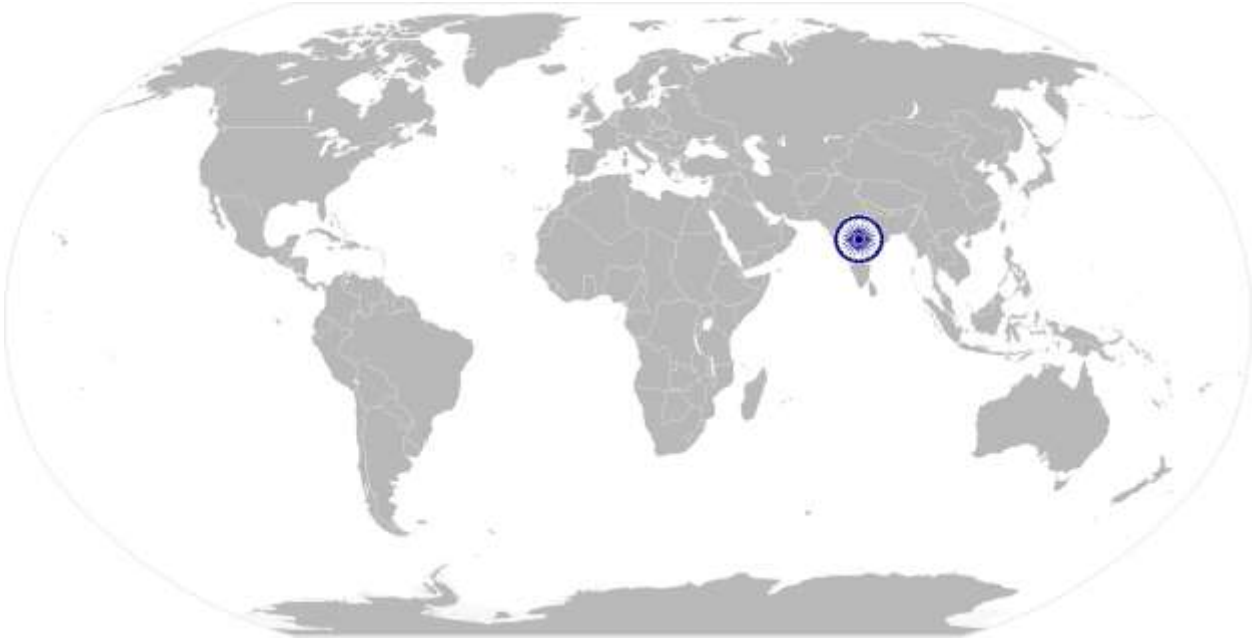


Overview

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

National Occupational Standard

Unit Code	FIC/N7022
Unit Title (Task)	Manage quality in food processing units
Description	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
Scope	This unit/task covers the following: • Quality management in the organization (for food processing unit) • Implement and monitor quality system (for food processing unit) • Ensure product compliance (for food processing unit)

Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Quality management in the organization (for food processing unit)	To be competent, the user/individual must be able to: PC1. establish objective/road map and budget for quality function PC2. communicate and share the company quality philosophy to key personnel in the organisation PC3. analyze quality performance and measure against internal and external standards PC4. prepare monthly summaries of quality issues for presentation to the senior management team PC5. keep senior management informed of significant developments in quality assurance activities PC6. support organization's various key decision making processes like cost 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
Implement and monitor quality system (for food processing unit)	To be competent, the user/individual must be able to: 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 PC17. support R&D, marketing, packaging team in new concept development, review of formulation and applicable product/package regulatory requirements PC18. analyze ways to reduce waste and increase efficiency PC19. develop and implement effective consumer/customer communication and feedback system to ensure the communication down the line, and minimizing the customer complaints PC20. compile quality control reports, create statistical process control metrics, manage non-conformity discrepancy reports, and recommend continuous improvement activities
Ensure product compliance (for food processing unit)	To be competent, the user/individual must be able to: PC21. ensure food products produced meet the organisation standards, national and international regulations PC22. ensure routine sampling, testing and inspection of raw materials, packing materials, production on-line samples, and finished products to achieve product quality PC23. ensure appropriate calibration of testing equipments PC24. ensure all legal licenses are renewed and up-to-date PC25. carry out audits to identify areas of weakness within organization system, document audit findings and recommend ways to improve them PC26. manage audits by third-party PC27. analyze and understand consumer complaints on product, identify reasons, and implement control and preventive measure 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 PC29. monitor performance by gathering relevant data and producing statistical reports PC30. oversee production processes to ensure production of products with consistent quality standards established by the organisation and government PC31. monitor production processes, process layouts, process sequences to obtain quality products through processes 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 PC33. encourage employees of quality department to take personal responsibility for achieving quality standards and to address or report critical issues 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 PC35. organize training and awareness programs and ensure employees are up-to-date on quality systems and requirements PC36. provide or organize training on organisation standards, legal regulations on food (FSSAI), testing procedures, production, effect of process parameters on

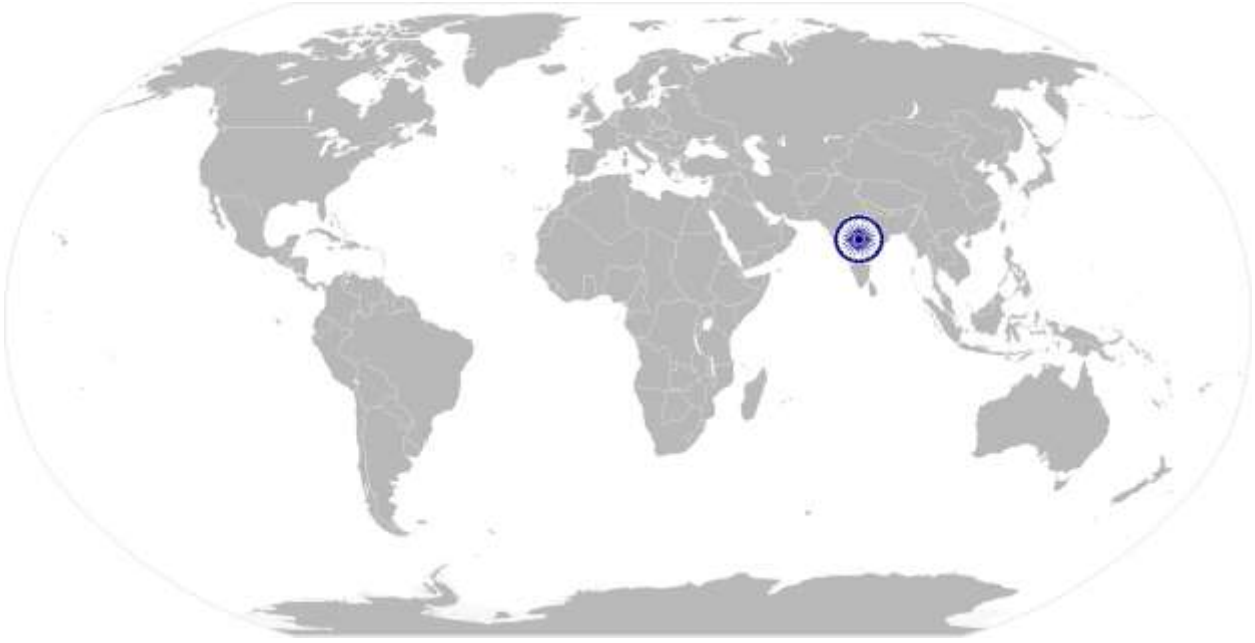
FIC/N7022 **Manage quality in food processing units**

	production process and product quality, basic microbiology, health and safety, hygiene practices, Good Manufacturing Practices (GMP) etc.
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. organisation policies and goals KA2. quality management KA3. budget management KA4. food regualtory policies and procedures related to products produced in the organisaiton KA5. quality mark accreditations of the organisations KA6. audit procedures KA7. code of business conduct KA8. leadership techniques KA9. manage competency requirements of the qa personnels KA10. manpower modelling and handling
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. quality management principles and methods, tools and techniques KB2. current developments, tools and techniques in quality management, legal and regulatory requirements KB3. marks, awards or accreditation in line with organisation's values and methods to obtain them KB4. methods to develop and implement quality system that deliver results at reasonable cost and acceptable level of risk KB5. methods to maintain and ensure quality system KB6. methods to evaluate if processes and product quality are meeting the organisation and regulatory standards KB7. methods to detect and record any non-conformance related to processes and product quality KB8. methods to investigate reason for non- conformance and decide on appropriate corrective actions KB9. methods to monitor effectiveness of quality system KB10. methods to improve business processes, quality systems and procedures KB11. FSSAI KB12. international regulations like FDA, CODEX Alimentarius etc KB13. QMS KB14. ISO KB15. HACCP KB16. GMP
Skills (S)	
A. Core Skills/ Generic Skills	**Writing Skills**
	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
	Reading Skills
	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
	Oral Communication (Listening and Speaking skills)
	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. Professional Skills	**Decision Making**
	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)
	Plan and Organize
	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)
	Customer Centricity
	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
	Problem Solving
	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
	Analytical Thinking
	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

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

	Critical Thinking
	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/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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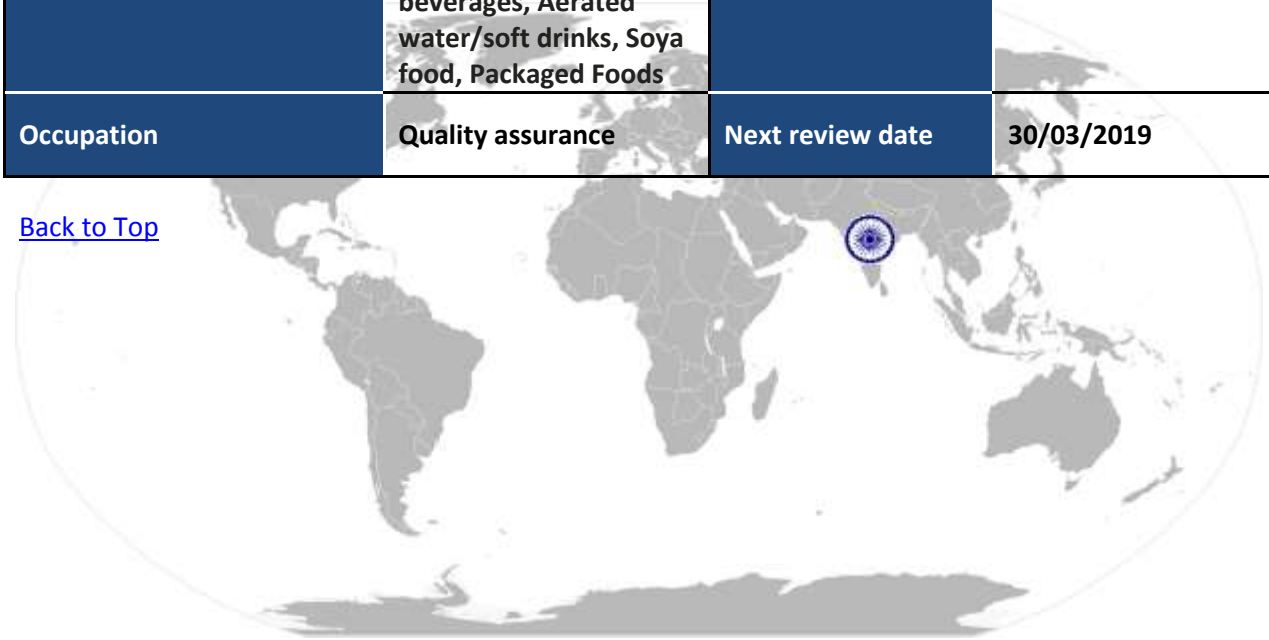

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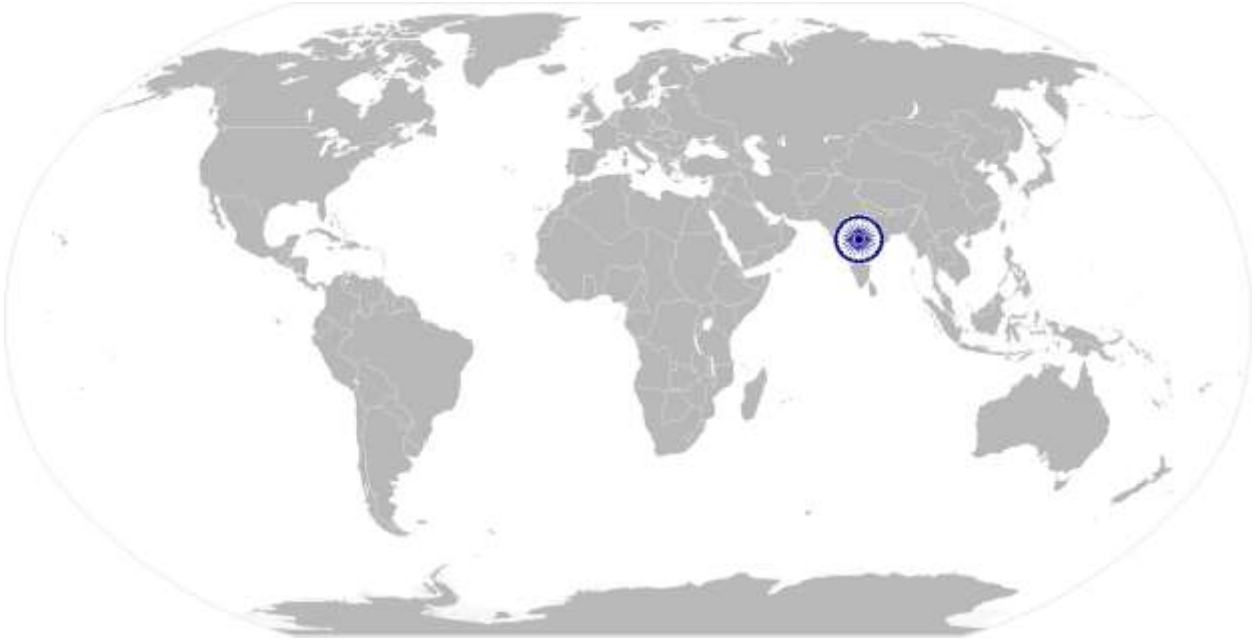

Overview

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: • Manage and conduct quality audits (for food processing unit) • Implement health and safety system (for food processing unit)

Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Manage and conduct quality audits (for food processing unit)	To be competent, the user/individual must be able to: PC1. establish to the quality team the importance of documentation, provide training on documentation system, and ensure all quality documents are maintained systematically PC2. ensure all relevant records and documents are complete, up-to-date and accessible PC3. ensure corrective actions agreed in previous audits have been implemented, and recommendations have been considered and acted upon PC4. manage third party audit by providing the auditor with access to all relevant information, records and documentation 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 PC6. ensure agreed corrective actions are carried out by agreed dates 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 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 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 PC10. identify and analyze any problems related to process and quality procedures, report findings and recommendations to management for immediate action PC11. maintain complete records of quality audits for management review and future reference
Implement health and safety system (for food processing	To be competent, the user/individual must be able to: PC12. establish organization's responsibilities for health and safety regulations and ensure there is a written health and safety policy applicable for all employees

FIC/N7023	Manage audit and implement health and safety system
unit)	PC13. ensure health and safety policy and procedures are clearly communicated to all employees of the organisation PC14. ensure health and safety to be a priority while planning organisation standards PC15. implement system for identifying hazards and assessing risks in processing food products, and set procedures to control and prevent them PC16. implement system for gmp, haccp, fifo/fefo, product recall etc PC17. organize training to the employees on food safety, hygiene and sanitation for effective implementation of the systems 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 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 PC20. ensure systems are in place for effective monitoring, measuring and reporting the performance of health and safety system PC21. conduct unannounced audits in all functions of the organisation to ensure health and safety procedures are being followed
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. organisaiton policies and goals KA2. quality management system KA3. quality mark accreditations of the organisations KA4. audit procedures KA5. audit management KA6. food regualtory policies and procedures related to products produced in the organisaiton KA7. documentation and records management system KA8. health and safety policy KA9. food safety system like FSSAI
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. methods of ensuring records and documentation are complete and up-to-date KB2. industry requirements for quality management and auditing KB3. various audit methods and techniques KB4. methods of preparation for audit KB5. methods of carrying out quality system audits to meet and maintain quality standards KB6. methods to carry out audit with available documents and identifying any discrepancies KB7. methods and procedures to decide and suggest appropriate corrective actions to each discrepancy KB8. methods and procedures to identify any discrepancies in system, possible risks to organization and employees

FIC/N7023 **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
Skills (S)	
A. Core Skills/ Generic Skills	**Writing Skills**
	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
	Reading Skills
	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
	Oral Communication (Listening and Speaking skills)
	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. Professional Skills	**Decision Making**
	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)
	Plan and Organize
	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)
	Customer Centricity
	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
	Problem Solving
	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
	Analytical Thinking
	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
	Critical Thinking
	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/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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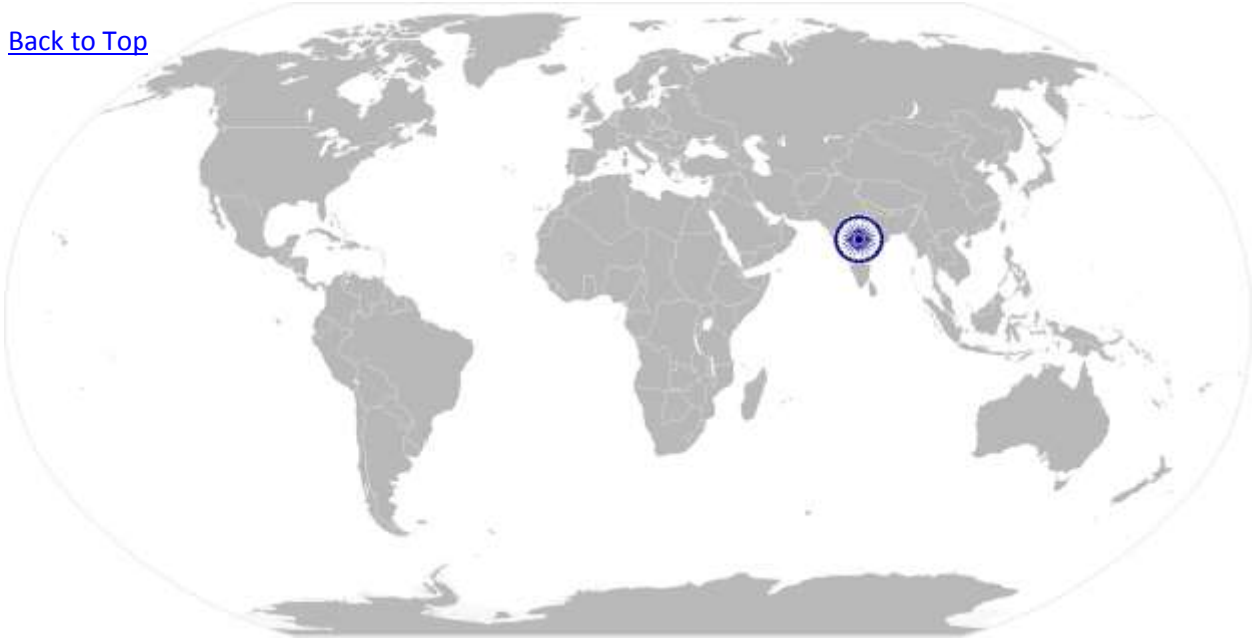

Annexure

Nomenclature for QP and NOS

Qualifications Pack

9 characters

[ABC]/ Q 0101

[Insert 3 letter code for SSC]

Q denoting Qualifications Pack

QP number (2 numbers)

Occupation (2 numbers)

Occupational Standard

An example of NOS with 'N'

9 characters

[ABC] / N 0101

[Insert 3 letter code for SSC]

N denoting National Occupational Standard

OS number (2 numbers)

Occupation (2 numbers)

Back to top…

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

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 evaulations 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
1.FIC/N7021 (Lead quality function in food processing units)	PC1.	develop operational plans for the qulaity department that is consistent with the objectives and goals of organisation	**100**	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
			100	**35**	**65**
2. FIC/N7022 (Manage quality in food processing units)	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
			100	**35**	**65**

Assessment Criteria

3. FIC/N7023 (Manage audit and implement health and safety system)	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
			100	**35**	**65**

SEMESTER V

SEMESTER V

Course Name	Core IX- Food Microbiology	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNC09**	**Academic Year Introduced**	2018 – 19
Type of Course	Theory	**Semester**	V

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Recognize microbial characteristics and demonstrate isolation techniques
CO2	Analyze the type of food spoilage & intoxication and describe the source of contamination
CO3	Appraise the benefits of fermentation and its products
CO4	Interpret the destruction methods employed and its effectiveness
CO5	Inspect food items for securing its quality

Mapping of COs with POs, PSOs

COs / POs & PSOs	PO(T)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	3	3	3
CO2	3	2	3	2	3	2	3	3	3
CO3	3	2	3	2	3	2	3	3	3
CO4	3	2	3	2	3	2	3	3	3
CO5	3	2	3	2	3	2	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Unit I - Introduction and scope of food microbiology	To gain knowledge about food microbiology	12
Unit II - Spoilage, microbiology of food and food borne diseases	To understand the causes of food spoilage, contamination and food borne diseases	10
Unit III - Food fermentation	To familiarize with the techniques of food fermentation and its uses	10
Unit IV - Control and destruction ofmicroorganisms	To employ best disinfectant methods and identify best disinfectingagents	12
Unit V - Indices of sanitary quality	To recognize the microbial limits of food, water and soil	10
Total Hours of Instruction		54

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

COURSE PLAN

Unit/Chapter	Intended learning Outcomes	CO(s) Mapped	Cognitive Level/ KD	Psychomotor domain activity	Psychomotor domain level
Unit I: INTRODUCTION AND SCOPE OF FOOD MICROBIOLOGY					
1.	Brief history of food microbiology	CO1	K2 F	Collect information on the recent developments in food microbiology	K6 S1
2.	Introduction to important microorganisms in food	CO1	K2 F		
3.	General characteristics of bacteria, fungi, virus, protozoa and algae	CO1	K1 C	Prepare a chart work depicting the characteristics of	K6 S2

				microorganisms	
4.	Cultivation of microorganisms –Nutritional requirements, types of media used and method of isolation	CO1	K1 C	Perform microbial isolation techniques in the laboratory	K3 S3
UNIT II: SPOILAGE, MICROBIOLOGY OF FOOD AND FOOD BORNE DISEASES					
5.	Types – food borne infections and Intoxications	CO2	K1 C	Trace the reported incidents on food borne diseases	K4 S1
6.	Water activity and food spoilage	CO2	K1 C	Draw a curve showing the water activity level of different foods (from minimum to maximum range)	K3 S2
7.	Food spoilage – types and sources	CO2	K1 C		
8.	Contamination of cereals and cereal products	CO2	K2 F	Recognize the sources of contamination and discuss on it	K2 S1
9.	Contamination of vegetables and fruits	CO2	K2 F	Frame a SOP for proper storing of fruits and vegetables to prevent contamination	K6 S4
10.	Contamination of meat and meat products	CO2	K2 F	Collect pictures for the do's and don'ts to be followed in handling of fleshy foods	K2 S3
11.	Contamination of fish, egg and poultry	CO2	K2 F		
12.	Contamination of milk and milk products	CO2	K2 F	Interpret the sources of contamination	K3 S1
13.	Contamination of sugar and sugar products	CO2	K2 F	Develop a scrap book or chart work with pictures showing the contamination of sugar and its products	K6 S2
14.	Contamination of canned foods	CO2	K2 F	Visit a store or super market and assess the canned products for contamination based on its physical appearance	K5 S3
UNIT III: FOOD FERMENTATION					
15.	Fermentation - definition and types; Microorganisms used in food fermentations	CO3	K2 C	Inspect the benefits of micro organisms used in fermentation techniques	K3 S1
16.	Dairy fermentation - starter cultures and their types, concept of probiotics	CO3	K2 C	Distinguish probiotics and prebiotics with appropriate examples	K4 S2
17.	Fermented foods-types, methodsof manufacture forvinegar, sauerkraut, tempeh, miso, soya sauce ,beer, wine and traditional Indian foods	CO3	K3 P	Collect pictures of fermented foods listed and circulate it with its way of usage	K6 S3

UNIT IV: CONTROL AND DESTRUCTION OF MICROORGANISMS					
18.	Fundamentals of control of microorganisms in food – Extrinsic and intrinsic factors affecting growth and survival of microorganisms	CO4	K2 C	Draw growth curve of micro organism and display it in your class room	K4 S1
19.	Use of high and low temperature, dehydration, freezing, freeze drying, irradiation and preservatives in food	CO4	K2 C	Assess the market and find out the products that are preserved using the given preservation techniques	K5 S3
20.	Sterilisation and disinfection – methods	CO4	K2 C	Collect videos on disinfection methods used worldwide in eliminating micro organisms or its growth	K6 S2
21.	Common disinfectants used in home and at industries	CO4	K3 P		
22.	Tests to identify the effectiveness of sterilization and disinfection.	CO4	K4 P		
UNIT V: INDICES OF SANITARY QUALITY					
23.	Indices of food, milk and water sanitary quality	CO5	K1 F	Identify the permissible organisms and its limit in food, milk and water	K4 S1
24.	Microbiological criteria of foods, water and milk testing	CO5	K4 P		
25.	Sampling of air, water, dust, soil, food and food handlers to study the various sources of transmission of microorganism in food	CO5	K4 P	Analyze the GHP and GMP procedures to be followed in preventing the transmission of microbes form one source to another	K4 S3

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2	Adams MR, Moss MO (2007), Food Microbiology, Royal Society of Chemistry, 3rd Edition
3	Matthews KR, Kniel KE, Montville TJ (2017), Food Microbiology; An Introduction, ASM Press, 4th Edition
REFERENCE BOOKS	
1	Doyle MP, Buchanan RL, (2012), Food Microbiology; Fundamentals and Frontiers, ASM Press, 4th Edition
2	Hal King, (2013) Food Safety management: Implementing a Food Safety Program in a Food Retail Business, Springer
3	Forsythe SJ, (2011) The Microbiology of Safe Food, Wiley Blackwell Publications, 2nd Edition
JOURNALS AND DOCUMENTS	
1	International Journal of Food Microbiology, Elsevier
2	Journal of Food: Microbiology, Safety and Hygiene
2	Journal of Food Processing and Technology

Course Name	Core X- Food Packaging Technology	**Programme Name**	B.Voc Food Science and Nutrition
Course Code	**18BFSNC10**	**Academic Year Introduced**	2018 - 2019
Type of Course	Theory	**Semester**	V

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Recall the history, packaging functions and requirements
CO2	Distinguish various types of packaging materials and other accessories in packaging
CO3	Apply the acquired knowledge in advanced packaging systems
CO4	Select and develop appropriate specific packaging material for specific food products
CO5	Test the effective and worthiness of packaging materials through various standard tests
CO6	Assess and evaluate the quality of packaged food
CO7	Study and interpolate the packaging rules and regulations

Mapping of COs with POs, PSOs

COs / POs& PSOs	PO(T)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	3	3	3
CO2	3	2	3	2	3	2	3	3	3
CO3	3	2	3	2	3	2	3	3	3
CO4	3	2	3	2	3	2	3	3	3
CO5	3	2	3	2	3	2	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	**Objectives**	**Hours of Instruction L+Tu+Te=To**
Introduction and scope of food packaging	To understand the basic functions of a food package, Food package design and development	5
Packaging materials	To familiarize with different types of packaging materials and its applications	5
Packaging systems and methods for food products	To impart knowledge on recent trends in Food Packaging system	10
Food packaging design	To learn the concepts in the designing of packaging materials for various food products	8
Testing and evaluation of packaging material	To gain knowledge about the testing and standards of packaging materials	10
Testing and evaluation of packaged foods	To learn about testing and standards of packaged foods	8
Packaging laws and regulations	To familiarize with the recent packaging laws and regulations	8
Total Hours of Instruction		54

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

COURSE PLAN

Unit/ Chapters	**Intended learning Outcomes**	**CO(s) Mapped**	**Cognitive Level /KD**	**Psychomotor domain activity**	**Psychomotor domain level**
UNIT I: Introduction and scope of food packaging					
1.	Definition, importance and role of food	C01	K1,F	Visit a food packaging andlabel	K2,S2

	packaging			manufacturing industry and prepare a report	
2.	Principles in the development of safe and protective packing	C01	K1,C		
3.	Factors determining the packaging requirements of various foods	C01	K2,C		
4.	Classification of packaging	C01	K2,C		
UNIT II: Packaging materials: Properties and application of primary packaging materials					
5.	Paperboards, metals, plastics, wood, plywood, glass, flexible packaging materials	C02	K1,C	Collect different types of packages and containers(paper,plastic,metal,glass) and discuss its advantages and disadvantagesinfront of your classmates	K4,S3
6.	Labels, caps and closures and wads, adhesives, inks and lacquers, cushioning materials, reinforcements etc.	C02	K1,C	Collect different types of closures,wads,cushioning materials adhesives,inks and lacquers discuss its advantages and disadvantagesinfront of your classmates	K4,S3
UNIT III: Packaging systems and methods for food products					
7.	Vaccum packaging, gas flush packaging, CAP & MAP, aseptic and retort packaging, Bag-in-Box packaging, artificial and intelligent packaging	C03	K2,P	Write an assignment on recent packaging systems and other advanced technologies used.	K2,S2
UNIT IV: Food packaging design					
8.	Package design for fresh horticultural produce and animal foods, dry and moisture sensitive foods, frozen foods, fats and oils, thermally processed foods and beverages**.**	C04	K5,C	Choose a particular food materials, enlist the requirements for effective packaging and suggest all the packaging materials that can be used	K2,S3
9.	Food marketing and role of packaging	C04	K2,C	Design a suitable package with label for the givenfood product	
UNIT V: Testing and evaluation of packaging material					
10.	Thickness, tensile strength, puncture resistance, bursting strength, seal strength, water vapor permeability, CO2 permeability, oxygen permeability, grease resistance	C05	K4,P	Bring a video related to any of the testing procedures of any packaging material and present it	K2,S2
UNIT VI: Testing and evaluation of packaged foods					
11.	Compatibility and shelf life studies, evaluation of transport worthiness of filled packages	C06	K4,P	Select a packaged food product(one brand) and identify their advanced technologiesadapted to increase the shelf life of the package	K2,S3

				(compare the shelf life)	
UNIT VII: Packaging laws and regulations					
12.	FDA, PFA, Packaging Commodity Rules, Weight and Measures Act, Packaging and Labelling Rules and Regulations of FSSAI	C07	K2,F	Bring one news article regarding issues faced by the food business companies violating the packaging laws and regulations,discussit with your classmates	K2,S3
13.	Coding and marking including barcoding	C07	K2,C	List out the different types of codings used in food packages	K2,S2
14.	Environmental & Eco issues and waste disposal	C07	K2,C	Choose one material and its implication on environment and come up with ideas for safe disposal or reuse	K3,S3

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2	Paine F.A and Paine H.Y,(1992) A Handbook of Food Packaging, Blackie Academic and Professional, New York.
3	Coles R, McDowell D, Kirwan MJ.,(2003), Food Packaging Technology. Blackwell Publishers, USA.
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3	Han J.H, Innovations in Food Packaging, Second Edition, Academic Press, UK, 2014.
4	Ahvenainen, R. (Ed.). (2003). Novel food packaging techniques. Elsevier.
5	Cerqueira, M. A. P. R., Pereira, R. N. C., da Silva Ramos, O. L., Teixeira, J. A. C., & Vicente, A. A. (2017). Edible food packaging: Materials and processing technologies. CRC Press.
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2	Annals. Food Science and Technology, Valahia University Press
3	Food Science and Human Wellness, Beijing Academy of Food Sciences
4	Journal of Food, Agriculture and Environment, WFL Publisher Ltd.
5	Natural Products and Bioprospecting, Springer

Course Name	Core XI - Food Microbiology	**Programme Name**	B.Voc.Food Science and Nutrition
Course Code	**18BFSNC11**	**Academic Year Introduced**	2018-2019
Type of Course	Practical	**Semester**	V

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Handle the equipments in a microbiology lab.
CO2	Prepare the laboratory media and special media, cultivation of bacteria, yeasts and moulds.
CO3	Staining the bacteria: gram-staining.
CO4	Cultivate and identify the important molds and yeast in food items.
CO5	Demonstration of available rapid methods and diagnostic kits used in identification of microorganisms or their products.

Mapping of COs with POs, PSOs

COs / POs & PSOs	PO(T)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	1	2	3	2	3	2	3	3	3
CO2	1	2	3	2	3	2	3	3	3
CO3	1	2	3	2	3	2	3	3	3
CO4	1	2	3	2	3	2	3	3	3
CO5	1	2	3	2	3	2	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

RUBRICS FOR PRACTICAL:

Assessment Rubrics / Scaling Percentage	Outstanding (81 - 100%)	Good (66 - 80%)	Satisfactory (50 - 65 %)
Conduct of Experiment (20)	Meticulous hands on skill in conducting experiments with clearunderstanding of principle and procedure	Able to conduct the experiment based on the given procedure	Lack of hands on skill and clarity in conducting experiments
Observation (20)	Excellent interpretation of the objectives and able to obtain accurate results	Good interpretation of the objectives and able to obtain result in tolerance range	Fair in interpreting the objectives and able to obtain result below tolerance range
Record (20)	Exceptional maintenance of records by following appropriate formats and adhering todeadline	Fair maintenance of records by following appropriate formats and submitting slightly beyond deadline	Lack of fair maintenance of record and delayed submission beyond deadline
Viva-voce (15)	Excellent in preparedness, clear delivery and knowledge in application	Good in preparedness, delivery and knowledge in application	Fair in preparedness, delivery and inadequate knowledge inapplication

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
1. Standard operating procedurefor microbiallaboratory	Handle the equipments in a microbiology lab.	3
2. Examine the morphology of microorganisms present in the givenfood samples by simple positivestaining	Staining the bacteria: gram-staining.	3

technique		
3. Examine the morphology of microorganisms present in the givenfood samples by simple negativestaining technique		3
4. Examine the morphologyof microorganisms present in the given food samples by gram's staining technique		3
5. Preparation of culture media forthe growth ofmicroorganisms	Prepare the laboratory media and special media, cultivation of bacteria, yeasts and moulds.	4
6. Techniques for isolation of microorganisms using serialdilution method		4
7. Enumerate the microbial load ofgiven food sample by spread platemethod		4
8. Enumerate the microbial load ofgiven food sample by pour platemethod		4
9. Enumerate the microbial load ofgiven food sample by streak plate method		4
10. Biochemical characteristics of microorganisms - indole production test	1. Cultivate and identify the important moldsand yeast in fooditems 2. Demonstration of available rapid methods and diagnostic kits used in identification of microorganisms ortheir products.	4
11. Methyl red test		4
12. Voges – proskauer test		3
13. Citrate utilization test		4
14. Enumerate the microbial load of food processing equipment's and vessels		4
15. Assessing the load of indicator microorganisms present in the given food sample		3
Total Hours of Instruction		54

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

COURSE PLAN

Unit/Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
1.	Standard operating procedure for microbial laboratory	CO1	K1, K2, K3 P	Power point Presentation and Practical Explanation in Laboratory	S1, S3
2.	Examine the morphology of microorganisms present in the given food samples by simple positive staining technique	CO3	K1, K2, K3,K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
3.	Examine the morphology of microorganisms present in the given food samples by simple negative staining technique		K1, K2, K3,K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
4.	Examine themorphology ofmicroorganisms present in the givenfood samples bygram's		K1, K2, K3,K5 P	Demonstration and Individual Practical practice in the Laboratory and	S1, S3

	staining technique			Record work	
5.	Preparation of culture media for the growth of microorganisms	CO2	K1, K2, K3,K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
6.	Techniques for isolation of microorganismsusing serial dilutionmethod		K1, K2, K3,K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
7.	Enumerate the microbial load of given food sample by spread plate method		K1, K2, K3,K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
8.	Enumerate the microbial load of given food sample by pour plate method		K1, K2, K3,K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
9.	Enumerate the microbial load of given food sample by streak plate method		K1, K2, K3,K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
10.	Biochemical characteristics of microorganisms - indole production test	CO4, CO5	K1, K2, K3,K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
11.	Methyl red test		K1, K2, K3,K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
12.	Voges – proskauer test		K1, K2, K3,K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
13.	Citrate utilization test		K1, K2, K3,K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
14.	Enumerate the microbial load of food processing equipment's and vessels		K1, K2, K3,K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
15.	Assessing the load of indicator microorganisms present in the given food sample		K1, K2, K3,K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3

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2	Food Microbiology, 5th Edition, Frazier, Westhoff, Vanitha N M, 2014
3	Laboratory Methods in Food Microbiology , , 3rd Edition, Harrigan F.W,2013
4	Fundamentals Food Microbiology, 4e, Ray, 2011
REFERENCE BOOKS	
1	Prescott M (2005) Microbiology. 6th Edition, Tata McGraw – Hill, New Delhi
2	Albert G Moat & John W Foster (2004). Microbial Physiology. 4th Edition, John Wiley & Sons, New York.
3	Edward Alcamo (2001). Fundamentals of Microbiology. 6th Edition, Jones & Bartlett Publishers, New York.
4	4. Robert F Boyd (1984). General Microbiology. Times Mirror / Mosby College Publishers.

Course Name	Core XII - Food Quality Analysis Practical	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNC12**	**Academic Year Introduced**	2018 - 19
Type of Course	Practical	**Semester**	V

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Execute the steps in Standard operating procedures for food analysis laboratory
CO2	Analyze the chemical properties and microscopic examination of starch in cereals, millets and pulses
CO3	appraise the degree of acidity indicators reflect the quality of foods
CO4	Analyze the protein content of fleshy foods which can be determined by different method
CO5	Interpret the density, organic solid content and fat present in the nuts and oil seeds
CO6	Categorize the various components present in the milk and milk products
CO7	Categorize the common milk adulterants as well as different method to detect the adulterants
CO8	Detect the presents of non -permitted food colours in spices, Condiments Sugar and Jaggery

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	1	2	3	2	3	2	3	3	3
CO2	1	2	3	2	3	2	3	3	3
CO3	1	2	3	2	3	2	3	3	3
CO4	1	2	3	2	3	2	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
General	To interpreted the Standard operating procedures for food analysis laboratory	1+5+3 = 9
Cereals, Pseudo cereals, Millets and Pulses	To determine the chemical properties and visualize the structure of different starches present in the different food products	3+5+2=10
Fruits and Vegetables	To determined by neutralizing the acid present in a known quantity of food sample	3+5+2 = 10
Fleshy Foods and Egg	To enable the students to determine the protein content of fleshy foods which can be determined by different method	1+4+1 = 6
Fats & Oils, Nuts and Oilseeds	To determined the density of the oil, organic solid content and fat present in the nuts and oil seeds	1+2+0 = 3
Milk and Milk Products	To enable the students to interpret the common milk adulterants as well as different method to detect the adulterants both quantitatively and qualitatively	2+5+2=9
Spices and Condiments Sugar and Jaggery	To enable the students to categorize the non - permitted food colours and other adulterant present in spices, Condiments Sugar and Jaggery	2+4+1=7
Total Hours of Instruction		54 (18x3)

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

COURSE PLAN

Module No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
General					
1.	Standardoperating procedures for food analysislaboratory	CO1	K6,P	Create flow diagram of the standard operative procedure in food analysis laboratory	K6, S3
Cereals, Pseudo cereals, Millets and Pulses					
2.	Determination of moisture content	CO2	K4,P	Appraise the average percent of water content present in the foodsample	K4, S1
3.	Determination of total ash content	CO2	K4,P	Determine the dry ash and wet ash content present in the sample	K4, S1
4.	Determination of acid insoluble ash content	CO2	K4,P	Estimate the purity and quality of the acid insoluble ash content	K4, S1
5.	Determination of crude fibre	CO2	K4,P	Compare sample value to currentliterature	K3, S1
4.	Examine the microscopic structure of different starches	CO2	K4,P	Differentiate microscopic structure of differentstarches	K3, S1
Fruits and Vegetables					
5.	Determination of titrable acidity	CO3	K4,P	Construct the total acid content present in various fruits and vegetables	K4, S1
Fleshy Foods and Egg					
6.	Determination of protein	CO4	K4,P	Assess and demonstrate the nitrogen content of the fleshy foods and egg while adopt the different method	K5, S1
Fats & Oils, Nuts and Oilseeds					
7.	Determination of specific gravity and refractive index	CO5	K4,P	Exemplify the specific gravity and refractive index in fats ,oils nuts and seeds	K4, S2
8.	Determination of melting point of fat	CO5	K4,P	Demonstrate the melting point of fat in fats and oilseeds	K4, S1
9.	Determination of total fat content	CO5	K4,P	Calculate the total fat content present in the different samples	K4, S2
10.	Tests for oils	CO5	K3,P	Identify the potential problems ofoils	K4, S1
Milk and Milk Products					
11.	Detection of components in milk	CO6	K4,P	Identify the components present in different milk and milk products	K4, S2
Spices and Condiments, Sugar and Jaggery					
12.	Test for adulterants	CO7	K4,P	Demonstrate the variousadulterants present in the spices, condiments, sugarand Jaggery	K4, S1

REFERENCES

TEXTBOOKS	
1	Ranganna, S. (2004), Handbook of analysis and quality control for fruit and vegetable products Tata McGraw Hill publishing co.Ltd., NewDelhi
2	S. Suzanne Nielsen (2019), Food Analysis, fourth Edition, ISBN 978-1-4419-1477-4
3	Lawless, H.T. and Klein, B.P. (1991), Sensory science theory and applications in foods, Marcel Dekker Inc.
4	Shalini sehgal (2016), A Laboratory Manual of Food Analysis, Kindle Edition, Published by I K International Publishing House, ASIN: B01F58FM36
5	Manuals of food quality control 8. Food analysis: quality, adulteration and tests of identity, (1997) ISBN 92-5-102412-X
6	FSSAI Manuals for Quality testing (www.fssai.gov.in)
JOURNALS	
1	Journal of Food Science and Technology, AFSTI publications.
2	Journal of Food Quality, Published by Wiley, ISSN-0146-9428
3	International journal of Food science and technology, Edited by: Charles Brennan,Vol-55, ISSN:1365-2621
4	Journal of Food Quality and Hazards Control Published by Shahid Sadoughi University of Medical Sciences, ISSN:2345-685X

Course Name	Elective III - Food for Disease	**Programme Name**	B.Voc. - Food Science and Nutrition
Course Code	**18BFSNEL03**	**Academic Year**	2019-2020
Type of Course	Theory	**Semester**	V Semester

COURSE OUTCOMES:

On completion of the course, the students will be able to	
CO1	Learn the concept and regulatory issues including Codex of nutraceutical
CO2	Understand the properties of nutrient components
CO3	Study the different types of nutraceutical potential foods
CO4	Learn the vital role of nutraceutical and functional food in disease
CO5	Understand the nutraceutical manufacturing process
CO6	Learn the testing techniques and methods for analysis

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	3	3	3
CO2	3	2	3	2	3	2	3	3	3
CO3	3	2	3	2	3	2	3	3	3
CO4	3	2	3	2	3	2	3	3	3
CO5	3	2	3	2	3	2	3	3	3
CO6	3	2	3	2	3	2	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module Title	Objectives	Hours of Instruction L+Tu+Te=To
Introduction to nutraceuticals and functionalfood	To learn the concept and regulatory issues including Codex of nutraceutical	3+2+1= 6
Nutraceutical properties of nutrient component of food	To understand the properties of nutrient components	6+3+1=10
Nutraceutical potential of food	To study the different types of nutraceutical potential foods	6+3+1=10
Nutraceutical and functional food in diseases	To learn the vital role of nutraceutical and functional food in disease	10+3+1=14
Manufacturing of Nutraceuticals	To understand the nutraceutical manufacturing process	4+3+1=8
Testing and evaluation of nutraceuticals	To learn the testing techniques and methods for analysis	2+3+1=6
Total Hours of Instruction		54(18x3)

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

COURSE PLAN :

Unit/Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
Unit-I Introduction to nutraceuticals and functional food					

1.	Definition, synonymous terms Basis of claims for a compound as nutraceutical Regulatory issues for nutraceuticals including CODEX	CO1	K2,C	Collect literature review presentation of regulatory issues including Codex	K5, S1
Unit-II Nutraceutical properties of nutrient component of food					
2.	Nutraceutical properties of a. polysaccharides b. bioactivelipids c. bioactivepeptides d. bioactive polyphenolsand carotenoids e. vitamins	CO2	K2,P	Illustrate and classify the nutrient components of food in nutracuetical aspect	K4, S1
Unit-III Nutraceutical potential of food					
3.	Nutraceutical potential of a. Cereals, pulses,millets, pseudo cereals b. Fruits andvegetables c. Nuts andoilseeds d. Milk e. Meat, egg, fish andpoultry f. Spices andcondiments g. Seaweeds, tea andhoney	CO3	K2,C	Pictorial representation (PPT) of any one of the food items	K2,S2
Unit-IV Nutraceutical and functional food in diseases					
4.	Concept of angiogenesis and the role of nutraceuticals/ functional foods	CO4	K2,C	Focus on emerging concept in angiogenesis	K4,S1
5.	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	CO4	K2,C	Point out the emerging era in the nutraceutical treatment	
Unit-V Manufacturing of Nutraceuticals					
6.	Manufacturing aspects of selected nutraceuticals such as lycopene, isoflavonoids, prebiotics and probiotics, glucosamine, phytosterols etc.	CO5	K2,P	Categorize the manufacturing process of nutrceuticals (lycopene, isoflavonoids, prebiotics and probiotics, glucosamine, phytosterols)	K5,S4
7.	Formulation of functional foods containing nutraceuticals – stability and analytical issues, labelling issues	CO5	K2,P	Assess the analytical issues of functional foods	K2,S1
Unit-VI Testing and Evaluation of Nutraceuticals					
8.	Clinical testing of	CO6	K2,C	Criticize the	K6,S1

	nutraceuticals and health foods			clinical trials of nutraceuticals	
9.	Interactions of prescription drugs and nutraceuticals, Adverse effects and toxicity of Nutraceuticals	CO6	K2,P	Point out the interactions between synthetic drugs and nutraceuticals	K4,S3
10.	Nutrigenomics and its relation to nutraceuticals	CO6	K2,C	Examine the nutrigenomics	K3,S1

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TEXTBOOKS	
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6.	Goldberg I. (1994). Functional Foods: Designer Foods, Pharma Foods
7.	Campbell JE & Summers JL. (2004). Dietary Supplement Labeling Compliance.
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REFERENCE BOOKS	
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12.	Dhiraj A. Vattem and Vatsalamaitin, Funtional foods, Nutraceutical and Natural products – concepts and applications, DES tech publications, 2016.
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15.	Brian Lockwood, Nutraceutical, II editions
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Course Name	Food Production Manager Miniproject I	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNMP04**	**Academic Year Introduced**	2018 - 19
Type of Course	Project	**Semester**	V

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Formulate the innovative product by their own
CO2	Rate the organoleptic evaluation of the innovative product

Mapping of COs with POs, PSOs

COs / POs & PSOs	PO(T)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Module I Develop the prototype of the innovated product	To perform the trial-and-error in developing the prototype of the developed product	54
Total Hours of Instruction		54(18*3)

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

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level/ KD	Psychomotor domain activity	Psychomotor domain level
MODULE I – Prototype of the innovated product					
1.	Formulate an innovative product using trial-and-error method	CO1	K4 C	Prepare and finalize the SOP of the innovated product	K4 S3
2.	Sensory Evaluation	CO2	K5 C	Identify the panel members and evaluate the organoleptic properties of your innovative product and submit a report	K6 S1

REFERENCES

REFERENCE	
1	Harry T. Lawless, Hildegarde Heymann, , Sensory Evaluation of Food Principles and Practices, 1999
2	B.Srilakshmi, Food Science, New Age International, 2015

3	knic.co.id/tips-to-optimize-food-production-process
JOURNALS AND DOCUMENTS	
1	https://www.ficsi.in/wp-content/themes/storefront/assetsweb/img/curriculum/ProductionManager.pdf
2	Journal of food science and nutrition research
3	Journal of food science

Course Name	Food Production Manager Portfolio I	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNPF04**	**Academic Year Introduced**	2018 - 19
Type of Course	Practical	**Semester**	V

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Discriminate the production process in food processing unit and production optimization
CO2	Exemplify the cost efficiency in food processing unit

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Module I Equipments	To illustrate the production process and calculate the cost efficiency in food processing unit	36
Total Hours of Instruction		36(18*2)

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

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
MODULE I – Production Process and cost efficiency					
1.	Define the Food Processing: Elements of the production decision, Types of production	CO1	K1 C	Compare the different type of food processing industry	K5 S2
2.	Enumerate the Production management System: Importance of business firm, importance of production management in customer and Society	CO1	K1 C	Compile the parts of the pictures of the production area in any one food industry	K6 S1
3.	Summarize the Production optimization:	CO1	K2 C	Design the pamphlet for latest market demands and needs of the food	K6 S4

	collect latest market Demand and information, Trends of foods, Analytical report tools, Update food and beverage industry information and food manufacturers			industry	
4.	State the Cost efficiency of food processing 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	CO2	K1 P	Visit any one food industry and collect cost efficiency of the equipment's	K6 S3

REFERENCES

REFERENCE	
1	Naqib Daneshjo (2013), Production Management Systems, Transfer inovácií 28/
2	https://www.indeed.com/career-advice/career-development/production-process
3	knic.co.id/tips-to-optimize-food-production-process
JOURNALS AND DOCUMENTS	
1	https://www.ficsi.in/wp-content/themes/storefront/assetsweb/img/curriculum/ProductionManager.pdf
2	Journal of Food Science and Technology
3	Journal of Food Composition and Analysis

SEMESTER VI

SEMESTER VI

Course Name	Core XIII - Food Industrial by-products and Waste Management	**Programme Name**	B.Voc. - Food Science and Nutrition
Course Code	**18BFSNC13**	**Academic Year**	2019-2020
Type of Course	Theory	**Semester**	VI Semester

COURSE OUTCOMES:

On completion of the course, the students will be able to	
CO1	Learn the different kinds of waste from food industry
CO2	Understand the waste management system through different types of methods
CO3	Elaborate the utilization of by products from organic food waste material

Mapping of COs with POs, PSOs

COs / Pos & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	3	3	3
CO2	3	2	3	2	3	2	3	3	3
CO3	3	2	3	2	3	2	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial									

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module Title	Objectives	Hours of Instruction L+Tu+Te=To
Food industry by-products and waste	To learn the different kinds of waste from food industry	5+4+1= 10
Waste treatment methods	To understand the waste management system through different types of methods	7+4+1=12
Utilization of fruits, vegetables and sugar by-products and waste	To elaborate the utilization of by products from organic food waste material	6+3+1=10
Utilization of by-products from cereals, millets, pulses, oilseeds and tuber crops		8+3+1=12
Utilization of by-products from Animal products based industries		6+3+1=10
Total Hours of Instruction		54

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

COURSE PLAN

Unit/Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
Unit-I Food industry by-products and waste					
1.	Introduction Status in India Types of waste and by-products from food industries	CO1	K2,F	Illustrate the types of wastes and its by products produced by food industry sector	K4, S2

2.	Composition and characterization Need for treatment and utilization Impact on environment	CO1	K2,C	Point out the treatment and utilization impact on environment	K4,S1
Unit-II Waste treatment methods					
3.	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.	CO2	K2,P	Compare and summarize the different kinds of methods used for reuse from the waste item	K5, S1
Unit-III Utilization of fruits, vegetables and sugar by-products and waste					
4.	Types of waste in fruits and vegetable processing industries. Process for waste utilization from fruit and vegetable industries	CO3	K2,C	Appraise the process of waste utilization from fruit and vegetables in the food industry	K6,S2
5.	Fermentation for production of alcohol and vinegar, oil & flavoring components, pigments extraction and acid production from waste By products utilization of sugar industry	CO3	K2,P	Visit nearby industry and enlist the waste management that you have observed in foods. Discuss it with your peer group	K5,S3
Unit-IV Utilization of by-products from cereals, millets, pulses, oilseeds and tuber crops					
6.	Utilization of by products from wheat, rice, corn, dhal milling Utlization of husk, bran, cob, germ, broken and powder	CO3	K2,C	Illustrate the waste management from the cereals	K3,S2
	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.	CO3	K2,C	Distinguish the techniques used in oil and tuber processing industries	K6,S4
Unit-V Utilization of by-products from Animal products based industries					
7.	Dairy industry - Introduction- opportunities –	CO3	K2,P	Collect videos on working methods and	K6,S1

	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 form animal hair, bone meal, meat meal,chondroitin sulfate, squalene, fish oil, micro nutrients- vitamins and minerals, pigments.			discuss it	

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10.	Vasso Oreopoulou and Winfried Russ, ―Utilization of By-Products and Treatment of Waste in the Food Industry‖, Springer Science Business Media, USA, 2007.
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18.	Nelson L. Nemerow and Franklin J. Agardy, ―Strategies of Industrial and Hazardous Waste Management‖, John Wiley and Sons, 1998
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6.	Singh, A., Kuila, A., Adak, S., Bishai, M., & Banerjee, R. (2012). Utilization of vegetable wastes for bioenergy generation. Agricultural Research, 1(3), 213-222.

Course Name	Core XIV - Food Trade And Business Management	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNC14**	**Academic Year Introduced**	2018 - 19
Type of Course	Theory	**Semester**	VI

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Appraise concepts, functions and process of entrepreneurship
CO2	Understand the Business plan, Process components of business and its technology licensing
CO3	Understand the Concept of E-business, E-commerce and formulate the various Techniques of market research
CO4	Appreciate the importance of Cash Register, Cash Flow Projections in the smooth flow of finances in the business
CO5	Identify the different types of resources, size and capital based classification of business enterprises
CO6	Understand the agricultural Trade Policy, goals, Food Policy, Import and export procedures in India
CO7	Differentiate the various Business Development Services and its Financial Institutions and Banks

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO (P1)	PO (P2)	PO (P3)	PO (P4)	PO (P5)	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	3	3	3
CO2	3	2	3	2	3	2	3	3	3
CO3	3	2	3	2	3	2	3	3	3
CO4	3	2	3	2	3	2	3	3	3
CO5	3	2	3	2	3	2	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial									

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	**Objectives**	**Hours of Instruction L+Tu+Te=To**
Entrepreneurship Concepts	To impart knowledge about concepts and functions of entrepreneurship	6+1+1= 8
Start-up and Business Plan	To provide learning on Business Planning Process and Technology licensing	5+1+1= 7
Concept of Market and MarketingMix	To elaborate the Concept of Market and Techniques of Marketing Mix	5+1+1= 7
Business Finance and Arithmetic	To Understand the importance and technique of preparing a Finance and arithmetic	9+1+2=12
Resource Mobilization	To Describe the planning effective resource mobilization and sources of businessinformation	6+0+1= 7
Trade and Policies	To impart knowledge on agricultural trade, Sustainable Development goals and policy in India	5+1+0= 6
Business Development Services	To Describe the various Business Development Services and itsuses	5+0+2= 7
Total Hours of Instruction		54 (18x4)

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

COURSE PLAN

Unit/ Module	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
Unit-1-Entrepreneurship Concepts					
1.	Concept and Functions of entrepreneurship,	CO1	K2, F	List five such similar examples which have marked their place for innovation.	K6,S4
2.	Need and Myths of entrepreneurship, process of entrepreneurship,	CO1	K2, C		
3.	Types, competencies and ethics of entrepreneurship,	CO1	K1, C		
4.	Intrapreneurship, social entrepreneurship, food preneurship.	CO1	K2, C	To collect information about any three different field of entrepreneurs	K4,S4
Unit-2 Start-up and Business Plan					
5.	Objectives of aBusiness plan, Business Planning Process,	CO2	K2, C	Visit a market to identify the people needs and write a new business plan	K4,S3
6	Opportunity Identification and Selection, Contents of a Business Plan,	CO2	K1, F		
7	Execution of business plan, Feasibility analysis,	CO2	K2, C	Survey and list the reasons for buying the packed foods	K4,S3
8	Innovations leading to entrepreneurial ventures,	CO2	K2, C		
9	Components of business-industry, trade and commerce,	CO2	K2, F	Visit one food industry and prepare a report about Business trade and commerce	K3,S2
10	Technology licensing, intellectual property law, patents, trademarks and copyright.	CO2	K2, F	Develop scrapbook on current intellectual property laws	K5,S4
Unit- 3 Concept of Market and Marketing Mix					
6.	Concept of market and its evolution, E-business and E-commerce,	CO3	K1,C	Collect any five products their punch line andtheir logo.	K6,S4
7.	Market environment at micro and macro level, Techniques of market research	CO3	K2, C	Assemble the groups of three organize a trade show for any ten states of India, through power point presentation	K3,S2
8.	Market survey, Market expansion, marketing mix	CO3	K2, C	Collect a newspaper article analyzing the current and traditional market conditions.	K4,S4
Unit-4 Business Finance and Arithmetic					
9.	Cash register, unit of sale, unit cost and unit price, types of cost, income statement,	CO4	K2, C	Prepare a presentation on how revolutions or inventions helped in trade	K5,S3
10.	Cash flow projections, break-even analysis for a single product or service, taxes	CO4	K2, C	Develop a product and fix it break-even analysis and taxes	K6,S3
Unit-5- Resource Mobilization					

11.	Planning effective resource mobilization, estimating financial requirements,	CO5	K1, F	Prepare a report on resource mobilization	K3,S3
12.	estimate capital requirement, sources of finance, mentorship,	CO5	K2, C	Organize a talk show discussing the role and importance of mentor of any entrepreneur of your choice.	K5,S4
13.	size and capital based classification of business enterprises, sources of business information, ICT in business	CO5	K1, C		
Unit-6- Trade and Policies					
14.	India's Agricultural Trade Policy and Sustainable Development goals	CO6	K2, C	Collect information about important government schemes in Agriculture sector	K4,S4
15.	Food Policy in India, Import and export procedures and guidelines in India	CO6	K2, F	Do a presentation on Import and export procedures followed by various food product in India	K4,S4
Unit-7-Business Development Services					
16.	Business development service providers in India - DIC, MSME, NSIC, SIDCO, Financial Institutions and Banks.	CO7	K2, C	Report the Services Companies in India and the policy of Government for promoting a micro, small and medium enterprises	K3,S3

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2	Madhurima Lall and Shikha Sahai (2008), Entrepreneurship, 2nd Edition, Excel Books, New Delhi.
3	S.S.Khanka (2012), Entrepreneurial Development, 4th Edition, S.Chand & Company Ltd.,.
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2	Mary Coulter (2005), Entrepreneurship in Action, Second Edition, Prentice Hall of India, New Delhi.
3	Jain P.C (2003), Handbook for New Entrepreneurs, Oxford University Press, Oxford.
4	African Technology Policy Studies Network (2012) Entrepreneurship Skills: Training Manual for Scientists.
JOURNALS AND DOCUMENTS	
1	Journal of Foodservice Business Research
2	Journal of Hotel and Business Management
3	Restaurant Business, international Quarterly published
4	International Journal of Food and Beverage Manufacturing and Business Models, Published by timely knowledge
5	Journal of Commerce And Trade, Published by Dr Himanshu Agarwal

Course Name	Core XV - Nutrition Assessment and Diet Planning Practical	**Programme Name**	B.Voc. - Food Science and Nutrition
Course Code	**18BFSNC15**	**Academic Year**	2019-2020
Type of Course	Practical	**Semester**	VI Semester

COURSE OUTCOMES:

On completion of the course, the students will be able to	
CO1	Understand the nutritional assessment methods
CO2	Learn the planning techniques, meal distribution and nutrient calculation for non communicable disease

Mapping of COs with POs, PSOs

COs / Pos & PSOs	PEO	PO (P1)	PO (P2)	PO (P3)	PO (P4)	PO (P5)	PSO1	PSO2	PSO3
CO1	1	3	3	3	3	3	3	3	**3**
CO2	1	3	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module Title	Objectives	Hours of Instruction L+Tu+Te=To
Methods of Assessments	To understand the nutritional assessment methods	3+7+4= 14
Planning, preparation and calculation of diet for specific conditions	To learn the planning techniques, meal distribution and nutrient calculation for non communicable disease	10+20+10= 40
Total Hours of Instruction		54

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

COURSE PLAN

Unit/Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
Unit-I Methods of Assessments					
1.	Anthropometric Assessments of Individuals	CO1	K2,C	Measure individual's height, weight, BMI, MUAC, WHR, Head and chest circumference and discuss it.	K6,S2
2.	Case study on Biochemical Assessments of Individuals			Collect the blood analysis report from different patients and discuss it.	K5, S1
3.	24 hr recall method Three days recall method			Calculate the nutrient from previous day menu and past three days menu	K4, S1
Unit-II Planning, preparation and calculation of diet for specific conditions					
4.	a) Normaldiet b) Liquiddiet c) Soft diet d) High and lowcaloric diet e) Bland diet forpeptic ulcer f) Diet for Viralhepatitis	CO2	K2,P	Plan a menu for each specific condition and calculate the nutrient content for proper utilization of nutrients	K5,S5

	and cirrhosis g) Diet forDiabetes mellitus h) Diet forHypertension andAtherosclerosis i) Diet for Nephritisand Nephroticsyndrome k) Low and medium cost diets for P.E.M., Anemia & vitamin A deficiency				

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12.	Gordon-Davis, L., & Van Rensburg, L. (2004). The hospitality industry handbook on nutrition and menu planning. Juta and Company Ltd.
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Course Name	Core XVI - IT Applications in Food Industry	Programme Name	B.Voc Food Science and Nutrition
Course Code	18BFSNC16	Academic Year Introduced	2018 - 19
Type of Course	Practical	Semester	VI

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1:	To use Word document, Microsoft Excel, the Power point presentation for recognize its application in communication and documentation, for maintaining the balance sheets and account
CO2:	To able to work in the food industry specific ERP software
CO3:	To get the idea about automation software in Food industry

Mapping of COs with POs, PSOs

COs / POs& PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	2	2	2	3	3	3	3	3	3
CO2	2	2	2	3	3	3	3	3	3
CO3	2	2	2	3	3	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial									

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	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
Module 1: Microsoft office					
1.	Microsoft Word	CO1	K3,P	To create a Microsoft Word Document and to learn the functions of Microsoft word document and access it .	S3
2.	Microsoft Excel	CO1	K3,P	To create a Microsoft Excel and to learn the functions of Microsoft Excel and access it	S3
3.	Microsoft Power point Presentation	CO1	K3,P	To create a MicrosoftPower point presentation, to access and apply it forthe development of the pamphlet and label.	S3
Module II: Enterprise Resource Planning					
4.	ERP software	CO2	K3,C	To get trained on ERP software and its application	S2

Module III: Automated Software					
5.	Automated Software	CO3	K2,C	To gain knowledge on the automation softwares through an industrial visit	S2

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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..
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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

Course Name	Elective- IV - Nutrition and Physical Fitness	**Programme Name**	B.Voc Food Science and Nutrition
Course Code	**18BFSNEL04**	**Academic Year Introduced**	2019- 20
Type of Course	Theory	**Semester**	VI

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Understand the physiological systems ,its role and functions
CO2	Determine the energy expenditure and devise a plan for energy balance
CO3	Specify the significance of cardiorespiratory assessment, training and fitness
CO4	Get insight into muscular fitness and its assessment and skill related training
CO5	Recommend fitness training in geriatric and mentally challenged population ,pregnant and lactating women
CO6	Formulate diet plans for athletes and suggest supplements

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	3	3	3
CO2	3	2	3	2	3	2	3	3	3
CO3	3	2	3	2	3	2	3	3	3
CO4	3	2	3	2	3	2	3	3	3
CO5	3	2	3	2	3	2	3	3	3
CO6	3	2	3	2	3	2	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial									

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Physiological System	To learn about the physiological systems ,its role and functions	5
Energy Balance and Body Composition	To familiarize with the concept of Energy Balance and Body Composition	5
Cardiorespiratory Training andFitness	To provide learning on Cardiorespiratory Training and Fitness	12
Muscular Endurance and Skill related fitness	To learn the concept of muscular and skill –related fitness	10
Geriatric fitness and fitness of physically and mentally challenged population	To impart knowledge on Training Geriatric ,physically challenged and mentally challenged population	12
Nutrition for Exercise	To define nutritional requirements for athletes and supplements	10
Total Hours of Instruction		54

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

COURSE PLAN

Unit/Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
UNIT I Physiological System					
1.	Structure and function - Cell,	CO1	K1,F	Classify and Illustrate types of animal cell with its component	K4,S1

2.	Skeletal system,	CO1	K1,F	Sketch a bones, label it and identify its significance and problems associated with it	K3,S2
3.	Blood and Circulatory system,	CO1	K1,F	Demonstrate the blood grouping ,blood coagulation time and bleeding time	K3,S1
4.	Gastro-intestinal system,	CO1	K1,F	Design a poster about components of gastro-intestinal, excretory system, respiratory and endocrine system with accurate information	K6,S3
5.	Excretory system,	CO1	K1,F		
6.	Respiratory system	CO1	K1,F		
7.	Endocrine system	CO1	K1,F		
UNIT II: Energy Balance and Body Composition					
8.	Energy balance, components of energy expenditure,	CO2	K2,C	Make a presentation on components of energy expenditure	K6,S2
9.	Body composition components and its determination,	CO2	K2,P	Develop a scrapbook about determination of body composition	K6,S3
10.	Energy systemfor exerciseand performance	CO2	K2,C	Differentiate aerobic and anaerobic exercises and energy spent on each event	K4,S2
11.	Dietary guidelines for energy balance	CO2	K2,C	List out the dietary guidelines for energy balance	K2,S2
UNIT III: Cardiorespiratory Training and Fitness					
12.	FITT principle, physical activity pyramid	CO3	K2,C	Create an assessment sheet for skill related fitness and do a trial with your classmates	K6,S4
13.	Cardiovascular fitness assessment,	CO3	K2,P		
14.	Cardiovascular conditioning by aerobic exercise	CO3	K3,C	Perform a demonstration class on cardiovascular conditioning (by students)	K3,S1
UNIT IV: Muscular Endurance and Skill related fitness					
15.	Muscular endurance fitness assessment	CO4	K2,P	Conduct fitness assessment in your class and interpret the results of your classmates	K3,S4
16.	Skill related fitness assessment,	CO4	K2,P		
17.	Endurance training,	CO4	K3,C		
18.	Strength training,	CO4	K3,C		
19.	Calisthenics, flexibility training	CO4	K3,C		
UNIT V: Geriatric fitness and fitness of physically and mentally challenged population					
20.	Geriatric population fitness assessment and Training issues	CO5	K2,C	Create a manual for simple exercise plan and yoga for elderly people .(with pictures)to maintain fitness and contradiction	K6,S5
21.	Physically and mentally challenged population fitness assessment Training issues	CO5	K2,C	Do a systematic review of journal presentation about effect of physical activity in improvement of mental health in physically challenged population	K2,S2
22.	Training issues for	CO5	K2,C	Bring articles and	K4,S3

	pregnant and lactating mother			information on pregnant and lactating women who excelled in sports and analyse their diet pattern (ex. Serena Williams ,Alysia Montano)	
UNIT VI: Nutrition for Exercise					
23.	Assessment of Nutritional Fitness,	CO6	K2,P	Demonstrate Fitness Assessment	
24.	Nutrition during, before and after exercise, fluid balance	CO6	K3,C	Do systematic review of journal presentation about beneficial nutrients in sports	K4,S3
25.	Dietary supplements	CO6	K2,C	Choose one supplement and prepare a portfolio for the supplement	K6,S3

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2	Bean, A. (2017). The complete guide to sports nutrition. Bloomsbury Publishing.
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2	Colgan, M. (2002). Sports Nutrition Guide: Minerals, Vitamins & Antioxidants for Athletes. Apple publishing.
3	Srilakshmi, B. (2019). Dietetics, new age international (P) Ltd. Publishers, New Delhi, 145-162.
4	Bean, A. (2009). Food for fitness. A&C Black.
JOURNALS AND DOCUMENTS	
1	Journal of the international Society of Sports Nutrition,Springer Nature
2	International Journal of Athletic therapy and Training,Human Kinetics Publishers.Inc.
3	Journal of Exercise Science and Fitness,Elsevier
4	Food Science and Human Wellness, Beijing Academy of Food Sciences

Course Name	Food Production Manager Mini Project- II	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNMP04**	**Academic Year Introduced**	2018 - 19
Type of Course	Project	**Semester**	VI

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Assess the cost of the product and assume the packaging material
CO2	Evaluate storage conditions and infer target group

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Module I Equipments	To gain knowledge about cost estimation and packaging techniques	
Total Hours of Instruction		

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

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
MODULE I – Cost estimation and Packaging					
1.	Estimate the Cost of developed product	CO1	K2 C	Calculate the techno economic feasibility of the developed product	K5 S2
2.	Identify the Suitable Packaging material	CO1	K2 C	Justify the packaging material used	K4 S3
3.	Interpret the Storage condition and target group	CO2	K2 C	Compare and contrast different storage condition	K5 S3

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2	Gregory K. Mislick (2015)Cost Estimation: Methods and Tools (Wiley Series in Operations Research and Management Science), First Edition, ISBN-13: 978-1118536131
JOURNALS AND DOCUMENTS	
1	https://www.nedcc.org/free-resources/preservation-leaflets/4.-storage-and-handling/4.1-storage-methods-and-handling-practices
2	https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/pnw612.pdf
3	Journal of packaging technology and research
4	Journal of food Processing and Preservation
5	International journal of scientific and Research

Course Name	Food Production Manager Portfolio II	**Programme Name**	B.Voc. Food Science and Nutrition
Course Code	**18BFSNPF04**	**Academic Year Introduced**	2018 - 19
Type of Course	Practical	**Semester**	VI

COURSE OUTCOMES

On completion of the course, the students will be able to	
CO1	Categorize the documentation System and implementation safety
CO2	Infer the Environmental policy in food processing unit

Mapping of COs with POs, PSOs

COs / POs & PSOs	PEO	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PSO1	PSO2	PSO3	PSO4
CO1	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Module I Equipments	To gain knowledge about documentation System and Environmental policy in food processing unit	36
Total Hours of Instruction		36(18*2)

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

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
MODULE I – Documentation System and Environmental policy					
1.	Define Record keeping Reason for Records, Maintenance and Inspection, Select any one food products, Food Safety Plan Records and health and safety guidelines. Documentation of Food Safety Systems, Principle of HACCP,Application of HACCP plan, Implementation and Maintenance of the HACCP plan, Packaging Material used in food industry, review workers performance and maintenance.	CO1	K1 C	Visit any one industry to collect data for record keeping and HACCP Plan in the food industry	K5 S2
2.	List environment Policy- Basic Environmental Policy.	CO2	K1 C	Layout the environmental pollution in any one Industry with picturization	K6 S3

	The effects of environmental Policy.				

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2	Tara Paster (2005), Haccp Food Safety Employee Manual, sixth Edition, ISBN-9780471781820.
3	https://www.fda.gov/food/hazard-analysis-critical-control-point-haccp/haccp-principles-application-guidelines
4	https://www.bandogrp.com/eng/csr/basicenvironmentalpolicy/
JOURNALS AND DOCUMENTS	
1	Journal of Food Safety
2	Environmental Science and Technology
3	Journal of Food Composition and Analysis
4	Trends in Food Science and Technology

QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR FOOD PROCESSING

Contents

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 Manger 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 Minimum Educational Qualifications Maximum Educational Qualifications	7 Bachelor's degree in engineering Not Applicable
Training (Suggested but not mandatory)	1. ISO 2. HACCP 3. Six Sigma 4. OHSAS 5. Integrated Management System 6. Food Safety Standards and Regulations (as per FSSAI)
Minimum Job Entry Age	21 years
Experience	10-12 yrs in food processing unit
Applicable National Occupational Standards (NOS)	**Compulsory:** 1. FIC/N9014 Manage production process in food processing unit 2. FIC/N9015 Manage production optimization and cost efficiency in food processing unit 3. FIC/N9016 Manage documentation system and implement safety and environmental policies in food processing unit **Optional:** N.A.
Performance Criteria	As described in the relevant OS units

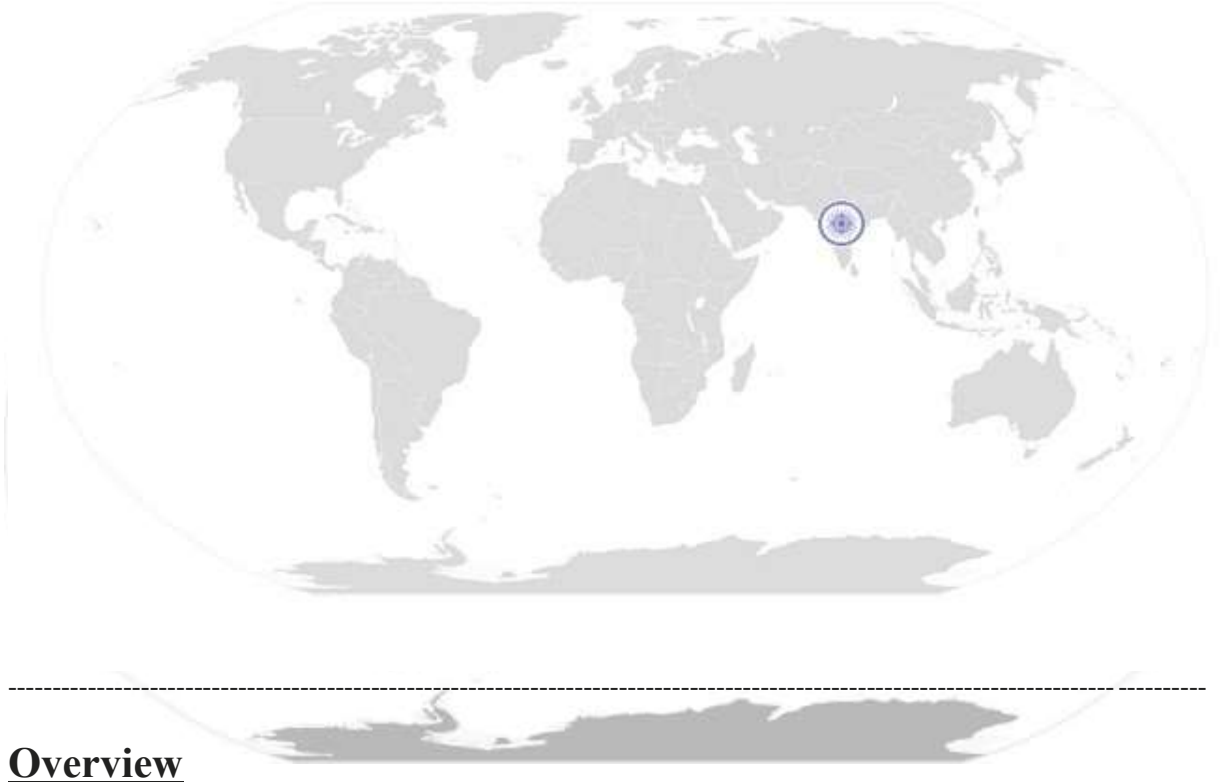
Definitions

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.

National Occupational Standard

Unit Code	FIC/N9014
Unit Title (Task)	Manage production process in food processing unit
Description	This OS unit is about managing production process in food processing units.
Scope	This unit/task covers the following: • Provide leadership to production team • Schedule production • Co-ordinate maintenance • Mange production • Manage new product trials

Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Provide leadership to production team	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
Schedule production	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

	and manpower requirements 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 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 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
Co-ordinate maintenance	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 PC15. co-ordinate with maintenance manager/supervisor to understand materials, consumables and manpower requirement and availability for maintenance activities, for uninterrupted production PC16. understand equipment maintenance process and procedure and co-ordinate for maintenance activities during breakdown, emergency response, routine cleaning and servicing, etc. PC17. analyze equipment maintenance data to interpret equipment performance and arrive at production capability of each process equipment 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 PC19. lead and build team spirit between production and maintenance personnel through effective communication to enhance equipment performance and to identify production improvement opportunities PC20. ensure maintenance procedures are followed meet food safety and environmental requirements
Mange Production	PC21. monitor production process for usage of raw materials, packaging materials, manpower, wastage against production plan and identify reason for variances against plan PC22. address the reason for variation in achieving production schedule, production target within allocated budget PC23. adjust production schedule in response to variables affecting achievement of production target PC24. monitor production output and cost, adjust processes and resources to minimize cost and to achieve quantity and quality product

	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 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 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 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.
Manage new product trials	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 PC30. prepare technical production procedures considering all engineering and process parameters for new product trial, educate and train supervisors and operators on trial procedure PC31. identify and consider all possible hazards, prepare plan and procedures to prevent and control hazards, provide training to trial team to handle hazards 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 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 PC34. document and evaluate trial production data and identify process/parameters to be modified/changed to achieve product of required specification PC35. prepare trial production report with recommendations on improvement opportunities, and share with cross function heads and relevant authorities for suggestion and consideration
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the	The user/individual on the job needs to know and understand: KA1. organisaiton goals and policies KA2. business processes of the organisation

company / organization and its processes)	KA3. production management KA4. food regualtory 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. Technical Knowledge	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
Skills (S)	
A. Core Skills/ Generic Skills	**Writing Skills**
	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
	Reading Skills
	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
	Oral Communication (Listening and Speaking skills)
	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. Professional Skills	**Decision Making**
	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)
	Plan and Organize
	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)
	Customer Centricity
	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
	Problem Solving
	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
	Analytical Thinking

	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
	Critical Thinking
	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/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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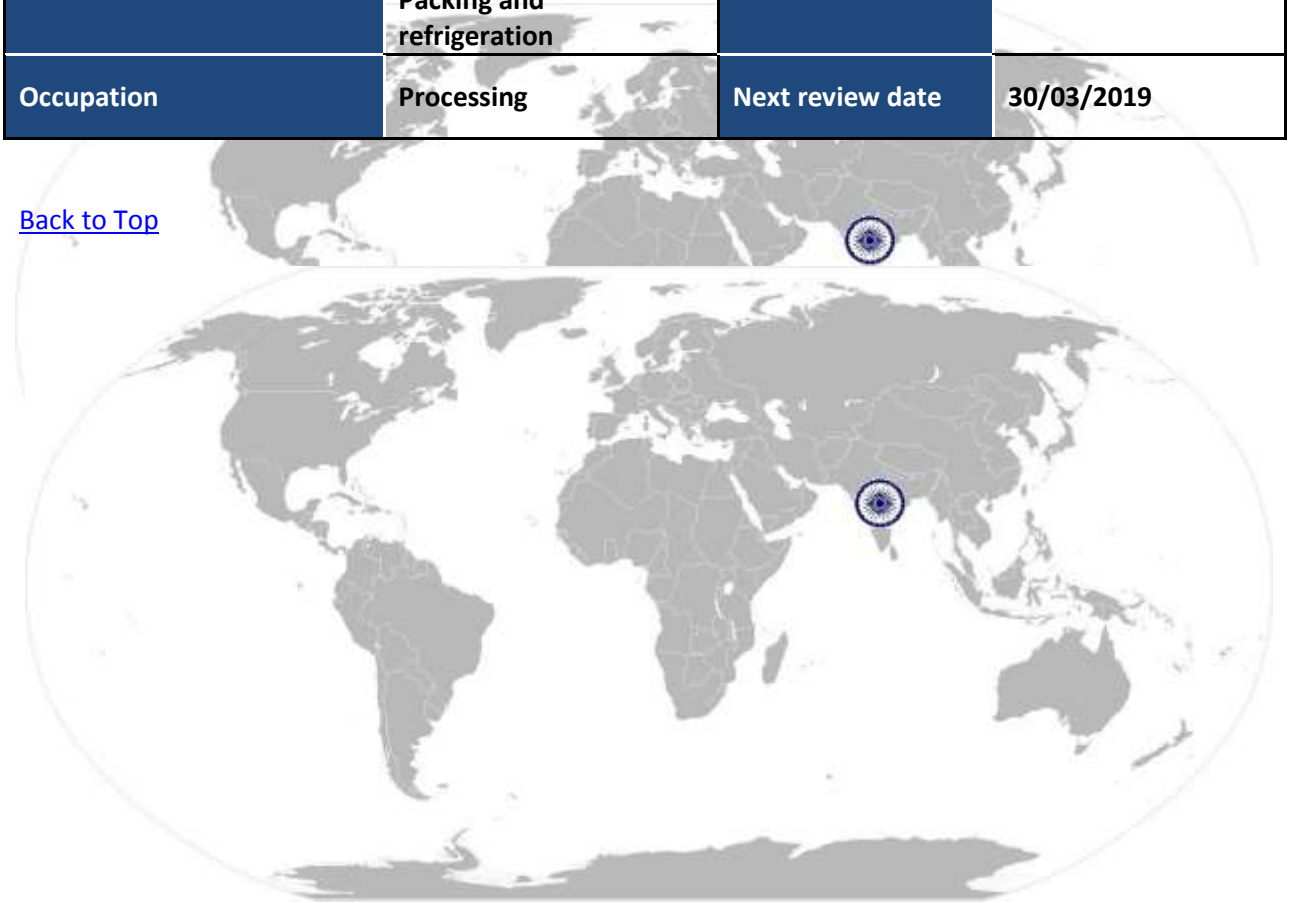
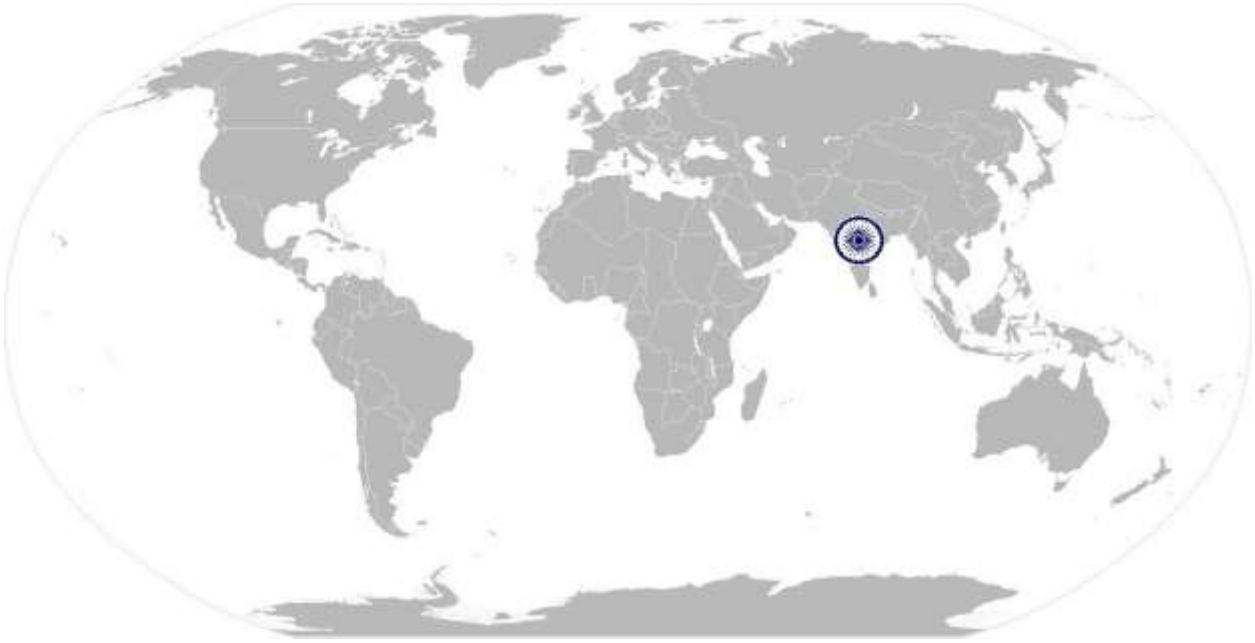


National Occupational Standard



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.

National Occupational Standard

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	• Optimize production • Manage utilities and energy for a production process • Implement change in production process • Manage production within budget

Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Optimize production	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 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 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
Manage utilities and energy for a production process	PC4. calculate utilities and energy usage in production area and for production process, identify methods to minimize usage PC5. develop plans and procedures to minimize use of utilities and energy without affecting the production efficiency 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 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 PC8. analyze usage pattern of energy and other utilities in production area and

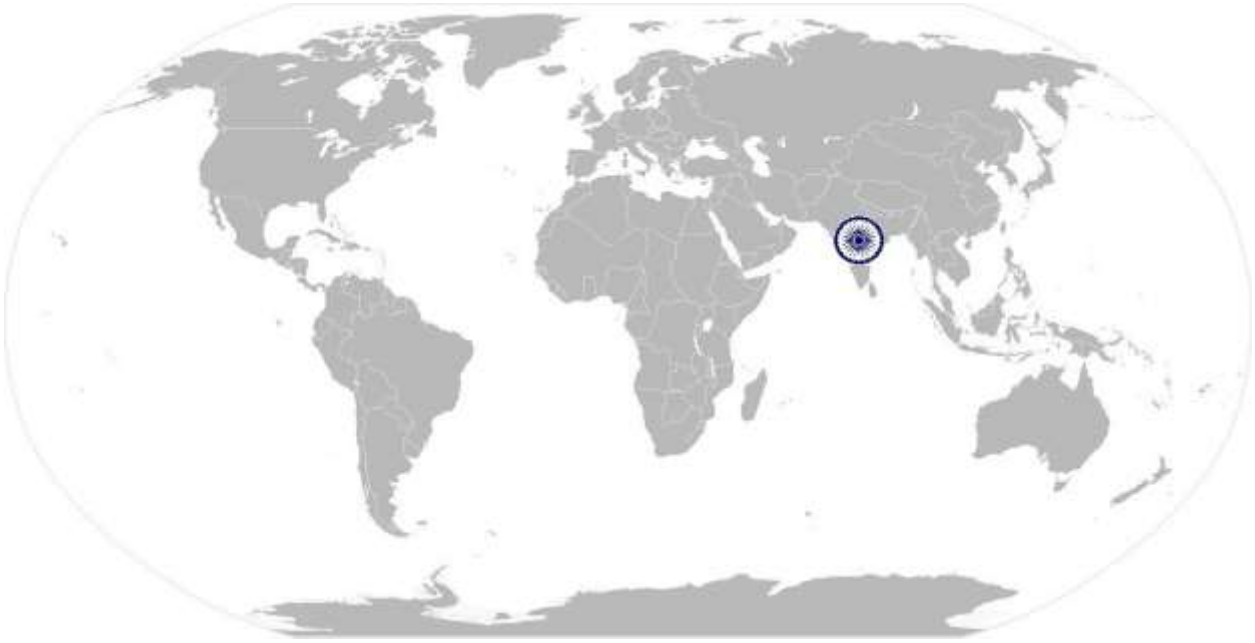
	process against budget allocation, identify cost effective options for minimizing wastage, and implement changes
Implement change in production process	PC9. identify system, production process that need to be changed, identify opportunities for implementing change in production process, analyze impact of change on product quality, impact on the team and present production process PC10. communicate with relevant authorities/superiors the need for change, results and benefits expected our of change 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 PC12. provide training and support to implement changes, develop a strategy to help teams implement change PC13. monitor changes implemented in production process and ensure changes are effective and meet the organisation and regulatory requirements PC14. document and communicate the progress achieved through implemented change to the management and everyone involved, and make them understand and enjoy achievement PC15. recognize and reward employees and teams for implementing change in production system and achieving better efficiency
Manage production within budget	PC16. manage budget efficiently by managing production with available resource, by avoiding overtime and too many casual workers/helpers 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 PC18. identify situations where actual budget exceeds the approved budget, investigate reason for variance and take appropriate corrective action to keep budget under control 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 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 PC21. encourage team to think and identify ways of reducing expenditure, analyze and pursue the suggested ideas

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

Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. organisaiton policies and goals KA2. principles and processes involved in business KA3. organization strategy, policies, proecdures and standards KA4. financial and accounting procedures of the organisation KA5. budget management KA6. code of business conduct KA7. manpower modelling and handling
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. production management and production process for products produced in the organisation KB2. process equipment design, capability, operation and maintenance KB3. process improvement tools and techniques KB4. methods to identify and assess current performance and identify improvement opportunities and proposals KB5. methods to analyze process information KB6. statistical tools to analyse process capability KB7. methods to calculate energy usage and methods save energy KB8. analyzing process, procedures, policies and structure that need to be changed KB9. reason for implementing changes, risks and benefits expected out of changes planned and implemented KB10. methods to assess the benefits and risks associated with change KB11. methods to influence change process in the management KB12. accounting models to manage budget KB13. budgetary systems, methods to monitor, control and evaluate performance against budgets KB14. food regulatory system like FSSAI KB15. GMP KB16. GHP KB17. HACCP KB18. QMS KB19. ISO KB20. OHSAS
Skills (S)	
A. Core Skills/ Generic Skills	**Writing Skills**
	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
	Reading Skills
	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
	Oral Communication (Listening and Speaking skills)
	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. Professional Skills	**Decision Making**
	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)
	Plan and Organize
	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)
	Customer Centricity
	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
	Problem Solving

	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
	Analytical Thinking
	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
	Critical Thinking
	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/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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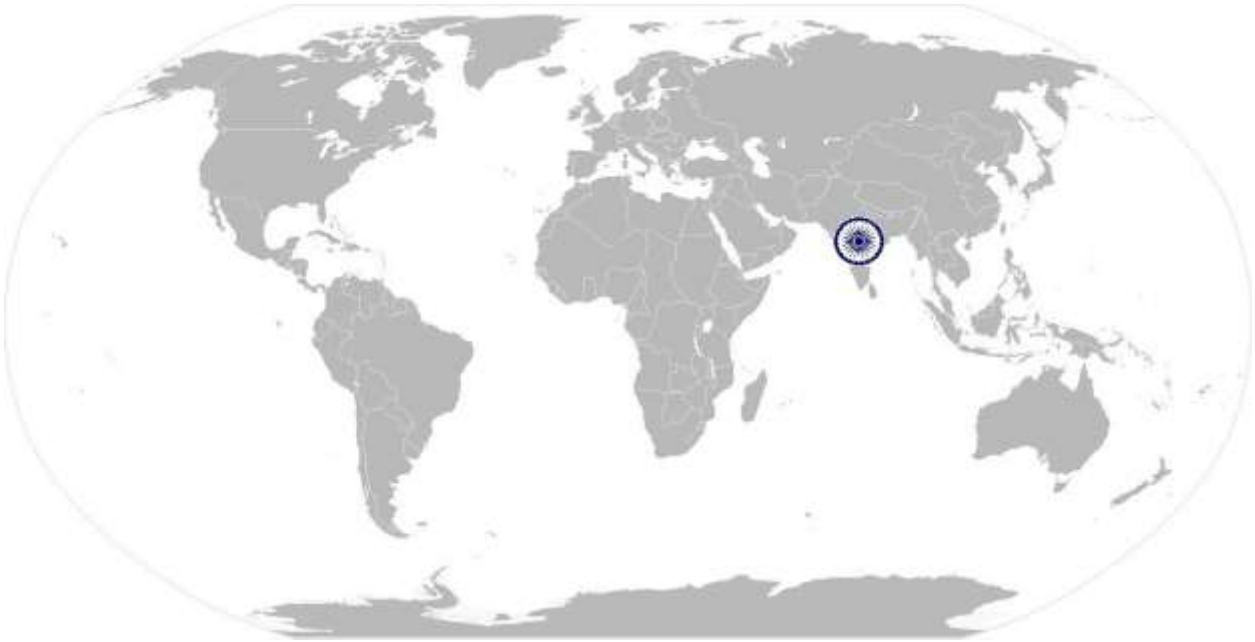


Overview

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

Unit Code	FIC/N9016
Unit Title (Task)	Manage documentation system and implement safety and environmental policies in food processing unit
Description	This OS unit is about managing documentation and implementing safety environmental policies in production process in food processing units
Scope	• Implement and monitor documentation system in production process • Implement and monitor safety and environmental management policies and procedures

Performance Criteria(PC) w.r.t. the Scope

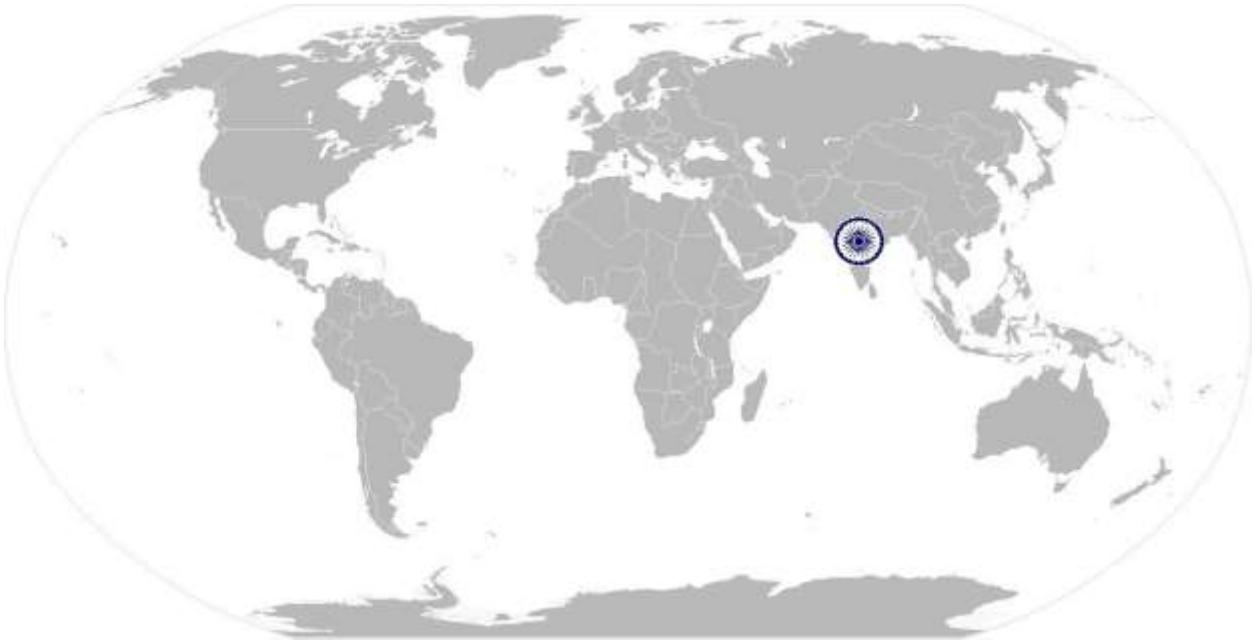
Element	Performance Criteria
Implement and monitor documentation system in production process	PC1. establish to production team the importance of documentation, provide training on documentation system, and ensure all documents are maintained systematically PC2. ensure all relevant records and documents are complete, up-to-date and accessible for audits on production process PC3. during audit provide the auditor with access to all relevant information, records and documents PC4. ensure corrective actions recommended and implemented are documented to assure production process is carried in accordance with organisation and regulatory standards PC5. establish methods to track production information from documented and maintained records
Implement and monitor safety and environmental management policies and procedures	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 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 PC8. ensure safe work procedures are followed in production area and during production process 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 PC10. identify safety and environmental hazards relevant to production processes, implement system to handle risks PC11. provide or organize training through relevant authorities on safety and environmental management system, to understand methods to control and

	prevent hazards PC12. conduct inspections in work place on use of protective clothing and accessories, and to ensure safety system is followed during production process 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 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 PC15. respond to environmental management hazard identification and incidents in an appropriate and timely way PC16. review practice and procedures followed on safety, conduct risk assessments, identify non-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
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. organisaiton policies and goals KA2. documentation and records management system KA3. quality management system KA4. enviroment management system KA5. quality mark accreditations of the organisations KA6. audit procedures and audit requirements KA7. health and safety policy KA8. food safety system like FSSAI
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. importance and methods of ensuring records and documentation are complete and up-to-date KB2. methods of carrying out audits to meet and maintain industry standards and regulatory requirements KB3. methods to carry out audit with available documents and identifying any discrepancies KB4. methods and procedures to identify any discrepancies in system, possible risks to organization and employees KB5. methods to identify and analyze inherent problems with processes and procedures followed

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

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

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



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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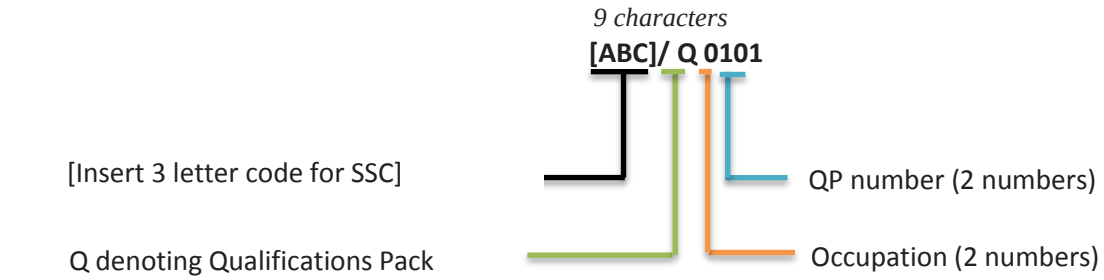
Annexure

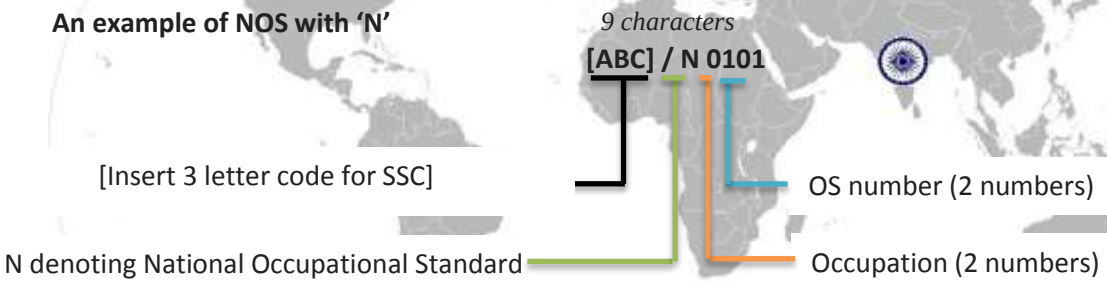
Nomenclature for QP and NOS

Qualifications Pack



Occupational Standard

An example of NOS with 'N'



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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

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 evaulations 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
1. FIC/N9014 (Manage production process in food processing unit)	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	**100**	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 polices, 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
				100	**35**	**65**
2. FIC/N9015(Manage production optimization and cost efficiency in food processing unit)	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	**100**	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 our 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
			100	**35**	**65**

Assessment Criteria

3. FIC/N9016 (Manage documentation system and implement safety and environmental policies in food processing unit)	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
			100	**35**	**65**