

# **JSS COLLEGE OF ARTS, COMMERCE & SCIENCE**

(An Autonomous College of University of Mysore)

Re-accredited by NAAC with 'A' grade

**OOTY ROAD, MYSORE-570 025, KARNATAKA**



ESTD-1964

## **SYLLABUS**

**2017-2020**

## **M.VOC. FOOD PROCESSING & ENGINEERING**

**Scheme of Instruction For M. Voc. (Food Processing & Engineering)**

**General Education Component**

**(L-Lecture; T-Tutorial; P-Practical/Practice) (1 Credit = 15 Hrs)**

Semesters	Paper No.	Title	L:T:P	Theory Hours	Tutorial	Practical Hours	Total Hours	Total Credits
					Hours			
Sem I	MFA 510	Food Chemistry	2:0:1	30	0	15	45	3
	MFA 520	Food and Nutrition	2:0:1	30	0	15	45	3
SemII	MFB 510	Food Microbiology	2:0:1	30	0	15	45	3
	MFB 520	Biostatistics	2:0:1	30	0	15	45	3
SemIII	MFC 510	Information Communication Technology	2:0:1	30	0	15	45	3
	MFC 520	EDP	2:0:1	30	0	15	45	3
SemIV	MFD 510	Food Marketing	2:0:1	30	0	15	45	3
	MFD 520	Food Standards, Regulatory Affairs and IPR Issues	2:0:1	30	0	15	45	3

Sl. No.	Food Chemistry	Hrs
1.	Introduction to food chemistry, its role in processing and food formulations,	1
2.	Moisture in foods: Role and type of water in foods, Functional properties of water, role of water in food spoilage, Water activity and sorption isotherm, Molecular mobility and food stability.	2
3.	Dispersed systems of foods: Physicochemical aspects of food dispersion system: a) Sol b) gel c) foam d) emulsions.	1
4.	Carbohydrates: Functional characteristics of different carbohydrates. Maillard reaction, caramelization, methods to control non enzymatic reactions. Starch and Dietary fibres, Functional properties of polysaccharides, natural vegetable gums, carbohydrate composition of various natural foods.	5
5.	Proteins in foods: Protein content and composition in various foods- cereal grains, legumes and oilseed proteins, proteins of meat, milk, egg and fish. Functional properties of proteins in foods – water and oil binding, foaming, gelation, emulsification. Effect of processing on functional properties of proteins-heat processing alkali treatments, chilling, freezing, dehydration and radiations. Unconventional sources of proteins- SCP fish protein concentrates, leaf proteins	5
6.	Lipids in foods: Role and use of lipids /fat, occurrence, fat group classification, Physicochemical aspects of fatty acids in natural foods, hydrolysis, reversion,. Chemical aspects of lipolysis, autooxidation, antioxidants, Technology of fat and oil processing: Refining, Hydrogenations, Inter etherification, Safety use of oils and fats in food formulation.	5
7.	Vitamins and minerals, Dietary sources, requirements, Allowances, Enrichment, Restorations, Fortifications, Losses of vitamins and minerals, Optimization and retention of vitamins and minerals	2
8.	Enzymes in food industry, Carbohydrases (Amylases, cellulases, pectinases,) Proteases, Lipases and oxidases in food processing.	2
8.	Chemistry of food flavour: definitions of flavour, Flavourmatics / flavouring compounds, Sensory assessment of flavour, Technology for flavour retention.	2

9.	Food additives: Buffer systems/ salts / Acids, Chelating agents and sequestrants, Antioxidants, Antimicrobial agents, Non-nutritive and low calorie sweeteners, Stabilizer and thickeners,	2
10.	Food colours, natural and synthetic, Regulatory aspects –Natural and synthetic permitted food colours.	1
11.	Food toxicants – anti nutritional factors and their occurrence, effects and methods of elimination or inactivation- protease inhibitors, lectins, lathrogens, phytates and flatulence factors.	2
12.	Food Contaminants, Pesticidal residues – permitted limits. Toxicology and public health.	2

<b>Sl. No.</b>	<b>Practical</b>	<b>Hrs</b>
1.	Determination of moisture content of foods using different methods	1
2.	Determination of crude proteins by microkjeldahl method	2
3.	Determination of crude fat by soxlet method	2
4.	Determination of acid value, saponification value and iodine number of fat/ oil	2
5.	Determination of minerals and acid insoluble ash and estimation of Calcium and phosphorus	3
6.	Assay of amylases, papain and lipases	2
7.	Detection of common food adulterants	2
8.	Determination of food colors	1

CODE NO:

Semester - I

Food Chemistry

TIME: 3 hrs

Max marks: 70

Instructions: Draw neat and labeled diagram wherever necessary.

PART-A

I. Write short notes for the following( any 5): ( 5x2=10)

- 1. -----
- 2. -----
- 3. -----
- 4. -----
- 5. -----
- 6. -----

PART-B

II. Answer any 4 of the following: ( 4x5=20)

- 1. -----
- 2. -----
- 3. -----
- 4. -----
- 5. -----

PART -C

III. Answer any 4 of the following: (4x10=40) IV.

- 1. -----
- 2. -----
- 3. -----
- 4. -----
- 5. -----

**INFORMATION AND COMMUNICATION TECHNOLOGY  
PRACTICAL**

**SCHEME OF EXAMINATION**

DURATION: 3 Hours

Maximum Marks: 70

Practical proper: 60

Record marks: 10

**NOTE :-** Candidates are required to submit the records duly signed by the teacher-in charge and certified by the Head of the Department

1. Determination of moisture content of foods using different methods
2. Determination of crude proteins by microkjeldahl method
3. Determination of crude fat by soxlet method
4. Determination of acid value, saponification value and iodine number of fat/ oil
5. Determination of minerals and acid insoluble ash and estimation of Calcium and phosphorus
6. Assay of amylases, papain and lipases
7. Detection of common food adulterants
8. Determination of food colors

Sl. no.	Food and Nutrition	Hrs
1.	Introduction to Food: Definition, classification and constituents of food : Carbohydrates, Fats , Proteins ,Fat soluble vitamins-A, D, E and K , Water soluble vitamins – Thiamin, Riboflavin, Niacin, Pyridoxine, Folate, Vitamin B12 and Vitamin C, Minerals – Calcium, Iron, Zinc, Iodine and Flourine.	3
2.	Food Design: Nutritive values of cereals, pulses, oil seeds, fruits, vegetables, fish, meat and eggs.	2
3.	Functions of food, Effect of deficiency & overconsumption of dietary sources on health, Basic Food Groups, Recommended dietary Allowance (RDA), Food guide pyramid, Dietary fibers, Functions of water in body. Balanced Diet: Concept of Balanced Diet: Definition, food groups used in planning balanced diets.	5
4.	Traditional and contemporary methods of food processing and quality evaluation of food products	3
5.	Nutrition: Basic terms used in Nutrition, relationship between food, health and nutrition, Bioavailability of nutrients. Basal Metabolic Rate (BMR). Protein quality, Dietary allowances and standards for different age groups: Adult man/woman, Preschool children, Adolescent children, pregnant woman. Geriatric nutrition, Nutrition for athletes	10
6.	Digestion and absorption of carbohydrates, proteins and fats. Factors influencing the sensory acceptability and digestion of foods	1
7.	Food Design: Nutritive values of cereals, pulses, oil seeds, fruits, vegetables, fish, meat and eggs. Nutrient composition of foods and Energy calculations	4
8	Antinutritional factors: Sources and harmful effects of anti vitamins (e.g.: avidin, dicoumarol), Natural toxicants, (e.g.: Lathyrus sativa).Food adultrants- structure and harmful effects of - Butter yellow, lead chromate and malachite green.	2

Sl. no.	Practical	Hrs
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1.	<p>Sensory acceptability of food products: Physical Attributes (Appearance, color, texture, taste and overall acceptability).</p> <p>Texture measurement of food products by instrumental methods.</p> <p>Preparation of food labelling.</p> <p>Formulation for foods for target groups (weaning, pre-school children, geriatric, therapeutic foods etc.).</p> <p>Processing of spices for traditional products.</p> <p>Storage and shelf determination.</p>	15
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**MODEL QUESTION PAPER**

**CODE NO:**

**Semester - I**

**Food and Nutrition**

**TIME: 3 hrs**

**Max marks: 70**

**Instructions: Draw neat and labeled diagram wherever necessary.**

**PART-A**

**V. Write short notes for the following( any 5):**

**( 5x2=10)**

- 7. -----
- 8. -----
- 9. -----
- 10. -----
- 11. -----
- 12. -----

**PART-B**

**VI. Answer any 4 of the following:**

**( 4x5=20)**

- 6. -----
- 7. -----
- 8. -----
- 9. -----
- 10. -----

**PART -C**

**VII. Answer any 4 of the following:**

**(4x10=40)**

**VIII.**

- 6. -----
- 7. -----
- 8. -----
- 9. -----
- 10. -----

## Food and Nutrition

### PRACTICAL

#### SCHEME OF EXAMINATION

DURATION: 3 Hours

Maximum Marks: 70

Practical proper: 60

Record marks: 10

**NOTE :-** Candidates are required to submit the records duly signed by the teacher-in charge and certified by the Head of the Department

1. Sensory acceptability of food products: Physical Attributes (Appearance, color, texture, taste and overall acceptability).
2. Texture measurement of food products by instrumental methods.
3. Preparation of food labelling.
4. Formulation for foods for target groups (weaning, pre-school children, geriatric, therapeutic foods etc.).
5. Processing of spices for traditional products.
6. Storage and shelf determination.

**General Component MFB 510 Semester - II**

Sl. no.	Food Microbiology	Hrs
1.	Microbiology: Introduction, historical developments in food microbiology; prokaryotes and eukaryotes; Microscope; classification & morphology of microbes; Techniques of pure culture; Bacteriology of air & water; classification of microorganisms-a brief account; sources of microorganisms in foods; microbial growth, growth curve; Thermal inactivation of microbes; Concept, determination & importance of TDT, F, Z & D values; Factors affecting heat resistance; Pasteurization and sterilization. factors affecting growth-intrinsic and extrinsic factors controlling growth of microorganisms. Microbiology of various food stuffs.-Cereals, legumes, oilseeds, fruits & vegetables, Milk and their processed products	8
2.	Disinfection & disinfectants; Energy metabolism of aerobic & anaerobic microbes	4
3.	Effect of food preservatives, heating process, irradiation, low temperature storage, chemical preservatives and high-pressure processing on the microbiology of foods; control of water activity and microbial growth	
4.	Foods microbiology and public health: food poisoning, types of food poisonings, important features etc; bacterial agents of food borne illness, food poisoning by <i>Clostridium</i> , <i>Salmonella</i> , <i>E. coli</i> , <i>Bacillus</i> , <i>Staphylococcus</i> etc.; non-bacterial agents of food borne illness: poisonous algae, and fungi-a brief account.	5
5.	Food spoilage and microbes of milk, fruits, vegetables and various plant products, spoilage of canned foods; methods of isolation and detection of microorganisms or their products in food; conventional methods; rapid methods, retention of microbes, (newer techniques)-immunological methods; fluorescent, anti body, radioimmunoassay, principles of ELISA, PCR (Polymerase chain reactions)	8
6.	Indicators microorganisms; microbiological criteria of foods and their significance; the HACCP system and food safety used in controlling microbiological hazards, applications of hurdle	4
	technology for controlling microbial growth.	

7.	Microbiology of Fermented foods:, Cereals, Vinegar, Oriental foods, Alcoholic beverages. Food poisoning and microbial toxins, standards for different foods. Food borne intoxicants and myco toxins	4
8.	Microbiology of milk & milk products like cheese, butter, ice cream, and milk powder etc	4
9.	Microbiology of fruits & vegetable and products like jam, jelly, sauce, juice; etc	4
10.	Microbiology of cereal & cereal products like bread, biscuits, confectionary etc	4

Sl. no.	Practical	Hrs
1.	Equipments used in microbiology laboratory, study of microscope, observation of microbial slides, preparation and sterilization of media, methods of sterilization, staining techniques, effects of environmental factors on growth of microorganisms,  <b>Assignment</b> -microbiological analysis of market samples- milk & milk products, fresh & processed fruits and vegetables, Cereal & bakery products	45

CODE NO:

Semester - II

Food Microbiology

TIME: 3 hrs

Max marks: 70

Instructions: Draw neat and labeled diagram wherever necessary.

PART-A

IX. Write short notes for the following( any 5):

( 5x2=10)

- 13. -----
- 14. -----
- 15. -----
- 16. -----
- 17. -----
- 18. -----

PART-B

X. Answer any 4 of the following:

( 4x5=20)

- 11. -----
- 12. -----
- 13. -----
- 14. -----
- 15. -----

PART -C

XI. Answer any 4 of the following:

(4x10=40) XII.

- 11. -----
- 12. -----
- 13. -----
- 14. -----
- 15. -----

**Food Microbiology****PRACTICAL****SCHEME OF EXAMINATION**

DURATION: 3 Hours

Maximum Marks: 70

Practical proper: 60

Record marks: 10

**NOTE :-** Candidates are required to submit the records duly signed by the teacher-in charge and certified by the Head of the Department

1. Equipments used in microbiology laboratory, study of microscope, observation of microbial slides, preparation and sterilization of media, methods of sterilization, staining techniques, effects of environmental factors on growth of microorganisms,
2. Assignment-microbiological analysis of market samples- milk & milk products, fresh & processed fruits and vegetables, Cereal & bakery products

**General Component Semester - IIMFB 520**

<b>Sl. no.</b>	<b>Biostatistics</b>	<b>Hrs</b>
1.	Statistical concepts: Data structure, sampling methods, collection, classification and tabulation of data, graphical and diagrammatic representation, histogram, frequency polygon, frequency curve, bar graph, pie chart etc.	4
2.	Measure of Central Frequency: Mean, median, mode.	2
3.	Measure of dispersion of data: Range, semi-interquartile range, mean deviation, standard deviation, standard error, coefficient of variation, confidence limits.	5
4.	Types of distribution of data: Normal, Binomial, Poisson.	7
5.	Z-test, t-test, ANOVA, multiple comparisons, LSD and DMRT, Chi-square test.	4

6.	Regression estimate, correlation coefficient.	4
7.	Experimental designs, data transformation.	4

<b>Sl. no.</b>	<b>Practical</b>	<b>Hrs</b>
1.	Analytical Problems / calculations	15

**MODEL QUESTION PAPER**

**CODE NO:**

**Semester - II**

**Biostatistics**

**TIME: 3 hrs**

**Max marks: 70**

**Instructions: Draw neat and labeled diagram wherever necessary.**

**PART-A**

**XIII. Write short notes for the following( any 5):**

**( 5x2=10)**

- 19. -----
- 20. -----
- 21. -----
- 22. -----
- 23. -----
- 24. -----

**PART-B**

**XIV. Answer any 4 of the following:**

**( 4x5=20)**

- 16. -----
- 17. -----
- 18. -----
- 19. -----
- 20. -----

**PART -C**

**XV. Answer any 4 of the following:**

**(4x10=40)**

**XVI.**

- 16. -----
- 17. -----
- 18. -----
- 19. -----
- 20. -----



## II SEMESTER PRACTICAL EXAMINATION

Biostatistics

**PRACTICAL**

### SCHEME OF EXAMINATION

DURATION: 3 Hours

Maximum Marks: 70

Practical proper: 60

Record marks: 10

**NOTE :-** Candidates are required to submit the records duly signed by the teacher-in charge and certified by the Head of the Department

1. Analytical Problems / calculations

**General Component Semester – IIIMFC 510**

<b>Sl. no.</b>	<b>Information Communication Technology</b>	<b>Hrs</b>
1	The humanitarian supply chain – Definition, system of organizations, people, technology, activities, information and resources involved in moving a product or service from supplier to customer	5
2	Technology framework – Front-end services, Middleware services and Infrastructure services: Supporting the food assistance supply chain; Mapping technologies; Web portals	5
3	Mobile technologies - Combining hand-held and wireless communications technologies	5
4	Beneficiary identification - Challenges in food assistance to ensure that assistance goes to the right beneficiaries	5
5	ICT in emergencies – Requirement inputs of Food assistance interventions during emergencies	5
6	Linking the humanitarian supply chain - Ways in which WFP uses technology and technological techniques to fulfill its role as the provider of food assistance in development and emergencies	5

<b>Sl. no.</b>	<b>Practical</b>	<b>Hrs</b>
1.	Identification of software related to Food Processing and Engineering	3
2.	Practicing the use of software	6
3.	Requirement development for Food Processing Software	6

**MODEL QUESTION PAPER**

**CODE NO:**

**Semester – III**

**Information Communication Technology**

**TIME: 3 hrs**

**Max marks: 70**

**Instructions: Draw neat and labeled diagram wherever necessary.**

**PART-A**

**XVII. Write short notes for the following( any 5):**

**( 5x2=10)**

- 25. -----
- 26. -----
- 27. -----
- 28. -----
- 29. -----
- 30. -----

**PART-B**

**XVIII. Answer any 4 of the following:**

**( 4x5=20)**

- 21. -----
- 22. -----
- 23. -----
- 24. -----
- 25. -----

**PART –C**

**XIX. Answer any 4 of the following:**

**(4x10=40)**

**XX.**

- 21. -----
- 22. -----
- 23. -----
- 24. -----
- 25. -----

## II SEMESTER PRACTICAL EXAMINATION

### Information Communication Technology

#### PRACTICAL

#### SCHEME OF EXAMINATION

DURATION: 3 Hours

Maximum Marks: 70

Practical proper: 60

Record marks: 10

**NOTE :-** Candidates are required to submit the records duly signed by the teacher-in charge and certified by the Head of the Department

- I. Identification of software related to Food Processing and Engineering.
- II. Practicing the use of software.
- III. Requirement development for Food Processing Software

Sl. no.	EDP	Hrs
1	Need for EDP, Entrepreneurship and enterprise – Concept, definition and characteristics with special reference to Food and allied areas of the Indian scenario.	2
2	Entrepreneurial development – objectives, evaluation and the existing experience, soft skill for entrepreneurship	2
3	Functions and classification of Entrepreneur and supporting institution and schemes by the National and International agencies  Factors influencing entrepreneurship groups	3
4	Gender equality in Entrepreneurship, Women Entrepreneurship, selection of enterprising men and women. The short comings for women entrepreneurship and remedial majors	3
5	Identifying products, services and enterprise establishmentSWAT Analysis	1
6	Institution working for promotion of entrepreneurship in the country such as NSIC, NIMSME, NIESBUD, KVIC/KVIB etc. And also National Financial Institutions such as banks, corporations and Agro industry projects	5
7	Identification of potential areas of food processing and regions for SMES, appraisal implementation, monitoring and evaluation, Globalization and the emerging business / entrepreneurial environment, business plan format for tiny and small enterprises, planning small scale units	5
8	Training the identified entrepreneurs, Investment analysis, Risk analysis and probable approach for successful entrepreneurship, cost benefit analysis, assessing financial viability of the project, market survey tools and market management	3
9	Network establishment for food chain, corporate and social responsibility	2
10	Communication skills, listing and noting down, project preparation and presentation skills, field dairy maintenance, upgradation of skills and knowledge on the contemporary food processing technology, public private partners	4

<b>Sl. no.</b>	<b>Practical</b>	<b>Hrs</b>
1	Different methods to identify potential entrepreneurs – men and women from both rural and urban areas	2
2	Selection of enterprise best suited for men and women, identification of business opportunities and financial processing sector	1
3	Selection and identification of enterprise based on local/regional – financial support, resources	3
4	Training on communication skills for development of enterprise by the entrepreneur	2
5	Market survey and identification of potential food processing entrepreneurships	3
6	Preparation of project reports, business plan and feasibility report	2
7	Presentation of the project proposed and documentation	2
1	Visit to Industries / Research Institutions	4
2	Project	8
3	Internship	12

**MODEL QUESTION PAPER**

**CODE NO:**

Semester – III

**EDP**

**TIME: 3 hrs**

**Max marks: 70**

**Instructions: Draw neat and labeled diagram wherever necessary.**

**PART-A**

**XXI. Write short notes for the following( any 5):**

**( 5x2=10)**

- 31. -----
- 32. -----
- 33. -----
- 34. -----
- 35. -----
- 36. -----

**PART-B**

**XXII. Answer any 4 of the following:**

**( 4x5=20)**

- 26. -----
- 27. -----
- 28. -----
- 29. -----
- 30.-----

**PART –C**

**XXIII. Answer any 4 of the following:**

**(4x10=40)**

**XXIV.**

- 26. -----
- 27. -----
- 28. -----
- 29. -----
- 30. -----

### III SEMESTER PRACTICAL EXAMINATION

#### EDP

#### PRACTICAL

#### SCHEME OF EXAMINATION

DURATION: 3 Hours

Maximum Marks: 70

Practical proper: 60

Record marks: 10

**NOTE :-** Candidates are required to submit the records duly signed by the teacher-in charge and certified by the Head of the Department

- I. Different methods to identify potential entrepreneurs – men and women from both rural and urban areas
- II. Selection of enterprise best suited for men and women, identification of business opportunities and financial processing sector
- III. Selection and identification of enterprise based on local/regional – financial support, resources
- IV. Training on communication skills for development of enterprise by the entrepreneur
- V. Market survey and identification of potential food processing entrepreneurships
- VI. Preparation of project reports, business plan and feasibility report
- VII. Presentation of the project proposed and documentation
- VIII. Visit to Industries / Research Institutions
- IX. Project
- X. Internship



<b>Sl. No.</b>	<b>Food Marketing</b>	<b>Hrs</b>
1.	Food Marketing: Definition, meaning, characteristics of rural and urban marketing	3
2.	Opportunities and challenges marketing food products by small scale entrepreneurs	2
3.	Rural marketing segmentation, rural consumer behavior, changing trends in rural consumer selection and decision, marketing process and influential factors, marketing needs for export products.	5
4.	Urban marketing segmentation, urban consumer behavior, changing trends in urban consumer selection and decision, marketing process and influential factors	5
5.	Product design, innovativeness presentation, services, prices, method of pricing, network for sourcing raw materials and distribution of products in both rural and urban area.	4
6.	Designing advertisement, campaign, sales promotion, choice of media, techniques, personal selling and publicity	4
7.	Online Marketing: Target population, product packing, distribution through courier and other mode of transportation.	3
8.	Food packaging, labelling for consumer acceptability	2
9.	Relevant of marketing information system, market research in accessing consumer behavior	2

<b>Sl. No.</b>	<b>Practical</b>	<b>Hrs</b>
1.	Regulatory aspects and food hygiene and safety for packing and marketing of food products. Costing of food products.	15
	<p>Visit to marketing federation, cooperatives APMCs and other marketing organization and institution for familiarization of marketing strategy, handling and transportation of fresh package products, perishable goods and self stable and transport table.</p> <p>Financial management, securing financial support, advancing the products for marketing, bulk and retail sales, recalling the products recovery of advances.</p>	

CODE NO:

Semester – IV

**Food Marketing**

TIME: 3 hrs

Max marks: 70

Instructions: Draw neat and labeled diagram wherever necessary.

**PART-A**

**XXV. Write short notes for the following( any 5):**

**( 5x2=10)**

- 37. -----
- 38. -----
- 39. -----
- 40. -----
- 41. -----
- 42. -----

**PART-B**

**XXVI. Answer any 4 of the following:**

**( 4x5=20)**

- 31. -----
- 32. -----
- 33. -----
- 34. -----
- 35. -----

**PART –C**

**XXVII. Answer any 4 of the following:**

**(4x10=40)**

- 31. -----
- 32. -----
- 33. -----
- 34. -----
- 35. -----

## IV SEMESTER PRACTICAL EXAMINATION

### PRACTICAL

## Food Marketing

### SCHEME OF EXAMINATION

DURATION: 3 Hours

Maximum Marks: 70

Practical proper: 60

Record marks: 10

**NOTE :-** Candidates are required to submit the records duly signed by the teacher-in charge and certified by the Head of the Department

1.Regulatory aspects and food hygiene and safety for packing and marketing of food products. Costing of food products

2.Visit to marketing federation, cooperatives APMCs and other marketing organization and institution for familiarization of marketing strategy, handling and transportation of fresh package products, perishable goods and self stable and transport table.

3.Financial management, securing financial support, advancing the products for marketing, bulk and retail sales, recalling the products recovery of advances.

**General Component Semester – IV                      MFD 520**

<b>Sl. No.</b>	<b>Food Standards, Regulatory Affairs and IPR Issues</b>	<b>Hrs</b>
1.	Introduction to concepts of food quality, food safety, food quality assurance and food quality management; objectives, importance and functions of quality control, Current challenges to food safety	3
2.	Principles of food quality assurance, total quality management (TQM) –good manufacturing/management practices, good hygienic practices, good lab practices, general awareness and role of management practices in quality control	3
3.	Microbial quality control: determination of microorganisms in foods by cultural, microscopic, physical, chemical methods. Statistical quality control in food industry Food adulteration, nature of adulterants, methods of evaluation of food adulterants and toxic constituents	3
4.	Food safety management, applications of HACCP in food safety, concept of food trace ability for food safety, Food safety and Standards Act 2006: salient provision and prospects	3
5.	Role of national and international regulatory agencies, Bureau of Indian Standards (BIS), AGMARK, Food Safety and Standards Authority of India (FSSAI)	3
6.	Introduction to WTO agreements: SPS and TBT agreements, Codex Alimentarius Commission, International organization for standards (ISO) and its standards for food quality and safety (ISO 9000 series, ISO 22000, ISO 15161, ISO 14000)	5
7.	Food safety in USA, USFDA, Legislation in Europe: Directives of the official journal of the EU, council regulations, food legislation in UK. Regulating methods for food analysis, case studies. Enforcers of Food Laws Approval Process for Food Additives, Nutritional Labeling	5
8.	Concept of property, rights, duties and their correlation; History and evaluation of IPR; Copyrights and related rights. Distinction among Various forms of IPR. Patent rights/protection and procedure; Infringement or violation; Remedies against infringement; Indian Patent Act 1970 and TRIPS; Geographical indication and Industrial design	5
<b>Sl. No.</b>	<b>Practical</b>	<b>Hrs</b>
1.	Study of food regulations in various countries ;  study of nutritional labeling of packaged food items by visiting food market, Visit the websites of FSSAI, BIS, AGMARK, ISO, Codex Alimentarius Commission, USFDA  Study of patent law in India and the procedure for grant of patent in India	15

**MODEL QUESTION PAPER**

**CODE NO:**

Semester – IV

**Food Standards, Regulatory Affairs and IPR Issues**

**TIME: 3 hrs**

**Max marks: 70**

**Instructions: Draw neat and labeled diagram wherever necessary.**

**PART-A**

**XXVIII. Write short notes for the following( any 5):**

**( 5x2=10)**

- 43. -----
- 44. -----
- 45. -----
- 46. -----
- 47. -----
- 48. -----

**PART-B**

**XXIX. Answer any 4 of the following:**

**( 4x5=20)**

- 36. -----
- 37. -----
- 38. -----
- 39. -----
- 40.-----

**PART –C**

**XXX. Answer any 4 of the following:**

**(4x10=40)**

- 36. -----
- 37. -----
- 38. -----
- 39. -----
- 40. -----

## IV SEMESTER PRACTICAL EXAMINATION

### PRACTICAL

### Food Standards, Regulatory Affairs and IPR Issues

#### SCHEME OF EXAMINATION

DURATION: 3 Hours

Maximum Marks: 70

Practical proper: 60

Record marks: 10

**NOTE :-** Candidates are required to submit the records duly signed by the teacher-in charge and certified by the Head of the Department

1. Study of food regulations in various countries ;
- 2.study of nutritional labeling of packaged food items by visiting food market, Visit the websites of FSSAI, BIS, AGMARK, ISO, Codex Alimentarius Commission , USFDA
- 3.Study of patent law in India and the procedure for grant of patent in India

<b>M.Voc (Food Processing and Engineering) Syllabus</b>		
<b>1<sup>st</sup> -M.Voc</b>		
<b>NSQF Level: 8 – Semester I &amp; II</b>		
<b>Sub Sector: Fruits &amp; Vegetables</b>		
<b>Job Role: Head of Production</b>		
<b>UNIT I</b>		
<b>Post Harvest Management of Fruits</b>		
<b>S.No</b>	<b>THEORY</b>	<b>Hrs</b>
1.	General Introduction of fruits-citrus, tropical and subtropical, pome, stone, soft, and berry fruits, melons and watermelons	1
2.	Importance and scope of post harvest management of fruits, Morphology, structure and composition of fruits	2
3.	Maturity Indices and standards for standards for selected fruits, methods of maturity determination	2
4.	Post-harvest physiological and biochemical changes in fruits; ripening of climacteric and non-climacteric fruits	2
5.	Harvesting and handling of important fruits. Harvesting tools; field heat removal/precooling of fruits. Sorting and grading at farm and cluster level; factors affecting post harvest losses	2
6.	Nature of post harvest deterioration; physiological change- physical damage; chemical injury-pathological decay; identification of diseases and disorders in fruit-nutritional disorders, respiratory disorders, temperature disorders and miscellaneous disorders. Classification of diseases and diseases organisms, types of diseases and agents of diseases in fruits.	4
7.	Pre-cooling of fruits and cold storage, zero energy cool chamber	3
8.	Shelf life enhancement- permitted chemicals for ripening, wax coating	3
9.	Storage practices: Refrigerated storage, modified atmospheric storage-novel MAP gases and their role, novel MAP applications, Applying high oxygen MAP; MAP of minimally processed fruits; controlled atmosphere storage/ultra low oxygen storage of fruits, recent advances in CAP and MAP	9
<b>TOTAL</b>		<b>28</b>
<b>S.No</b>	<b>PRACTICALS</b>	<b>Hrs</b>
1.	Familiarization of various fruits available in India and categorization of fruits used for pulping	3
2.	Studies on morphological features of some of the fruits	3
3.	Studies on maturity indices; Studies on harvesting of fruits	3
4.	Studies on permitted chemicals for ripening and enhancing the shelf life of fruits	3
5.	Studies on regulations of ripening of banana and mango	3
6.	Studies on physiological disorders like chilling injury of certain fruits	3
7.	Studies on pre cooling and storage of fruits and vegetables	3
8.	Demonstration on wax coating on apples, citrus and Mango	3
9.	Studies on various storage systems and structures;	3
10.	Studies on pre packaging of whole and cut vegetables	3
11.	MAP of minimally processed fruits & vegetables	3
12.	Visit to commercial packaging houses for mango, banana, pomegranate, grapes	3
13.	Visit to Controlled Atmospheric packaging centres	4
14.	Visit to commercial storage structures for onion and potato	4
15.	Visit to multi chamber cold storages for fruits and vegetables	4
16.	Visit to Fruit Orchards -Observations on Pruning, orchard Hygiene, Irrigation, Manuring, Insect Pests, Pathological Spoilages, Pre-harvest spray schedules to	4

	control pathological spoilages and insect infestation	
17.	Visit to Fruit Orchards - Studies on Causes for pre and post harvest losses. Spoilage factors, post harvest field operations including methods to reduce the post harvest losses	4
	<b>TOTAL</b>	<b>56</b>
<b>UNIT II</b>		
<b>Technology for processing of Fruit Pulp</b>		
<b>S.No</b>	<b>THEORY</b>	<b>Hrs</b>
1.	Process of receiving, ripening, checking raw material quality, sorting, washing, cutting/slicing, deseeding/destining, pulping, precooking/pasteurization, sterilizing, aseptic packaging or canning, retort pouching, sampling for quality analysis and storing	2
2.	Machineries and tools used for the fruit pulping process such as fruit washer, peeler, slicer, fruit pulper, steam jacketed kettles, packaging machines etc	2
3.	Quality assessment of packaging materials	2
4.	Enzymes in quality and processing of tropical and sub tropical fruits	3
5.	Non thermal processing methods-ultra violet light, high pressure processing, ultrasound, ozone application, irradiation, pulsed electric field	7
6.	Introduction, canning machineries, various steps involved in canning of fruit pulp, syrup preparation, pretreatment for canning operation	7
7.	Canning of various fruits, process flow diagram for canning, filling, exhausting, sealing and processing operations	5
	<b>TOTAL</b>	<b>28</b>
<b>S.No</b>	<b>PRACTICALS</b>	<b>Hrs</b>
1.	Canning of mango pulp	5
2.	Canning of tomato pulp	5
3.	Preservation of tomato pulp by chemical preservation method	5
4.	Preservation of banana pulp by freezing method	5
5.	Canning of mango slices in syrup	5
6.	Canning of pineapple slices in syrup	5
7.	Canning of banana slices in syrup	5
8.	Visit to fruit processing units and collection of data on wastes and by products	5
9.	Visit to Aseptic packing units for fruit pulps & concentrates	8
10.	Visit to the pilot plants of CFTRI & DFRL Mysore	8
	<b>TOTAL</b>	<b>56</b>
<b>UNIT III</b>		
<b>Food Quality and Food Microbiology</b>		
<b>S.No</b>	<b>THEORY</b>	<b>Hrs</b>
1.	Introduction – definition, historical development and significance of food microbiology; Microscope; Classification & morphology of microbes; Techniques of pure culture; Bacteriology of air & water; Anti-microbial agents – physical & chemical – mechanism & action	3
2.	Sources of Contamination: Air, Water, Soil, Sewage, Post processing Contamination. Intrinsic & extrinsic factors influencing the growth of Microorganisms in foods	3
3.	Disinfection & disinfectants; Energy metabolism of aerobic & anaerobic microbes; Thermal inactivation of microbes; Concept, determination & importance of TDT, F, Z & D values; Factors affecting heat resistance; Pasteurization and sterilization	4
4.	Microbiology of Fruits and vegetables and their products like jam, jelly, sauce, juice/pulp	3
5.	Food Quality aspects of Fruits & vegetables; Introduction, Quality principles, Quality enhancement model. Application of quality enhancement model	3
6.	Food Waste Treatment : Liquid waste, Solid waste vessel containers & wrapping	3



	waste, Hazardous waste .Quality and Safety of Frozen Foods: Fruits, Vegetable	
7.	Measuring and Controlling Devices: Role of transducers measurements in food processing; Humidity, Turbidity and Color, Food & Process temperature controller and indicators. Statistical Quality Control for food Industry : Food Quality System, Fundamentals, Process control implementing quality control program, six sigma, RSM	4
8.	Food additives – preservatives, antioxidants, sequestrates, surface active agents, stabilizers and thickeners, bleaching and maturing agents, starch modifies, buffers, acids, alkalis, food colors, artificial sweeteners, nutritional additives, flavoring agents.	5
	<b>TOTAL</b>	<b>28</b>
	<b>PRACTICALS</b>	<b>3</b>
1.	Determination of firmness of fruits	3
2.	Determination of moisture content	3
3.	Titrateable acidity estimation	3
4.	Estimation of SO <sub>2</sub> in food sample	3
5.	Estimation of sodium benzoate in food sample	3
6.	Estimation of polyphenol and polyphenol oxidase	3
7.	Estimation of Reducing sugar, Non-reducing and total sugars	3
8.	Determination of organic acid content	3
9.	Ascorbic acid estimation	3
10.	Determination of pH in food products	3
11.	Determination of total Ash	3
12.	Determination of total soluble solids	3
13.	Estimation of ash content	3
14.	Estimation of crude fibre	3
15.	Estimation of pectin	3
16.	Flow process chart of food plant Waste utilization processes, various treatment for waste disposal analysis of cleaners & sanitizers, CIP Cleaning	11
	<b>TOTAL</b>	<b>56</b>
<b>UNIT IV</b>		
<b>Food Safety, Hygiene and Sanitation for Processing of Fruit Pulp</b>		
<b>S.No</b>	<b>THEORY</b>	<b>Hrs</b>
1.	Food safety, hygiene and sanitation for processing of fruit pulp: food safety standards and regulations for fruit pulp, definition of hygiene, hygiene practices and its importance at every stage of fruit pulp processing at industrial level; personal hygiene requirements; physical, chemical and biological hazards and methods for prevention of various hazards; CIP and COP methods and procedures, GHP, GMP and HACCP; waste management-pre and post production.	14
2.	Microbiological aspect of Food; types of food microbes, causes of food spoilage, types of food spoilage/deterioration, criteria to check the food spoilage, need for food preservation, different types of food preservation methods, method of assessing the quality of products based on physical parameters	14
	<b>TOTAL</b>	<b>28</b>
<b>S.No</b>	<b>PRACTICALS</b>	<b>Hrs</b>
1.	Clean and maintenance of work area using appropriate sanitizers, ensure the work area safe and hygienic for fruit processing, disposal of waste material as per SOPs and industrial requirement	8
2.	Check the working and performance of machineries and tools for fruit pulp process, clean the machineries and tools used with recommended sanitizer, to place the necessary tools required for the process, to attend minor repair, faults of all machineries if required.	8
3.	Disassembling and assembling of machineries used in fruit pulp industry (Fruit mill, crusher etc)	8
4.	Demonstration of CIP and COP methods of cleaning the machines with approved	8

	sanitizers	
5.	Visit to industry to learn about GHP, GMP, HACCP	12
6.	Visit to industry to learn about waste management pre and post production	12
	<b>TOTAL</b>	<b>56</b>
<b>S.No</b>	<b>UNIT V</b>	<b>Hrs</b>
<b>Plant Design, Plant Economics and Plant Management</b>		
1.	Food Industry management- location of plant land and building requirements, plant capacity, plant and machinery requirement, building and plant layout, utilities, byproducts, waste, energy and safety audit, manpower requirements	5
2.	Introduction to economics: Meaning, scope, and contribution to business decisions. Analysis of Demand: Law of demand, Utility function, Rate of commodity substitution, Maximization of utility, Demand functions, Indifference curve analysis, Substitution and income effects. Market demand and demand elasticities: concept of market demand, price and income elasticities of demand, importance of elasticity. Demand forecasting: causes and techniques of demand forecasting	6
3.	Analysis of supply and market equilibrium: Law of supply, price elasticity of supply, equilibrium of demand and supply. Theory of the Firm: Production function, returns to scale, Optimizing behavior, Input demands, Cost functions, Profit maximization, economics & diseconomies of scale, break even analysis. Market structures perfect competition: Profit maximization and equilibrium of firm and industry, Short run and long run supply curves; Price and output determination, practical applications	6
4.	Plant maintenance program; Role of maintenance staff and plant operators, Preventive maintenance; Guidelines for good maintenance & safety precautions; Lubrication & lubricants; Work place improvement through '5S'. Hygiene and sanitation requirement in food processing and fermentation industries; CIP methods, sanitizing & disinfestation, pest control in food processing; storage and service areas	6
5.	Supply chain management for fruits	5
	<b>TOTAL</b>	<b>28</b>
<b>PRACTICALS</b>		
1.	Visit to industry to learn the management system	16
2.	Visit to Fruit & Vegetable Processing Industries. Preparation of a Business Plan for setting up fruit & vegetable processing unit	40
	<b>TOTAL</b>	<b>56</b>
VI	<b>Hands on Training in Fruit Pulp Processing Industry and submission of report</b>	120
	<b>TOTAL</b>	<b>540</b>

# Model Curriculum

## Plant Manager

**SECTOR: FOOD PROCESSING**

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

**OCCUPATION:**

**PROCESSING REF**

**ID: FIC/Q9004,**

**V1.0**

**NSQF LEVEL: 9**



## Certificate

### CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

**FOOD INDUSTRY CAPACITY AND SKILL INITIATIVE (FICSI)**

for the

#### MODEL CURRICULUM

Complying to National Occupational Standards of  
Job Role/Qualification Pack: **'Plant Manager'**  
QP No. **'FIC/Q0004, Version 1.0, NSQF Level 6'**

Date of Issuance: **March 30, 2018**

Valid up to: **March 30, 2019**

\* Valid up to the next review date of the Qualification Pack

Authorized Signatory  
(Food Industry Capacity and Skill Initiative)

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# Plant Manager

## CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Plant Manager”, in the “Food Processing” Sector/Industry and aims at building the following key competencies amongst the learner

<b>Program Name</b>	<b>Plant Manager</b>		
<b>Qualification Pack Name &amp; Reference ID. ID</b>	FIC/Q9004, v1.0		
<b>Version No.</b>	1.0	<b>Version Update Date</b>	30/03/2016
<b>Pre-requisites to Training</b>	Preferably Class 12 and 6-7 years' experience in a food processing unit		
<b>Training Outcomes</b>	<b>After completing this programme, participants will be able to:</b> Daily management of food processing unit Coordination of food processing unit operations including production planning, managing human resources, supply chain, production operation, maintenance, quality assurance, storage and distribution of finished products.		

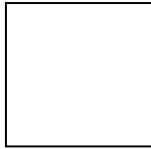
This course encompasses 3 out of 3 National Occupational Standards (NOS) of “Plant Manager” Qualification Pack issued by “Food Industry Capacity and Skill Initiative”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<p><b>Introduction to the training program</b></p> <p><b>Theory Duration</b> (hh:mm) 00:30</p> <p><b>Practical Duration</b> (hh:mm) 00:00</p> <p><b>Corresponding NOS Code</b> Bridge Module</p>	<p>Introduce each other and build rapport with fellow participants and the trainer.</p>	<p>White board/Chart papers, marker</p>
2	<p><b>Overview of the “Plant Manager” Role</b></p> <p><b>Theory Duration</b> (hh:mm) 01:00</p> <p><b>Practical Duration</b> (hh:mm) 00:00</p> <p><b>Corresponding NOS Code</b></p>	<p>Understanding the roles and responsibilities of plant manager Awareness of the nature and availability of job opportunities</p>	<p>Laptop/computer white board, marker, projector, chart papers</p>
3	<p><b>Introduction to the Food Processing Industry</b></p> <p><b>Theory Duration</b> (hh:mm) 01:30</p> <p><b>Practical Duration</b> (hh:mm) 00:00</p> <p><b>Corresponding NOS Code</b></p>	<p>Define food processing List the various sub sectors of food processing industry</p>	<p>Laptop, white/black board, marker, chart papers, projector, Trainer’s guide, Student manual</p>
4	<p><b>Introduction to food processing process</b></p> <p><b>Theory Duration</b> (hh:mm) 02:00</p> <p><b>Practical Duration</b> (hh:mm)</p>	<p>List the common machineries used in food processing Explain the process of testing food for accepted quality standards Demonstrate the test for checking the quality of food Describe the procedure for processing various food</p>	<p>Laptop, white board, marker, chart papers, projector, trainer’s guide and student handbook</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	04:00 <b>Corresponding NOS Code</b>	Identify different equipment used in food industry	
5	<b>Organizational standards and norms</b>  <b>Theory Duration</b> (hh:mm) 04:00  <b>Practical Duration</b> (hh:mm) 02:00  <b>Corresponding NOS Code</b>	State the roles and responsibilities of a plant manager State how to conduct yourself at the workplace State the personal hygiene and sanitation guidelines State the food safety hygiene standards to follow in a work environment	Laptop, white board, marker, chart papers, projector, trainer's guide and student handbook, protective gloves, head caps, aprons, safety goggles, safety boots, mouth masks, sanitizer, safety manual
6	<b>Lead operations of a food processing unit</b>  <b>Theory Duration</b> (hh:mm) 15:00  <b>Practical Duration</b> (hh:mm) 11:40  <b>Corresponding NOS Code</b> FIC/N9017	<ul style="list-style-type: none"> <li>Develop operational plans for the operation of food processing unit that is consistent with the objectives and goals of organisation, and to produce quantity and quality products</li> <li>Develop operational plan that is flexible and complements supply chain, inventory, human resource, production, maintenance, quality and logistics management of production unit</li> <li>Develop operational plan to improve output in all areas of functions with the objective to reduce overall cost, and to produce quantity and quality products</li> <li>Develop operational plan considering national and international regulatory requirements, health and safety, food safety and hygiene requirements on process and product(s), and to maintain safe and environmental compliant workplace</li> <li>Develop objectives and set demanding but achievable targets for operation function managers, and assign clear responsibilities with expected targets/performance</li> <li>Provide direction and professional expertise to all function managers to achieve organisation goals</li> <li>Monitor and control the operational plan to achieve its overall objectives</li> </ul>	Laptop, white board, marker, chart papers, projector, trainer's guide and student handbook



Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> <li>• Evaluate the implemented operational plan periodically, analyze performance data, identify areas for improvement and recommend changes</li> <li>• Monitor performance of managers and employees to ensure that departmental and individual objectives are achieved within scheduled timelines and budget</li> <li>• Design new work processes, procedures, systems, structures and roles for any changes implemented in the organisation to achieve organizational goal and regulatory requirements</li> <li>• Review and ensure implemented changes are effective and meet the requirements of the organization</li> <li>• Maintain professionalism, tact, diplomacy, sensitivity, diversity and equality, and lead food processing unit to achieve organisation objectives and goals</li> <li>• Ensure that work arrangements, resources and business processes respond to different needs, abilities and values</li> <li>• Develop and implement new business strategies for improving processes and procedures to improve performance</li> <li>• Develop a leadership style and apply them appropriately for managers to follow the lead willingly to achieve organisation targets and goals</li> <li>• Communicate clearly the organisation vision, values and goals to employees, make managers understand and commit their expertise to achieve organisation goals</li> <li>• Lead managers of all operation functions, link operational plans and drive managers towards achieving organisation vision, objectives and goals</li> <li>• Lead managers through difficulties, challenges and conflicts</li> <li>• Conduct meetings with managers regularly and effectively, encourage them to share their views, provide guidance and support to overcome process issues and lead to achieve organisation goal</li> </ul>	



Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> <li>• Encourage managers to take lead in their own areas of expertise, take own decisions in their area of function, and provide recognitions when they are successful</li> <li>• Lead the managers and organisation successfully through difficulties and challenges</li> <li>• Design processes with achievable targets and realistic timeline, proper resource allocation, with defined process responsibilities to manage food processing operation based on organizational goals</li> <li>• Develop processes that are effective and sustainable, implement and ensure it is followed, review its effectiveness and make necessary changes if required</li> <li>• Develop process measures that are affordable, and provide enough information and required training for managers and employees to manage the process</li> <li>• Review and understand resource requirements for process and allocate necessary resources to all functional areas</li> <li>• Develop systems to link all function processes, and encourage function heads and employees to interact across the organisation to form a complete system</li> <li>• Establish effective methods to review the quality of work and product, and improve the process</li> <li>• Focus attention on issues that are critical to achieve results, provide solutions and guidance to overcome the issues that affect the process</li> <li>• Identify issues and trends and recognize their impact upon current and future work, work out solutions and implementation plan to overcome and utilize latest trends to achieve long term goals of the organisation</li> <li>• Develop policies and procedures for any change in organisation goal, organisation structure PC31. set responsibilities for managers, set and prioritize objectives for change, clearly communicate change and make the managers understand their responsibilities and commitment</li> </ul>	



Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> <li>Implement change, identify and deal with obstacles to change, and support managers and employees through the change process</li> <li>Brief managers on their responsibilities and make them understand their role, objectives for their area and the overall organisation, and expected performance</li> <li>Monitor progress and performance quality of the managers on regular basis against the level of expected performance and provide prompt and constructive feedback PC35. support managers in identifying and dealing with problems and unforeseen events</li> <li>Identify gaps and performance issues, discuss the causes and recommend solutions to improve performance of managers and their team</li> <li>Monitor performance, analyze employee strength and weakness, and make changes in their tasks/responsibilities</li> <li>Review performance and update work plans in their area, monitor and conduct review meetings on regular basis, recognize successful completion of work or work activities by function manager(s) and their teams</li> <li>Motivate managers to complete expected target and any additional work allocated and provide additional support and resources to complete work</li> </ul>	
7	<p><b>Ensure proper production and operation management</b></p> <p><b>Theory Duration</b> (hh:mm) 08:00</p> <p><b>Practical Duration</b> (hh:mm) 12:00</p> <p><b>Corresponding NOS Code</b> FIC/N9018</p>	<p>Update self with an understanding of the goals of the organisation and forecast/requirements of the sales and marketing manager, with the knowledge of production method and process, plant capacity, resource availability, plan products and quantity to be produced</p> <p>Monitor and regulate supply chain management which includes sourcing and procurement, conversion of raw materials to finished products, all logistics activities, coordination and collaboration with suppliers,</p>	Laptop, white board, marker, chart papers, projector, trainer's guide and student handbook ,



Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>intermediaries, third party service providers, and customers, to integrate supply and demand management within and across companies</p> <p>Monitor and regulate inventory process to meet the production requirement of the organisation, review current procurement procedures, analyze benefits and risks that may impact the procurement of supplies, implement plans and methods to improve and provide solutions to resolve any immediate problems</p> <p>Evaluate current storage methods and identify ways of improving the storage of supplies to provide better fit with supply chain strategy</p> <p>During production process, coordinate production activities with procurement, maintenance, and quality control function to obtain optimum production and efficient utilization of human resources, machines and equipment</p> <p>Make adjustments/revise/reschedule production schedules and priorities in case of breakdown down of equipment/issues with physical or human resource/ urgent orders/unforeseen issues or any operational problems</p> <p>Direct production activities and establish production priorities to produce quantity and quality products within the operation budget</p> <p>Review and analyze human resource, production, quality control, maintenance, and operational reports to identify reason for nonconformance/ non-compliance to organisation and regulatory standards for product and process, develop and implement operating methods and procedures to eliminate problems and improve product and process quality</p> <p>Monitor storage and distribution of products to and from the plant/processing unit warehouse, ensure storage and distribution norms and procedures like palletizing, stacking height, labeling, fefo etc are followed</p>	



Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>Establish systems to collect and assess information on performance of all functions, analyze data and evaluate performance of departments and organisation, through knowledge and understanding identify reasons for problems and low performance</p> <p>Establish and implement methods and procedures for improvement, ensure implemented methods deliver expected result, and identify opportunities to improve organization performance</p> <p>Read financial responsibilities, compile available financial information, evaluate the cost, benefits and risks of the current budget, and estimate financial requirements for operation of food processing unit</p> <p>Consult with department managers the objectives and associated plans, discuss and identify priorities and develop a realistic master budget for food processing operation, communicate the final proposed budget with all managers</p> <p>Submit the proposed master budget with clear proposals to the management for approval, assist them to evaluate the budget, negotiate with clarity and strong reasoning and get the budget approved</p> <p>Evaluate, analyze and allocate budget to departments of food processing operation, allocate budget to each department managers with expectations and targets, provide required ongoing support and resources</p> <p>Establish systems to monitor and evaluate performance against delegated budgets and the master budget and put contingency plans in place</p> <p>Identify reason for significant variances between budget and actual expenditure, discuss with managers, provide solutions and ensure immediate corrective action is taken</p> <p>In case of unforeseen situation/emergency/shortage.</p>	



Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>identify any additional financial needs, prepare provisional budget, negotiate and get it approved by the management, delegate provisional budget to respective managers, monitor and control expenditure</p> <p>Encourage managers to identify ways of reducing expenditure, analyze and pursue potential ideas, implement those in all areas of function</p> <p>Review the financial performance of managers regularly, and identify improvement opportunities and ensure it is implemented, provide information to the management on the financial performance of the operation management</p> <p>Determine human resource requirement including contingencies to achieve organisation goal, organize interview, hiring and training of new employees through human resources manager</p> <p>Ensure that all employees receive appropriate training on job duties, corporate policies and applicable regulations</p> <p>Oversee and direct the activities of subordinate managers, provide coaching and mentoring, and conduct evaluations of all</p> <p>Discuss with managers of operation function and identify resource requirement for their area, analyze, estimate and approve resources, monitor effective use of those resources</p> <p>Ensure compliance of all employees with organization policy, procedures and applicable regulations</p> <p>Conduct meetings to address grievances, to resolve or effect settlements within the scope of authority, and refer unresolved grievances for management-union negotiations</p> <p>Take personnel actions, such as promotions, transfers, discharges or disciplinary measures, within the scope of authority</p> <p>Update self with knowledge of quality management system, legal and regulatory requirements, environmental issues related to the</p>	



Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>organisation, process and products produced</p> <p>Ensure system, plan and resources are in place to assure food products produced in the organisation meet the organisation standards, national and international regulations</p> <p>Implement procedure, standards and specifications to meet quality goals of the organisation, co-ordinate departments and provide support to implement food safety system like HACCP in the organisation</p> <p>Evaluate records of quality of product and process to assess the effectiveness of quality system followed in the organisation, review and revise the quality system through quality assurance manager and implement changes</p> <p>Organize training for employees to update on latest developments/systems/ tools and techniques in quality management system and evaluate their competency to fulfill organisation goals</p> <p>Encourage employees of all functions to take personal responsibility for achieving quality standards of product and process and address or report/address any non-conformance</p> <p>Monitor process and product quality against target and plan, identify and assess risks of shortfalls in the quality of processes and products/services and take immediate corrective action to address risks</p> <p>Direct and coordinate implementation of quality system such as ISO, HACCP, etc. in the organisation through quality manager</p> <p>Ensure managers responsible for organizational processes understand the requirements of quality system, establish their roles in implementation of quality system in their functional areas, enhance their confidence and commitment to quality by providing continuous support</p> <p>Encourage and support department heads and employees for quality</p>	



Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>audit process to obtain accreditation, certifications to a standard or a mark of quality, monitor quality audit process, review results and take immediate corrective action through concerned managers</p> <p>Identify the environmental impact related to the resources, process and products produced in the organisation such as air/water/noise pollution, effluent treatment, waste disposal etc, identify risks to the environment, consult with experts and identify opportunities to improve environmental performance</p> <p>Set and implement policies and procedures through managers, monitor to ensure its efficiency and effectiveness and make changes as required to meet the regulatory requirements</p>	
8	<p><b>Manage new projects and ensure compliance to regulatory requirements</b></p> <p><b>Theory Duration</b> (hh:mm) 07:00</p> <p><b>Practical Duration</b> (hh:mm) 09:00</p> <p><b>Corresponding NOS Code</b> FIC/N9019</p>	<p>Implement new project/business plans of the organisation for introducing new products or for improving processes, procedures and performance</p> <p>Map or perform comparative study of the project with the current project/product to understand the ways proposed project fits with the overall vision, objectives and plans of the organization</p> <p>Read the key objectives and scope of the proposed project, prepare resource requirement for implementation of new project, negotiate with clarity and strong reasoning and get approval from superiors/management</p> <p>Consult with experts and managers and prepare realistic and thorough plan to implement the project successfully, prepare project report considering all possibilities</p> <p>Submit the project report to the superiors/management, discuss plan, consider suggestions and recommendations and make necessary changes where necessary, take approval of final plan</p> <p>brief project team managers on the project plan and their roles and responsibilities, start implementation of project and provide ongoing</p>	<p>Laptop, white board, marker, chart papers, projector, trainer's guide and student handbook, logbooks, internal audit register, food safety manual, quality policy etc.</p>





Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>support, encouragement and information for successful completion</p> <p>Monitor, control and review project plan during each stage of implementation</p> <p>Provide sufficient resources to deal with contingencies and to manage any potential risks</p> <p>Inform the management/superiors of the developments in the project on regular basis, discuss progress and problems, take approval for any changes in project plan</p> <p>Complete project within agreed level of resources, meeting all legal and regulatory requirements, share the success with the project team members, recognize and reward their contribution</p> <p>Update self with understanding of national and international food safety regulations and standards related to the food processing units, process and products produced in the organisation</p> <p>Ensure effective policies and procedures are in place in the organization to meet to legal and regulatory requirements</p> <p>Ensure regulatory standards set by the organisation for products are stringent in context of the national and international legal requirements</p> <p>Ensure managers of all functional area have a clear understanding of the policies and procedures on food regulatory standards</p> <p>Organize training for all employees on policies and procedures on food regulatory standards and the importance of following regulations</p> <p>Monitor and ensure relevant legal and regulatory requirements pertaining to food processing units and products produced in the organisation are followed and met</p> <p>Identify reasons for non-compliance, review and revise the policies and procedures in consultation with quality and regulatory affairs manager to correct and overcome failures, provide support to all managers to implement corrective actions for the organisation and</p>	



Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<p>products to comply with regulatory standards</p> <p>Update self with understanding of health and safety requirements, and food safety, hygiene and sanitation requirements for the organisation and products produced</p> <p>Ensure that the organisation has written policy and procedures on health and safety, food safety, hygiene and sanitation, and those are clearly communicated to all employees of the organisation, and are put into practice and followed</p> <p>Implement a system for identifying hazards and assessing risk in food processing and products and set procedures to control and prevent them</p> <p>Implement system for GMP, HACCP, FIFO/FEFO, product recall, etc., organize training to the employees on health and safety, food safety, hygiene and sanitation for effective implementation of the systems, allocate required resources for implementation, and ensure those are followed by all employees</p> <p>Ensure systems are in place for effective monitoring, measuring and reporting on the performance of health and safety system</p> <p>Evaluate the existing systems and procedures, consult with managers and experts and identify methods to reduce risks/improve control measure</p> <p>Ensure health and safety policies are practiced across the organisation, effectively monitored, reviewed and revised at regular intervals to meet the changes in national and international regulations</p>	
9	<p><b>Professional and Core Skills</b></p> <p><b>Theory Duration</b> (hh:mm) 03:00</p> <p><b>Practical Duration</b> (hh:mm) 05:00</p>	<p>Undertake a self-assessment test</p> <p>Identify personal strengths and weaknesses</p> <p>Plan and schedule the work order and manage time effectively to complete the tasks assigned</p> <p>Prevent potential problems from occurring</p>	<p>Laptop, white/black board, marker, chart papers, projector ,Trainer's guide, Student manual</p>



Sr. No.	Module	Key Learning Outcomes	Equipment Required
	<b>Corresponding NOS Code</b>	Resolve issues and problems using acquired knowledge and realize the importance of decision making Identify potential problems and make sound and timely decision Improve your reading skills State the importance of listening	
10	<b>IT Skills</b>  <b>Theory Duration</b> (hh:mm) 05:00  <b>Practical Duration</b> (hh:mm) 07:00  <b>Corresponding NOS Code</b>	Identify parts of the computer Use the computer keyboard effectively to type Use computer applications effectively to record day-to-day activities Use the word processor effectively Use the spreadsheet application effectively Use the computer to document day-to-day activities	Laptop, white/black board, marker, chart papers, projector, Trainer's guide, Student manual
11	<b>Field Visits</b>  <b>Theory Duration</b> (hh:mm) 04:00  <b>Practical Duration</b> (hh:mm) 30:00  <b>Corresponding NOS Code</b>	Observe the factory location, layout and safety aspects of food processing Observe the storage facilities for raw materials and finished products Observe the various machineries used in process Observe the various machineries used in process Observe the cleaning methods and processes followed to maintain the process machineries and tools Observe the raw materials used and their storage procedures Observe the packaging and storage processes of raw material and finished product Observe the post-production cleaning and maintenance process followed in the industry	All the tools and equipment listed above must be available at the site of field visit
12	<b>Revision</b>  <b>Theory Duration</b> (hh:mm) 02:00  <b>Practical Duration</b> (hh:mm) 02:00  <b>Corresponding NOS Code</b>	Revised the knowledge gained so far	All the tools and equipment listed above must be available at the time of revision
13	<b>Evaluation</b>	Assess the knowledge and skills acquired by the participants	All the tools and equipment listed above



Sr. No.	Module	Key Learning Outcomes	Equipment Required
	<b>Theory Duration</b> (hh:mm) 08:00  <b>Practical Duration</b> (hh:mm) 20:00  <b>Corresponding NOS Code</b>		must be available for evaluation
14	<b>On-the-job Training</b>  <b>Theory Duration</b> (hh:mm) 30:00  <b>Practical Duration</b> (hh:mm) 65:00  <b>Corresponding NOS Code</b>	Apply the skills and knowledge acquired in the training program in the field	All the tools and equipment listed above must be available on the site at the time of OJT
	<b>Total Duration</b> <b>240:00</b>  <b>Theory Duration</b> <b>88:00</b>  <b>Practical Duration</b> <b>152:00</b>	<b>Unique Equipment Required:</b> Laptop, white board, marker, chart papers, projector, trainer's guide and student handbook, protective gloves, head caps, aprons, safety goggles, safety boots, mouth masks, sanitizer, safety manual	

Grand Total Course Duration: **240Hours, 0 Minutes**

(This syllabus/ curriculum has been approved by SSC: Food Industry Capacity and Skill Initiative)



**Trainer Prerequisites for Job role: “Plant Manager” mapped to Qualification Pack: “FIC/Q9004, v1.0”**

Sr. No.	Area	Details
1	<b>Description</b>	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “FIC/Q9004”, Version 1.0
2	<b>Personal Attributes</b>	An aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training, and pre/post work to ensure competent, employable candidates at the end of the training. Strong communication skills, ability to work as part of a team; a passion for quality and for developing others; well-organized and focused, eager to learn and keep oneself updated with the latest in the mentioned fields.
3	<b>Minimum Educational Qualifications</b>	M.Sc/M.Tech/ME in Food Technology or Food Engineering with 7-8 years of hands on experience in a food industry B.Sc (home Sc) /B.Tech/BE in Food Technology or Food Engineering with 9-10 years of hands on experience in a food industry
4a	<b>Domain Certification</b>	Certified for Job Role: “Plant Manager” mapped to QP: “FIC/Q9004, v1.0”. Minimum accepted score is 80%
4b	<b>Platform Certification</b>	Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “SSC/Q1402”. Minimum accepted SCORE IS 80 % as per FICSI guidelines.
5	<b>Experience</b>	M.Sc/M.Tech/ME in Food Technology or Food Engineering with 7-8 years of hands on experience in a food industry B.Sc (home Sc) /B.Tech/BE in Food Technology or Food Engineering with 9-10 years of hands on experience in a food industry

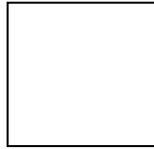


**Annexure: Assessment Criteria**

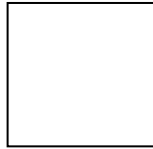
<b>Assessment Criteria</b>	
<b>Job Role</b>	<b>Plant Manager</b>
<b>Qualification Pack</b>	<b>FIC/Q9004, v1.0</b>
<b>Sector Skill Council</b>	<b>Food Processing</b>

<b>Sr. No.</b>	<b>Guidelines for Assessment</b>
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 centre(as per assessment criteria below)
4	Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria
5	To pass the Qualification Pack, every trainee should score a minimum of 70% (overall) in every QP
6	The marks are allocated PC wise; however, every NOS will carry a weight age in the total marks allocated to the specific QP

<b>Assessable Outcome</b>	<b>Assessment Criteria</b>	<b>Total Mark (600)</b>	<b>Out Of</b>	<b>Marks Allocation</b>	
				<b>Theory</b>	<b>Skills Practical</b>
<b>1. FIC/N9017: Lead Operations of a food processing unit</b>	PC1. Develop operational plans for the operation of food processing unit that is consistent with the objectives and goals of organisation, and to produce quantity and quality products	<b>100</b>	3	1	2
	PC2. Develop operational plan that is flexible and complements supply chain, inventory, human resource, production, maintenance, quality and logistics management of production unit		2.5	1	1.5
	PC3. Develop operational plan to improve output in all areas of functions with the objective to reduce overall cost, and to produce quantity and quality products		2.5	0.5	2
	PC4. Develop operational plan considering national and international regulatory requirements, health and safety, food safety and hygiene requirements on process and product(s), and to maintain safe and environmental compliant workplace		2.5	1	1.5



Assessable Outcome	Assessment Criteria	Total Mark (600)	Out Of	Marks Allocation	
				Theory	Skills Practical
	PC5. Develop objectives and set demanding but achievable targets for operation function managers, and assign clear responsibilities with expected targets/performance		3	1	2
	PC6. Provide direction and professional expertise to all function managers to achieve organisation goal		2.5	1	1.5
	PC7. Monitor and control the operational plan to achieve its overall objectives		2.5	0.5	2
	PC8. Evaluate the implemented operational plan periodically, analyze performance data, identify areas for improvement and recommend changes		2.5	1	1.5
	PC9. Monitor performance of managers and employees to ensure that departmental and individual objectives are achieved within scheduled timelines and budget		3	1	2
	PC10. Design new work processes, procedures, systems, structures and roles for any changes implemented in the organisation to achieve organizational goal and regulatory requirements		2.5	1	1.5
	PC11. Review and ensure implemented changes are effective and meets the requirements of the organisation		2.5	1	1.5
	PC12. Maintain professionalism, tact, diplomacy, sensitivity, diversity and equality, and lead food processing unit to achieve organisation objectives and goals		2.5	1	1.5
	PC13. Ensure that work arrangements, resources and business processes respond to different needs, abilities and values		2.5	0.5	2
	PC14. Develop and implement new business strategies for improving processes and procedures to improve performance		2.5	1	1.5
	PC15. Develop a leadership style and apply them appropriately for managers to follow the lead willingly to achieve organisation targets and goals		2.5	1	1.5
	PC16. Communicate clearly the organisation vision, values and goals to employees, make managers understand and commit their expertise to achieve organisation goals		2.5	0.5	2



Assessable Outcome	Assessment Criteria	Total Mark (600)	Out Of	Marks Allocation	
				Theory	Skills Practical
	PC17. Lead managers of all operation functions, link operational plans and drive managers towards achieving organisation vision, objectives and goals		3	1	2
	PC18. Lead managers through difficulties, challenges and conflicts		2.5	1	1.5
	PC19. Conduct meetings with managers regularly and effectively, encourage them to share their views, provide guidance and support to overcome process issues and lead to achieve organisation goal		2.5	0.5	2
	PC20. Encourage managers to take lead in their own areas of expertise, take own decisions in their area of function, and provide recognitions when they are successful		2.5	1	1.5
	PC21. Lead the managers and organisation successfully through difficulties and challenges		3	1	2
	PC22. Design processes with achievable targets and realistic timeline, proper resource allocation, with defined process responsibilities to manage food processing operation based on organizational goals		2.5	1	1.5
	PC23. Develop processes that are effective and sustainable, implement and ensure it is followed, review its effectiveness and make necessary changes if required		2.5	1	1.5
	PC24. Develop process measures that are affordable, and provide enough information and required training for managers and employees to manage the process		2.5	0.5	2
	PC25. Review and understand resource requirements for process and allocate necessary resources to all functional areas		2.5	1	1.5
	PC26. Develop systems to link all function processes, and encourage function heads and employees to interact across the organisation to form a complete system		2.5	0.5	2
	PC27. Establish effective methods to review the quality of work and product, and improve the process		2.5	0.5	2

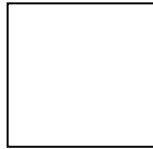




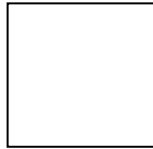
Assessable Outcome	Assessment Criteria	Total Mark (600)	Out Of	Marks Allocation	
				Theory	Skills Practical
	PC28. Focus attention on issues that are critical to achieve results, provide solutions and guidance to overcome the issues that affect the process		2.5	1	1.5
	PC29. Identify issues and trends and recognize their impact upon current and future work, work out solutions and implementation plan to overcome and utilize latest trends to achieve long term goals of the organisation		3	1	2
	PC30. Develop policies and procedures for any change in organisation goal, organisation structure		2.5	1	1.5
	PC31. Set responsibilities for managers, set and prioritize objectives for change, clearly communicate change and make the managers understand their responsibilities and commitment		2.5	1	1.5
	PC32. Implement change, identify and deal with obstacles to change, and support managers and employees through the change process		2.5	1	1.5
	PC33. Brief managers on their responsibilities and make them understand their role, objectives for their area and the overall organisation, and expected performance		2	1	1
	PC34. Monitor progress and performance quality of the managers on regular basis against the level of expected performance and provide prompt and constructive feedback		3	1	2
	PC35. Support managers in identifying and dealing with problems and unforeseen events		2.5	1	1.5
	PC36. Identify gaps and performance issues, discuss the causes and recommend solutions to improve performance of managers and their team		3	1	2
	PC37. Monitor performance, analyze employee strength and weakness, and make changes in their tasks/responsibilities		2.5	1	1.5
	PC38. Review performance and update work plans in their area, monitor and conduct review meetings on regular basis, recognize successful completion of work or work activities by function manager(s) and their teams		2.5	1	1.5



Assessable Outcome	Assessment Criteria	Total Mark (600)	Out Of	Marks Allocation	
				Theory	Skills Practical
	PC39. Motivate managers to complete expected target and any additional work allocated and provide additional support and resources to complete work		2	1	1
			<b>100</b>	<b>35</b>	<b>65</b>
<b>2. FIC/N9018: Ensure proper production and proper management</b>	PC1. Update self with an understanding of the goals of the organisation and forecast/requirements of the sales & marketing manager, with the knowledge on production method and process, plant capacity, resource availability, plan products and quantity to be produced	<b>100</b>	2	1	1
	PC2. Monitor and regulate supply chain management which include sourcing and procurement, conversion of raw materials to finished products, all logistics activities, coordination and collaboration with suppliers, intermediaries, third-party service providers, and customers, to integrates supply and demand management within and across companies		3	0.5	2.5
	PC3. Monitor and regulate inventory process to meet the production requirement of the organisation, review current procurement procedures, analyze benefits and risks that may impact the procurement of supplies, implement plans and methods to improve, provide solutions to resolve any immediate problems		3	1	2
	PC4. Evaluate current storage methods, identifying ways of improving the storage of supplies to provide better fit with supply chain strategy		3	1	2
	PC5. During production process, coordinate production activities with procurement, maintenance, and quality control function to obtain optimum production and efficient utilization of human resources, machines and equipment		1.5	0.5	1
	PC6. Make adjustments/revise/reschedule production schedules and priorities in case of breakdown down of equipment/issues with physical or human resource/ urgent		1.5	0.5	1



Assessable Outcome	Assessment Criteria	Total Mark (600)	Marks Allocation		Skills Practical
			Out Of	Theory	
	orders/unforeseen issues or any operational problems				
	PC7. Direct production activities and establish production priorities to produce quantity and quality products within the operation budget		3	1	2
	PC8. Review and analyze human resource, production, quality control, maintenance, and operational reports to identify reason for non-conformance/ noncompliance to organisation and regulatory standards for product and process, develop and implement operating methods and procedures to eliminate problems and improve product and process quality		3	1	2
	PC9. Monitor storage and distribution of products to and from the plant/processing unit warehouse, ensure storage and distribution norms and procedures like palletizing, stacking height, labeling, FEFO etc are followed		3	0.5	2.5
	PC10. Establish systems to collect and assess information on performance of all functions, analyze data and evaluate performance of departments and organisation, through knowledge and understanding identify reasons for problems and low performance		1.5	1	0.5
	PC11. Establish and implement methods and procedures for improvement, ensure implemented methods deliver expected result, and identify opportunities to improve organization performance		1.5	1	0.5
	PC12. Read financial responsibilities, compile available financial information, evaluate the cost, benefits and risks of the current budget, and estimate financial requirements for operation of food processing unit		3	1.5	1.5
	PC13. Consult with department managers the objectives and associated plans, discuss and identify priorities and develop a realistic master budget for food processing operation, communicate the final proposed budget with all managers		3	1	2



Assessable Outcome	Assessment Criteria	Total Mark (600)	Out Of	Marks Allocation	
				Theory	Skills Practical
	PC14. Submit the proposed master budget with clear proposals to the management for approval, assist them to evaluate the budget, negotiate with clarity and strong reasoning and get the budget approved		2.5	1	1.5
	PC15. Evaluate, analyze and allocate budget to departments of food processing operation, allocate budget to each department managers with expectations and targets, provide required ongoing support and resources		3	1	2
	PC16. Establish systems to monitor and evaluate performance against delegated budgets and the master budget and put contingency plans in place		2.5	1	1.5
	PC17. Identify reason for significant variances between budget and actual expenditure, discuss with managers, provide solutions and ensure immediate corrective action is taken		2.5	1	1.5
	PC18. In case of unforeseen situation/emergency/shortage, identify any additional financial needs, prepare provisional budget, negotiate and get it approved by the management, delegate provisional budget to respective managers, monitor and control expenditure		3	1	2
	PC19. Encourage managers to identify ways of reducing expenditure, analyze and pursue potential ideas, implement those in all areas of function		2.5	1	1.5
	PC20. Review the financial performance of managers regularly, and identify improvement opportunities and ensure it is implemented, provide information to the management on the financial performance of the operation management		2.5	1	1.5
	PC21. Determine human resource requirement including contingencies to achieve organisation goal, organize interview, hiring and training of new employees through human resources manager		3	1	2
	PC22. Ensure that all employees receives appropriate training on job duties,		2.5	1	1.5



Assessable Outcome	Assessment Criteria	Total Mark (600)	Out Of	Marks Allocation	
				Theory	Skills Practical
	corporate policies and applicable regulations				
	PC23 Oversee and direct the activities of subordinate managers, provide coaching and mentoring, and conduct evaluations of all		2.5	1	1.5
	PC24 Discuss with managers of operation function and identify resource requirement for their area, analyze, estimate and approve resources, monitor effective use of those resources		3	1	2
	PC25 Ensure compliance of all employees with organization policy, procedures and applicable regulations		2.5	1	1.5
	PC26 Conduct meetings to address grievances, to resolve or effect settlements within the scope of authority, and refer unresolved grievances for management-union negotiations		2.5	0.5	2
	PC27 Take personnel actions, such as promotions, transfers, discharges or disciplinary measures, within the scope of authority		3	1	2
	PC28 Update self with knowledge of quality management system, legal and regulatory requirements, environmental issues related to the organisation, process and products produced		2.5	0.5	2
	PC29 Ensure system, plan and resources are in place to assure food products produced in the organisation meet the organisation standards, national and international regulations		3	1	2
	PC30 Implement procedure, standards and specifications to meet quality goals of the organisation, coordinate departments and provide support to implement food safety system like HACCP in the organisation		3	1	2
	PC31 Evaluate records on quality of product and process to assess the effectiveness of quality system followed in the organisation, review and revise the quality system through quality assurance manager and implement changes		2.5	1	1.5
	PC32 Organize training for employees to update on latest		2.5	0.5	2



Assessable Outcome	Assessment Criteria	Total Mark (600)	Out Of	Marks Allocation	
				Theory	Skills Practical
	developments/systems/ tools and techniques in quality management system and evaluate their competency to fulfill organisation goals				
	PC33 Encourage employees of all functions to take personal responsibility for achieving quality standards of product and process and to address or report/address any non-conformance		2.5	1	1.5
	PC34 Monitor process and product quality against target and plan, identify and assess risks of shortfalls in the quality of processes and products/services and take immediate corrective action to address risks		3	1	2
	PC35 Direct and coordinate implementation of quality system like ISO, HACCP etc in the organisation through quality manager		3	1	2
	PC36 Ensure managers responsible for organizational processes understand the requirements of quality system, establish their roles in implementation of quality system in their functional areas, enhance their confidence and commitment to quality by providing continuous support		3	1	2
	PC37 Encourage and support department heads and employees for quality audit process to obtaining accreditation, certifications to a standard or a mark of quality, monitor quality audit process, review results and take immediate corrective action through concerned managers		2.5	1	1.5
	PC38 Identify the environmental impact related to the resources, process and products produced in the organisation like air/water/noise pollution, effluent treatment, waste disposal etc, identify risks to the environment, consult with experts and identify opportunities to improve environmental performance		1.5	0.5	1
	PC39 Set and implement policies and procedures through managers, monitor to ensure its efficiency and effectiveness and make changes as required to meet the regulatory requirements		1.5	0.5	1
			<b>100</b>	<b>35</b>	<b>65</b>



Assessable Outcome	Assessment Criteria	Total Mark (600)	Out Of	Marks Allocation	
				Theory	Skills Practical
<b>3. FIC/N9019: Manage new projects and implement health and safety system in food processing unit</b>	PC1. Implement new project/business plans of the organisation for introducing new products or for improving processes, procedures and performance	<b>100</b>	3	1	2
	PC2. Map or perform comparative study of the project with the current project/product to understand the ways proposed project fits with the overall vision, objectives and plans of the organisation		4	1	3
	PC3. Read the key objectives and scope of the proposed project, prepare resource requirement for implementation of new project, negotiate with clarity and strong reasoning and get approved from superiors/management		5	2	3
	PC4. Consult with experts and managers and prepare realistic and thorough plan to implement the project successfully, prepare project report considering all possibilities		4	1.5	2.5
	PC5. Submit the project report to the superiors/management, discuss plan, consider suggestions and recommendations and make necessary changes where necessary, take approval of final plan		4	1.5	2.5
	PC6. Brief project team managers on the project plan and their roles responsibilities, start implementation of project and provide ongoing support, encouragement and information for successful completion		5	2	3
	PC7. Monitor, control and review project plan during each stage of implementation		4	1.5	2.5
	PC8. Provide sufficient resources to deal with contingencies and to manage any potential risks		4	1.5	2.5
	PC9. Inform the management/superiors of the developments in the project on regular basis, discuss progress and problems, take approval for any changes in project plan		4	1.5	2.5
	PC10. Complete project within agreed level of resources meeting all legal and regulatory requirements, share the success with the project team		4	1.5	2.5



Assessable Outcome	Assessment Criteria	Total Mark (600)	Marks Allocation	
			Out Of	Skills Practical
	members, recognize and reward their contribution			
	PC11. Read national and international food safety regulations and standards related to the food processing units, process and products produced in the organisation	3	1.5	2.5
	PC12. Ensure effective policies and procedures are in place in the organization to meet to legal and regulatory requirements	5	2	3
	PC13. Ensure regulatory standards set by the organisation for products are stringent than the national and international legal requirements	4	1.5	2.5
	PC14. Ensure managers of all functional area have a clear understanding of the policies and procedures on food regulatory standards	4	1.5	2.5
	PC15. Organize training for all employees on policies and procedures on food regulatory standards and the importance of following regulations	4	1	3
	PC16. Monitor and ensure relevant legal and regulatory requirements pertaining to food processing units and products produced in the organisation are followed and met	5	2	3
	PC17. Identify reasons for noncompliance, review and revise the policies and procedures in consultation with quality and regulatory affairs manager to correct and overcome failures, provide support to all managers to implement corrective actions for the organisation and products to comply with regulatory standards	5	2	3
	PC18. Read the health and safety requirements, and food safety, hygiene and sanitation requirements for the organization and products produced	3	1	2
	PC19. Ensure that the organisation has written policy and procedures on health and safety, food safety, hygiene and sanitation, and those are clearly communicated to all employees of the organisation, and are put into practice and being followed	4	1	3





Assessable Outcome	Assessment Criteria	Total Mark (600)	Out Of	Marks Allocation	
				Theory	Skills Practical
	PC20. Implement system for identifying hazards and assessing risk in food processing and products, set procedures to control and prevent them		4	1	3
	PC21. implement system for GMP, HACCP, FIFO/FEFO, product recall etc, organize training to the employees on health and safety, food safety, hygiene and sanitation for effective implementation of the systems, allocate required resources for implementation, and ensure those are followed by all employees		5	2	3
	PC22. Ensure systems are in place for effective monitoring, measuring and reporting on the performance of health and safety system		4	1	3
	PC23. Evaluate the existing systems and procedures, consult with managers and experts and identify method to reduce risks/improve control measure		4	1	3
	PC24. Ensure health and safety policies are practiced across the organisation, effectively monitored, reviewed and revised at regular intervals to meet the changes in national and international regulations		4	1	3
	<b>Total</b>		<b>100</b>	<b>35</b>	<b>65</b>
	<b>Grand Total</b>	<b>300</b>	<b>300</b>	<b>200</b>	<b>100</b>
	<b>Percentage Weightage</b>		<b>100</b>	<b>60%</b>	<b>40%</b>
	<b>Minimum Pass% to qualify (aggregate):</b>			<b>70%</b>	

