

## GENERAL INFORMATION

1. Name of the Trade: AGRO PROCESSING
2. NCO Code No. 7414.90
3. Duration : One year (Two semesters)
4. Power Norms : 6 kW
5. Space Norm: Lab Space – **96 Sq. m**  
Class Room Space - **30 Sq. m**
6. Entry Qualification: Passed 10<sup>th</sup> Class Examination with science and mathematics.
7. Unit Size(No. of students): 20
8. Instructor's/Trainer's Qualification:
  - (i) National Trade Certificate in Agro Processing/Mechanic agriculture machinery trade with three years experience in relevant industry.  
OR
  - (ii) Diploma in Food Technology with two years experience in relevant industry.  
OR
  - (iii) Degree in Food Technology with one years experience in relevant industry.
9. Desirable Qualification Preference will be given to **Craft Instructor's Certificate (CIC)**
10. Job Profile
  - **Quality Analyst** in Agro Processing industry.
  - **Supervisor** in Agro Processing Industry.
  - **Packaging Supervisor** in Agro Processing industry.
  - **Skilled Worker** in Food MNC.
  - **Entrepreneur** in Agro processing.

**Note:** At least one instructor must have Degree/Diploma in particular trade

<b>AGRO PROCESSING</b>		
<b>SYLLABUS: FIRST SEMESTER</b>		
<b>Weeks</b>	<b>Practical</b>	<b>Theory</b>
1-3	<p>Conducting survey of the different agro products from the market.</p> <p>Functional and structural designs of grain storage structure such as cover, grain bins, warehouses and silos.</p> <p>BIS specification for storage structures and design</p>	<p><b>Agro processing industry</b></p> <p>Introduction and scope of agro processing industries in India.</p> <p>Status, Production and utilization of cereals and pulses in India and the world. Factor s affecting quality of food grains.</p> <p>Scope of agro processed products for entrepreneurship.</p>
4-6	<p>Structure of important cereals (Wheat, rice, corn, barley, sorghum, oats).</p> <p>Structure of important Pluses (Green gram, horse gram, pigeon pea, lentil, black gram).</p>	<p><b>Structure and composition:</b></p> <p>The chemical compositions and nutritional values of cereal, pulses and oil seeds.</p> <p>Importance of cereal, pulses and oil seeds in diet.</p> <p>Distribution of vitamins, protein, minerals, carbohydrates and fats in different grains and their relevance to milling.</p>
7-11	<p>Working with agro processing machinery :</p> <p>Hammer mill, Groundnut decorticator hand operated,</p> <p>Mini dal mill, Mini rice mill, Mini oil expeller, Grain cleaner, Mini grain mill, Wheat flour mill, Micro pulveriser and Destoner, Packaging machine (Heat sealing machine), Weighing Balance, Extruder.</p> <p>Handling and practice on the equipment</p> <p>Fault identification and removal of faults</p> <p>Capacity evaluation of different agro processing machines.</p>	<p><b>Machinery in Agro processing</b></p> <p>Different machines used in agro processing industry; working principles operation and maintenance.</p> <p>Cost and capacity of machines in agro processing industry.</p> <p>Maintenance of equipment, Safety.</p>
12-14	<p>Cleaning, grading and other pre-processing activities.</p> <p>Production of whole wheat flour.</p> <p>Production of Suji, Maida, Dalia.</p> <p>Packaging and labelling of the products.</p> <p>Determination of starch content from wheat flour.</p>	<p><b>Cereal grains, wheat</b></p> <p>Different grains suitable for agro processing</p> <p>Primary processing of wheat.</p> <p>Methods of Cleaning, grading, milling.</p> <p>Standards for the wheat flour.</p> <p>Production of different wheat product.</p> <p>Adulteration in flour.</p>

15-17	Pre-treatment in dal milling like cleaning, grading, soaking, and drying. Milling pulses for production of dal, e.g. pigeon pea, green gram, Bengal gram. Packaging and uses of wastes from dal mill.	<b>Dal (Pulse) Milling</b> Pre milling treatments of pulses, pulse milling and recent developments. Principle of dal milling. Pulses suitable for milling. Different Methods of dal milling Working and principle of dal mill. Pre-treatment in dal milling Waste utilization. Adulteration in pulse.
18-19	Production of packed whole pulse like Bengal gram, black gram, green gram, groundnut. Study of packaging equipment and machinery used for packing of agro processed products.	<b>Packaged whole pulse :</b> Suitability of whole pulse for marketing. Production of packed whole grains. Packaging, labelling, storage and marketing of whole grains. Study the various type of packaging materials used in agro processing industry.
20-22	Production of cereal based products like macaroni, noodles, spaghetti and vermicelli. Estimation of moisture content in cereals flour. Determination of different quality parameters in cereals and pulses product.	<b>Cereals and pulses industry By-Products :</b> Recovery and utilization of starch, gluten, dextrin, dextrose, bran, bran oil, Germ and germ oil, husk, hulls of pulses, soybean meal and hulls, protein isolates, high fructose corn syrup, corn liquor, yellow and white dextrin and dextrose powder.
23-25	Industrial Training in Agro processing industry	
26	Revision/Examination	

<b>AGRO PROCESSING</b>		
<b>SYLLABUS: SECOND SEMESTER</b>		
<b>Weeks</b>	<b>Theory</b>	<b>Practical</b>
1-2	<p>Varietal effects on processing of cereals and pulses.</p> <p>Introduction to operation Green revolution.</p> <p>Knowledge of importance on Agro Industries Product in food Industry &amp; its market value.</p> <p>Introduction of agro processing industry.</p> <p>Scope of agro processed products for entrepreneurship.</p> <p>Knowledge about the sources of accidents.</p> <p>Known the necessary safety &amp; precautions taken in each machines.</p> <p>Known to prevention overcome from accidents.</p>	<p>Necessity of housekeeping.</p> <p>Maintaining general safety.</p> <p>First aid practice &amp; treatment.</p> <p>Safety precautions taken &amp; use safety equipments including fire fighting equipments.</p> <p>Familiarization of organization &amp; their Agro Industries products unit.</p> <p>Handling of tools, equipments, &amp; machineries in the section &amp; proper utilization &amp; upkeep.</p> <p>Indenting &amp; procurement of tools and materials from store as need.</p> <p>Conducting survey of the different agro products from the market</p>
3-5	<p><b>Spice Grinding</b></p> <p>Production of major spices in India &amp; their importance in Indian diet.</p> <p>Spices suitable for processing.</p> <p>Unit operations in spices processing: Principles, method and machinery in spice grinding.</p> <p>Quality assurance &amp; methods to detect adulteration.</p>	<p>Procurement and Pre- processing of spices, cleaning, grading, de-stoning working with machinery for spice grinding.</p> <p>Production of spice powders from, coriander, black pepper, red chilly, turmeric</p> <p>Packaging of whole spice for marketing.</p>
6-9	<p><b>Oil Extraction :</b></p> <p>Importance and functions of oils in food and health.</p> <p>Different methods of oil extractions, oil expression from oilseeds like mustard/rapeseed, coconut, sunflower, groundnut, sesame and cotton.</p> <p>Different types of oil expellers.</p> <p>Oilseeds, properties and suitability.</p> <p>Process flow chart of oil extractions.</p> <p>Filtration and packaging.</p> <p><b>Oil refining and purification :</b></p> <p>Refining, purification, deodorization, stabilization and hydrogenation.</p>	<p>Working of oil expellers</p> <p>Oil expelling from different oil seeds e.g. mustard, groundnut, and rapeseed, sunflower.</p> <p>Filtration and packaging of oil.</p> <p><b>Different quality parameters :</b></p> <p>Peroxide value, saponification value, Iodine value, acid value, TBA , RM value, P- value, Kries value,</p> <p>Detect the adulteration in oils</p>

10-12	<p><b>Rice Milling</b>  Discuss the working and principle of rice mill in detail and their parts.  Properties of paddy for rice milling  Process of modern rice milling  Working principle and operation.  Cleaner, Sheller, separator, polisher and graders etc.  Nutritional loss in polished rice.  Rubber roller.  <b>Parboiling of rice:</b> Theory &amp; methods of Parboiling.  Advantages and limitations of parboiling of rice.</p>	<p>Processing of paddy for rice in lab.  Practical demonstration on rice milling process in Rice mill.  Packaging of rice: Weighing, bagging, Sealing machines.</p>
13-15	<p><b>Soya Products</b>  Details of soya product  Processing methods of soya milk, soya paneer (tofu), soya-atta, soya-snacks, soya-srikhand, namkins</p>	<p>Preparation of soya milk, soya paneer (tofu), soya- atta, soya-snacks, soya-srikhand, namkins</p>
16-17	<p><b>Groundnut decorticators</b>  Different groundnut decorticators  Decortications, cleaning, grading and packaging.</p>	<p>Working with groundnut decorticators for production of decorticated groundnut.</p>
18-19	<p><b>Storage and packaging</b>  Need and importance of storage and packaging methods  Quality standards for packed processed products.</p>	<p>Pack the given food products and seal  Development of good quality package and testing of the quality with market survey and demand.</p>
20-22	<p><b>Food regulations:</b> Overview of Food Safety and Standards Act, 2006 BIS, ISO-22000,Agmark,HACCP, International Food Standards GMP. Importance of personal Hygiene, Cleaning &amp; Sanitary standards of agro processing.</p>	<p>Application of HACCP and GMP in agro processing industry.  Utilization of agro industry wastes:</p>
23-25	Industrial Training in Agro processing industry	
26	Revision/Examination	

## Equipment, Machine & Tools

Sl. No.	Item/ Specification	Quantity proposed batch of 20 for a trainees
1	Hammer mill : Power operated, one HP 50 Kg/hr	1
2	Groundnut decorticator hand operated : Hand operated 20 Kg/hr	1
3	Mini dal mill : Power operated, 2 HP 100 Kg/hr	1
4	Mini rice mill : Power operated, 2 HP 100 Kg/hr	1
5	Mini oil expeller : Power operated, 10 HP 25 lit/hr	1
6	Grain cleaner : Power operated, 01 HP; 300 Kg/hr	1
7	Mini grain mill : Power operated, 01 HP 20 Kg/hr	1
8	Wheat flour mill : Power operated 5 HP 100 Kg/hr	1
9	Micro pulveriser : Power operated, 2 HP 50 Kg/hr	1
10	Storage bins of different capacity :Aluminium, 10-50 Kg Capacity with proper outlet and inlet	As required
11	Platform scale balance : 100 Kg Capacity,	1
12	Electric oven : For moisture determination, 0-250 °C, digital display (2*2*2)	1
13	Moisture box : Aluminium, 100 g capacity cylindrical	1
14	De-stoner : For cleaning light materials, air classifier type	1
15	Packaging material : PP, PE, laminated, Stand pouches	As required
16	Extruder : Lab scale	1

17	Weighing Balance (0.10 gm to 2 kg), (100 gm to 5 kg)	2
18	Soya milk plant with kettle and paneer press	1

<b>A)</b>	<b>Furniture</b>	
	<b>Class Room</b>	
	• Instructor Chair & Table	01 No
	• Dual Desk	10 No.
	<b>Workshop/Lab</b>	
	Suitable Work tables	04 No.
	Stools	20 No.
	Discussion Table	01 No.
	Tool Cabinet	01 No.
	Trainees Locker with space for 20	01 No.
	First Aid Box	01 No.
	Book Shelf (glass panel)	01 No.

- Raw material, Testing Chemicals and consumables are not included in the list.

