

## GENERAL INFORMATION

1. Name of the Trade: **Milk and Milk Products**
2. NCO Code No. **7413.90**
3. Duration : One year (Two semester)
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 milk and milk products trade with three years experience in relevant industry.  
OR  
(ii) Diploma in Food Technology/ Dairy Technology with two years experience in relevant industry.  
OR  
(iii) Degree in Food Technology/Dairy 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 milk plants
  - **Supervisor** in milk plants.
  - **Packaging Supervisor** in milk plants.
  - **Skilled Worker** in Food MNC.
  - **Entrepreneur** in milk and milk products

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

## MILK AND MILK PRODUCTS

### SYLLABUS: FIRST SEMESTER

Sl. No	Practical	Theory
1-3	<ul style="list-style-type: none"><li>• Conduct market survey of different dairy products available.</li><li>• Survey of availability of the raw material for dairy industry</li><li>• Visit and study of a dairy plant.</li></ul>	<ul style="list-style-type: none"><li>• Status of dairy industries in India.</li><li>• Introduction of white revolution.</li><li>• Importance of dairy industry opportunities of employment in the Dairy Industry.</li></ul>
4-6	<ul style="list-style-type: none"><li>• Study of Packaging Materials used in dairy industry.</li><li>• Study of objective and functions of packaging and packaging materials.</li><li>• Study of packaging equipments and machinery used in dairy industry.</li><li>• Collection of various types of packaging material used for the packaging of dairy products.</li><li>• Need and importance of storage and packaging methods of dairy products.</li></ul>	<ul style="list-style-type: none"><li>• Overview of Food Spoilage: Bacterial and fungal food spoilage. Food poisoning, Food born infection and Food born intoxication.</li><li>• Main causes of milk spoilage. Preventions of milk and milk products from spoilage (Microbial spoilage)</li></ul>
7-11	<p>Testing of milk for its quality.</p> <ul style="list-style-type: none"><li>• Sampling of milk.</li><li>• To perform physical examination of milk.</li><li>• To perform platform tests of milk like organoleptic tests, clot on boiling test, alcohol test and acidity test.</li><li>• Estimation of fat by Gerber method.</li><li>• Estimation of specific gravity of milk by lactometer.</li><li>• Estimation of SNF content in milk.</li><li>• Detection of various adulterants in milk.</li><li>• To ascertain microbiological quality of milk by MBRT and SPC.</li></ul>	<ul style="list-style-type: none"><li>• Definition of milk.</li><li>• Composition and physico-thermal property of milk.</li><li>• Collection of raw milk.</li><li>• Method of Sampling of raw milk.</li><li>• Plat form test.</li><li>• Quality of raw milk.</li><li>• Different products made from the milk.</li><li>• Introduction to different dairy products useful for marketing.</li><li>• Principle and methods used for milk processing.</li></ul>

12-16	<ul style="list-style-type: none"> <li>• Care and maintenance of equipments.</li> <li>• Handling of equipments safely.</li> <li>• Fault identification and removal of faults.</li> <li>• Corrective and Preventive action for safe operation.</li> </ul>	<p>Study and working of equipments used e.g.</p> <ul style="list-style-type: none"> <li>• Single and two stage homogenizers.</li> <li>• Batch, Flash, and Continues pasteurizer.</li> <li>• Spray Drier and Drum Drier.</li> <li>• Evaporators (Different Type)</li> <li>• Cream Separator.</li> <li>• Deep freezer.</li> <li>• Softy making machine.</li> <li>• Ice cream freezer.</li> <li>• Cheese vat.</li> <li>• Jacket kettle.</li> <li>• Butter churner.</li> <li>• Boiler.</li> <li>• Optionally mini dairy plant.</li> <li>• Form fill seal machine.</li> <li>• Centrifugal Machine.</li> </ul>
17-22	<p>Preparation of</p> <ul style="list-style-type: none"> <li>• Pasteurized milk</li> <li>• Standard milk</li> <li>• Toned milk</li> <li>• Double toned milk</li> <li>• Flavoured milk.</li> <li>• Fermented milk</li> <li>• Concentrated milk.</li> <li>• Condensed milk</li> <li>• Bulgarian milk</li> <li>• Acidophilus milk</li> </ul> <p>Store product hygienically. Conduct primary processing of market milk &amp; store. Practical Demonstration on Form fill seal machine.</p>	<ul style="list-style-type: none"> <li>• Principle of thermal processing of milk processing.</li> <li>• Pasteurization and Sterilizations of milk.</li> <li>• UHT Processing of milk.</li> <li>• Methods for production of different types of milks - pasteurized, standard, toned, double toned, flavoured milk. Ingredients of special milks, fermented milk, concentrated milk.</li> <li>• Other dairy products like dried milk, condensed milk.</li> <li>• Standards of milk and milk products.</li> <li>• Condensed milk: Composition, production, and defects.</li> <li>• Fermented dairy products: Production of Bulgarian milk, Acidophilus milk.</li> </ul>
23-25	Industrial Training in Dairy industry	
26	Revision/Examination	

<b>MILK AND MILK PRODUCTS</b>		
<b>SYLLABUS: SECOND SEMESTER</b>		
<b>Sl. No</b>	<b>Practical</b>	<b>Theory</b>
1-2	<ul style="list-style-type: none"> <li>Conduct market survey of different dairy products available.</li> </ul>	<ul style="list-style-type: none"> <li>Introduction of basic unit operations involved in the processing of milk and milk products.</li> </ul>
3-6	Preparation of <ul style="list-style-type: none"> <li>Cream</li> <li>Butter</li> <li>Ghee</li> </ul> Analysis of various quality parameters of prepared dairy products as cream, butter and ghee. To demonstrate the effect of temperature on the rate of cream separation under the influence of gravity. Pack the given dairy products and seal.	<ul style="list-style-type: none"> <li>Cream: Composition, production and defects. Different types of creams and their production method.</li> <li>Butter: Composition, method of production, theories of churning, grading and prevention of defects. Quality of butter.</li> <li>Ghee: Compositions, Different methods of Ghee production Quality of ghee.</li> </ul>
7-9	Preparation of <ul style="list-style-type: none"> <li>Processed cheese.</li> <li>Paneer.</li> <li>Channa</li> <li>Mawa</li> <li>Dahi</li> <li>Srikhand</li> <li>Buttermilk</li> <li>Milk cake</li> </ul> Pack the given dairy products and seal	<ul style="list-style-type: none"> <li>Cheese: Composition, types of cheese, production of cottage and cheddar cheeses; defects.</li> <li>Paneer: Composition, Production; defects.</li> <li>Indian dairy products: Rabri, kulfi, srikhand, lassi, Mawa, Dahi , Butter milk, Channa</li> </ul>
10-14	<ul style="list-style-type: none"> <li>To prepare different types of ice cream from a commercially available ice cream mix and to study defects in ice cream.</li> </ul> Quality evaluation of ice cream. <ul style="list-style-type: none"> <li>To determine percentage overrun of commercially prepared ice-cream.</li> </ul> Pack the given dairy products and seal. Storage methods of ice-cream.	<ul style="list-style-type: none"> <li>Principle of homogenization.</li> <li>Application of homogenization in dairy industry.</li> <li>Ice cream: Definition and composition, Role of ingredients used, Principles and Technology of ice-cream manufacturing, grading and prevention of defects in ice creams.</li> <li>Freezing method and equipment used.</li> </ul>
15-18	Demonstration on dairy products like <ul style="list-style-type: none"> <li>Dried milk (spray dried)</li> </ul> Determination of solubility index of dried milk powder. Analysis of various quality	<ul style="list-style-type: none"> <li>Drying Theories,</li> <li>Dried milk: Definition and composition, production by drum drying and air spray system; defects; dried milk products–butter-milk powder, whey powder, cream</li> </ul>

	parameters of prepared dried milk. Pack the given dairy products, seal and storage.	powder, infant milk food. <ul style="list-style-type: none"> <li>• Drying Equipment: Spray Drier, Drum Drier</li> </ul>
19-20	Application of HACCP and GMP in a Dairy plant. Utilization of dairy industry wastes: Whey utilization; production of casein and lactose.	<ul style="list-style-type: none"> <li>• <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 dairy industry.</li> </ul>
21-22	<ul style="list-style-type: none"> <li>• Washing of equipments used in dairy industry.</li> <li>• Maintenance of can washer.</li> <li>• Steam sterilization of canes.</li> <li>• CIP of dairy equipments.</li> </ul>	<ul style="list-style-type: none"> <li>• Selection and use of dairy cleaners and sanitizers.</li> <li>• Cleaning in place system (CIP),</li> <li>• Various chemical used for CIP of dairy plant.</li> <li>• Factor affecting washing operation.</li> </ul>
23-25	Industrial Training in Dairy Industry	
26	Revision/Examination	

<b>Equipment, Machine &amp; Tools</b>		
<b>Sl. No.</b>	<b>Item/ Specification</b>	<b>Quantity proposed for a batch of 20 trainees</b>
1	Mini dairy plant: Complete Mini- processing unit for milk.	1
2	Milk Chiller : For chilling milk up to a temperature of about –10 °C	1
3	Milk cans : Made of steel/ Aluminium, 40 –100 lit capacity	As required
4	Cream separator : Motor operated, Centrifugal, capacity up to 1-2 Kg/ cream per min.	1
5	Cheese vat : Made of heavy Stainless steel (306), size approx. 4'X 2.5'X 1' with proper outlet and taps	1
6	Plate pasteurizer (Lab model)	1
7	Butter churner	1
8	Boiler ( Lab scale)	1
9	Deep fridge	1
10	Steam jacketed kettle with surface scrapper	1
11	Mawa machine	1
12	Crown corking machine	1
13	Form fill seal machine	1
14	Ice cream plant	1
15	Centrifuge : For Fat estimation in milk,	1
16	Gerber tubes for fat estimation	1
17	Electric oven	1
18	Desicator	1
19	Weight balances Digital (min 10 gm to max 5 kg)	1
20	Jacket Kettle	1
21	Flash evaporator.	1
22	Can body reformer	1
23	Can seamer	1
24	Exhaust box.	1
25	Cup sealer	1
26	Vacuum pan	1
27	Vernier caliper : 15 cm. 0.01 mm LC	2
28	Screw Gauge : Micrometer, 0.001 mm LC,10 cm cap	4
29	Steel scale : 12 “ standard steel	2

30	Steel Measuring tape : Scales 1 meter, and of 50 ft	2
31	Weight balances Digital(min 0.01gm to max 1kg)	1
32	Cutting equipments : Different knives,	As required
33	Sinks : standard size	1
34	Hot plate : Electrical 2 KW	1
35	Spray drier (Lab Scale)	1
36	Heat sealing machine : Hand / pedal operated	1
37	Tanks SS : 50 litres capacity, cylindrical with cap	1
38	Syrup tanks : 50, 100 lit capacity SS	1
39	Pressure cooker : 5 Kg and 10 Kg SS	1
40	Liquid filling machine : For filling liquid in bottles, 200 ml, 500 ml, 1000 ml. Manual	As required
41	SS filter : Sieve type cloth filter, hydraulic,	1
42	Sugar Coating pan : SS, Revolving type with speed control,	1
43	Bottle opener : Heavy duty, Stainless Steel	1
44	Burette with stand : 50 ml ordinary glass	1
45	Pipette : 5-50 ml capacities, glass	As required
46	Lab glassware's : Different sizes and types	As required
47	Working tables : Stainless Steel Size 6' X 3'	1
48	Improved stoves : Made of MS with proper safety Measures, Valves etc	1
49	Stainless steel / Aluminium pots : Different Capacities	As required
50	Wooden spoons : Different sizes	As required
<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.
	Storage rack	01 No.

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