



GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
DIRECTORATE GENERAL OF TRAINING

COMPETENCY BASED CURRICULUM

DAIRYING

(Duration: One Year)

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 4



SECTOR – FOOD PROCESSING & PRESERVATION

DAIRYING

(Non-Engineering Trade)



(Revised in 2018)

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL - 4

Skill India

कौशल भारत - कुशल भारत

Developed By

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE

EN-81, Sector-V, Salt Lake City,

Kolkata – 700 091

ACKNOWLEDGEMENT

The DGT sincerely acknowledges contributions of the Industries, State Directorates, Trade Experts, Domain Experts and all others who contributed in revising the curriculum. Special acknowledgement is extended by DGT to the following expert members who had contributed immensely in this curriculum.

List of Expert contributed/ participated for finalizing the course curriculum of Dairying trade held on 20.02.2018 at ITI Tarsali, Vadodara.			
S No.	Name & Designation Sh/Mr/Ms	Organization	Remarks
1.	Laxmi Das Hindocha Managing Director	Transpek Industries Ltd. Vadodara	Chairman
2.	S. A. Pandav RDD, Vadodara	DET Gujarat	Member/ Coordinator
3.	Nikunj Kumar R. Patel	Baroda, Dairy, Vadodara	Member
4.	Nirmal N. Patel	Baroda, Dairy, Vadodara	Member
5.	Birendra Kumar Manager (Production)	Vidya Dairy, Anand	Member
6.	Ajay M. Zala Dy. Manager (Dairy)	Vidya Dairy, Anand	Member
7.	M. G. Meghani OSD	KDCMPU Ltd., Anand	Member
8.	Mayank I. Patel Dy. Manager	KDCMPU Ltd., Anand	Member
9.	Hiren J. Purohit HR Officer	Laxmi Cukezone Pvt. Ltd., Anand	Member
10.	Harun Saiyad Store Incharge	Laxmi Cukezone Pvt. Ltd., Anand	Member
11.	R. S. Kate, Sales Head	R. K. Foods, Tarsali, Gujarat	Member
12.	Jitendra, Manager	Dungee Dum Ltd., Tarsali, Gujarat	Member
13.	Y. B. Joshi, Pricipal	ITI Khambat, Gujarat	Member

S No.	Topics	Page No.
1.	Course Information	1
2.	Training System	2-5
3.	Job Role	6-7
4.	General Information	8
5.	NSQF Level Compliance	9
6.	Learning/ Assessable Outcome	10-11
7.	Learning Outcome with Assessment Criteria	12-16
8.	Trade Syllabus	17-24
9.	Core Skill – Employability Skill	25-29
10.	Annexure I	
	List of Trade Tools & Equipment	30-33
	List of Tools & Equipment for Employability Skill	34
11.	Annexure II - Format for Internal Assessment	35

Skill India
कौशल भारत - कुशल भारत

1. COURSE INFORMATION

During one year duration of 'Dairying' trade, a candidate is trained on Professional Skill, Professional Knowledge and Employability Skill. In addition to this, a candidate is entrusted to undertake project work, extracurricular activities and on-the-job training to build up confidence. The broad components covered related to the trade are categorized in two semesters each of six months duration. The semester wise course coverage is categorized as below:

1st Semester – In the first semester, the trainee learns about elementary first-aid, firefighting, environment regulation and housekeeping, etc. The trainee learns about different breeds of cows/ buffalos and handle new born calf. Learns to groom animals and maintain sanitation of sheds. Observe and identify symptoms of certain specific disease in animals. The trainee learns to prepare feed and fodder for dairy. He also learns about allied trades tools and basic machinery used in electrical and mechanical maintenance. The trainee learns to use and maintain boilers and associated system used in the dairy industry.

2nd Semester – In the second semester, the trainee learns to use and maintain refrigeration, air conditioning systems and instruments used in the dairy industry. He carries out various tests by collecting milk samples and determines the specific gravity of milk samples. Counts different types of microorganisms in milk samples and carries out COB and MBR tests. The trainee learns the process of pasteurization of milk. Prepares sterilized, toned, doubled toned milk, butter, ghee and other dairy products.

Skill India
कौशल भारत - कुशल भारत

2.1 GENERAL

The Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers a range of vocational training courses catering to the need of different sectors of the economy/ labour market. The vocational training programs are delivered under the aegis of National Council of Vocational Training (NCVT). Craftsman Training Scheme (CTS) and Apprenticeship Training Scheme (ATS) are two pioneer programs of NCVT for propagating vocational training.

Dairying trade under CTS is one of the popular courses delivered nationwide through a network of ITIs. The course is of one year (02 semester) duration. It mainly consists of Domain area and Core area. In the Domain area (Trade Theory & Practical) impart professional skills and knowledge. While the core area (Employability Skill) imparts requisite core skills, knowledge, and life skills. After passing out the training program, the trainee is awarded National Trade Certificate (NTC) by NCVT which is recognized worldwide.

Candidates broadly need to demonstrate that they are able to:

- Read and interpret technical parameters/documents, plan and organize work processes, identify necessary materials and tools;
- Perform tasks with due consideration to safety rules, accident prevention regulations and environmental protection stipulations;
- Apply professional skill, knowledge & employability skills while performing jobs.
- Document the technical parameters related to the task undertaken.

2.2 CAREER PROGRESSION PATHWAYS

- Can join Apprenticeship programs in different types of industries leading to a National Apprenticeship certificate (NAC).

2.3 COURSE STRUCTURE

Table below depicts the distribution of training hours across various course elements during a period of one year (02 semesters): -

S No.	Course Element	Notional Training Hours
1.	Professional Skill (Trade Practical)	1320
2.	Professional Knowledge (Trade Theory)	264
3.	Employability Skills	110
5.	Library & Extracurricular activities	66
6.	Project Work	120
7.	Revision and Examination	200
	Total	2080

2.4 ASSESSMENT & CERTIFICATION

The trainee will be tested for his skill, knowledge and attitude during the period of the course and at the end of the training program as notified by the Government of India (GoI) from time to time. The employability skills will be tested in the first two semesters itself.

a) The **Internal Assessment** during the period of training will be done by **Formative Assessment Method** by testing for assessment criteria listed against learning outcomes. The training institute has to maintain an individual trainee portfolio as detailed in assessment guideline. The marks of internal assessment will be as per the template (Annexure – II).

b) The final assessment will be in the form of summative assessment method. The All India Trade Test for awarding NTC will be conducted by NCVT at the end of each semester as per the guideline of Government of India. The pattern and marking structure is being notified by Govt. of India from time to time. **The learning outcome and assessment criteria will be the basis for setting question papers for final assessment. The examiner during final examination will also check** the individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.

2.4.1 PASS REGULATION

The minimum pass percentage for practical is 60% & minimum pass percentage of theory subjects is 40%. For the purposes of determining the overall result, 50% weightage is applied to the result of each semester examination.

2.4.2 ASSESSMENT GUIDELINE

Appropriate arrangements should be made to ensure that there will be no artificial barriers to assessment. The nature of special needs should be taken into account while

undertaking the assessment. Due consideration should be given while assessing for teamwork, avoidance/reduction of scrap/wastage and disposal of scrap/waste as per procedure, behavioral attitude, sensitivity to the environment and regularity in training. The sensitivity towards OSHE and self-learning attitude are to be considered while assessing competency.

Assessment will be evidence based comprising the following:

- Job carried out in labs/workshop
- Record book/ daily diary
- Answer sheet of assessment
- Viva-voce
- Progress chart
- Attendance and punctuality
- Assignment
- Project work

Evidences of internal assessments are to be preserved until forthcoming semester examination for audit and verification by examining body. The following marking pattern to be adopted while assessing:

Performance Level	Evidence
(a) Weightage in the range of 60%-75% to be allotted during assessment	
For performance in this grade, the candidate should produce work which demonstrates attainment of an acceptable standard of craftsmanship with occasional guidance, and due regard for safety procedures and practices	<ul style="list-style-type: none"> • Demonstration of good skill in the use of hand tools, machine tools and workshop equipment. • Below 70% tolerance dimension achieved while undertaking different work with those demanded by the component/job. • A fairly good level of neatness and consistency in the finish. • Occasional support in completing the project/job.
(b) Weightage in the range of 75%-90% to be allotted during assessment	
For this grade, a candidate should produce work which demonstrates attainment of a reasonable standard of craftsmanship, with little guidance, and regard for safety procedures and practices	<ul style="list-style-type: none"> • Good skill levels in the use of hand tools, machine tools and workshop equipment. • 70-80% tolerance dimension achieved while undertaking different work with those demanded by the component/job. • A good level of neatness and consistency in the finish. • Little support in completing the project/job.

(c) Weightage in the range of more than 90% to be allotted during assessment	
<p>For performance in this grade, the candidate, with minimal or no support in organization and execution and with due regard for safety procedures and practices, has produced work which demonstrates attainment of a high standard of craftsmanship.</p>	<ul style="list-style-type: none"> • High skill levels in the use of hand tools, machine tools and workshop equipment. • Above 80% tolerance dimension achieved while undertaking different work with those demanded by the component/job. • A high level of neatness and consistency in the finish. • Minimal or no support in completing the project.



Skill India
 कौशल भारत - कुशल भारत

3. JOB ROLE

Dairy Worker, General; performs all or several tasks in preparation of various dairy products. Pasteurises raw milk or other dairy product to remove harmful bacteria. Develops bacterial culture for use in making butter, buttermilk, cheese and other products. Separates cream from milk and churns it into butter. Curdles milk and converts curds into cheese. May make ice-cream.

Separator Man; Cream Separator; Cream man (Dairy) operates milk separator to separate cream from milk. Assembles and adjusts separator as necessary, according to type of product for which separated cream or milk is to be used; places empty containers below cream and skimmed outlets; pours milk into separator; switches on centrifugal machine which automatically carries milk into bowl and separates milk into fat and skimmed milk; regulates separator to obtain required percentage of cream for making butter or ghee; cleans plant using hot water, soda and other detergent solutions. May also attend to pasteurizing plant.

Butter Maker; performs all or several tasks for making butter. Pasteurizes milk to eliminate harmful bacteria. Separates cream from milk in centrifuge. Adds lactic ferment to ripen cream. Pours or pumps cream into mechanical churn. Starts churn to make butter, controlling butter moisture, temperature and time of churning. May add salt to butter in churn. May take samples of butter for testing. May boil and strain butter to make 'ghee' and be designated as GHEE MAKER

Cheese Maker; cooks milk and specified ingredients to make cheese according to formula. Pasteurizes and separates milk to obtain prescribed butter fat content; turns valves to fill vat with milk and heat milk to specified temperature; starts agitator to mix ingredients; tests samples of milk for acidity and allows agitator to mix ingredients until specified level of acidity is reached; dumps and mixes measured amount of rennet into milk; stops agitator to allow milk to coagulate into curd; cuts curd or separates curd with hand scoop to release whey (watery part); observes thermometer, adjusts steam valve, and starts agitator to stir and cook curd at prescribed temperature for specified time; squeezes and stretches sample of curd with fingers and extends cooking time to achieve desired firmness or texture; scoops curd into burlap containers to drain off excess moisture; places cheese in moulds and presses it into shape. May salt cheese by immersing them in brine or roll cheese in dry salt, pierce or smear cheese with cultured wash to develop mould growth, and place or turn cheese blocks on shelves to cure cheese. May supervise ripening of cheese. May specialize in making particular type of cheese. May Pasteurise milk and operate centrifugal machine to separate cream out of pure milk.

Dairy Workers (non-farm), Other; include all other dairy workers not elsewhere classified, for example, those salting cheese by immersing them in brine or by rubbing them with dry salt, sterilizing milk; operating machines which homogenise milk, moulding butter or cheese into shape, packing and wrapping butter with paper, making condensed or powdered milk, etc. and may be designated according to nature of work performed.

Reference NCO-2015:

- (i) 7513.0100
- (ii) 7513.0200
- (iii) 7513.0300
- (iv) 7513.0400
- (v) 7513.9900



Skill India
कौशल भारत - कुशल भारत

4. GENERAL INFORMATION

Name of the Trade	Dairying			
NCO - 2015	7513.0100, 7513.0200, 7513.0300, 7513.0400, 7513.9900			
NSQF Level	Level 4			
Duration of Craftsmen Training	1 Year (2 Semesters each of six month duration)			
Entry Qualification	Passed 10 th class examination under 10+2 System of education			
Unit Strength (No. of Student)	20 (Max. Supernumeraries seats: 6)			
Space Norms	125 Sq.mt.			
Power Norms	3 KW			
Instructors Qualification for:				
(i) Dairying Trade	Degree/ Diploma in Dairy from recognised board with two years post qualification Experience. <p style="text-align: center;">OR</p> Passed Carftsman Training Course in the Dairy trade under NCVT with five years post qualification experience. Desirable: Preference will be given to a candidate with Craft Instructor Certificate (CIC) Note: At least one instructor must have Degree/Diploma in particular trade			
(ii) Employability Skill	MBA OR BBA with two-year experience OR Graduate in Sociology/ Social Welfare/ Economics with two-year experience OR Graduate/ Diploma with two-year experience and trained in Employability Skills from DGT institutes. <p style="text-align: center;">AND</p> Must have studied English/ Communication Skills and Basic Computer at 12 th / Diploma level and above. <p style="text-align: center;">OR</p> Existing Social Studies Instructors duly trained in Employability Skills from DGT institutes.			
List of Tools and Equipment	As per Annexure – I			
Distribution of training on hourly basis: (Indicative only)				
Total Hrs/ Week	Trade Practical	Trade Theory	Employability Skills	Extracurricular Activity
40 Hours	30 Hours	6 Hours	2 Hours	2 Hours

5. NSQF LEVEL COMPLIANCE

NSQF level for '**Dairying**' trade under CTS: **Level 4**

As per notification issued by Govt. of India dated- 27.12.2013 on National Skill Qualification Framework total 10 (Ten) Levels are defined.

Each level of the NSQF is associated with a set of descriptors made up of five outcome statements, which describe in general terms, the minimum knowledge, skills and attributes that a learner needs to acquire in order to be certified for that level.

Each level of the NSQF is described by a statement of learning outcomes in five domains, known as level descriptors. These five domains are:

- a. Process
- b. Professional knowledge
- c. Professional skill
- d. Core skill
- e. Responsibility

The Broad Learning outcome of '**Dairying**' trade under CTS mostly matches with the Level descriptor at Level- 4.

The NSQF level-4 descriptor is given below:

LEVEL	Process Required	Professional Knowledge	Professional Skill	Core Skill	Responsibility
Level 4	Work in familiar, predictable, routine, situation of clear choice	Factual knowledge of field of knowledge or study	Recall and demonstrate practical skill, routine and repetitive in narrow range of application, using appropriate rule and tool, using quality concepts	Language to communicate written or oral, with required clarity, skill to basic Arithmetic and algebraic principles, basic understanding of social political and natural environment	Responsibility for own work and learning.

6. LEARNING/ ASSESSABLE OUTCOME

Learning outcomes are a reflection of total competencies of a trainee and assessment will be carried out as per the assessment criteria.

6.1 GENERIC LEARNING OUTCOME

1. Apply safe working practices.
2. Comply with environment regulation and housekeeping.
3. Assist in exigencies and carry out elementary first-aid during emergencies.
4. Work in a team, understand and practice soft skills, technical English to communicate with required clarity.
5. Explain energy conservation, global warming and pollution and contribute in day-to-day work by optimally using available resources.
6. Explain personnel finance, entrepreneurship and manage/organize related task in day-to-day work for personal & societal growth.

6.2 SPECIFIC LEARNING OUTCOME

Semester-I

7. Recognize different breeds of Cows & buffaloes.
8. Handle the new born calf, its sanitation etc.
9. Plan the floor arrangement after different animal houses.
10. Groom & wash the animals along with cleaning & sanitation of sheds.
11. Observe & identify symptoms of certain specific disease in animals.
12. Prepare feed and fodder for Dairy.
13. Use different types of cutting drilling, tapping, grinding & other required tools, coupler and valves used in Dairy.
14. Maintain electrical wiring and other electrical machinery used in Dairy.
15. Use and maintain boilers and associated system machinery used in Dairy.

Semester-II

16. Use and maintain the Refrigeration and Air Conditioning system used in Dairy.
17. Use and maintain instrumentation system used in Dairy.
18. Carryout various test by collecting milk sample.
19. Determine the specific gravity of milk samples and carry out test using various testing techniques.
20. Count different types of microorganisms and milk samples.
21. Carry out COB and MBR tests.
22. Carryout Pasteurization of milk.

23. Prepare sterilized, toned and doubled toned milk followed by packing. Prepare butter, ghee and other dairy products.
24. Maintain of records, balance sheet and other related documents used in dairy industry.



Skill India
कौशल भारत - कुशल भारत

7. LEARNING OUTCOME WITH ASSESSMENT CRITERIA

GENERIC LEARNING/ ASSESSABLE OUTCOME	
LEARNING/ ASSESSABLE OUTCOME	ASSESSMENT CRITERIA
1. Apply safe working practices.	1.1 Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements, and according to policy.
	1.2 Recognize and report all unsafe situations according to policy.
	1.3 Identify and take necessary precautions on fire and safety hazards and report according to work policy and procedures.
	1.4 Identify, handle and store/ dispose-off dangerous goods and substances according to policy and procedures following safety regulations and requirements.
	1.5 Identify and observe policies and procedures with regard to illness or accident.
	1.6 Identify safety alarms accurately.
	1.7 Report supervisor/ competent of authority in the event of accident or sickness of any staff and record accident details correctly according to accident/injury procedures.
	1.8 Identify and observe evacuation procedures according to site policy.
	1.9 Identify Personal Protective Equipment (PPE) and use the same as per related working environment.
	1.10 Identify basic first-aid and use them under different circumstances.
	1.11 Identify different fire extinguisher and use the same as per requirement.
2. Comply with environment regulation and housekeeping.	2.1 Identify environmental pollution & contribute to the avoidance of instances of environmental pollution.
	2.2 Deploy environmental protection legislation & regulations.
	2.3 Take opportunities to use energy and materials in an environmentally friendly manner.
	2.4 Avoid waste and dispose waste as per procedure.
3. Assist in exigencies and carry out elementary first-aid during emergencies.	3.1 Demonstrate elementary first-aids.
	3.2 Demonstrate safety practices to be observed in kitchen.
	3.3 Demonstrate use of personal protective dresses.
	3.4 Identify emergency exit route.

	3.5 Demonstrate fire fighting procedure using fire extinguishers.
4. Work in a team, understand and practice soft skills, technical English to communicate with required clarity.	4.1 Obtain sources of information and recognize information.
	4.2 Use documents, regulations and occupationally related provisions.
	4.3 Conduct appropriate and target oriented discussions with higher authority and within the team.
	4.4 Present facts and circumstances, possible solutions & use English and French terminology.
	4.5 Resolve disputes within the team.
	4.6 Conduct written communication.
5. Explain energy conservation, global warming and pollution and contribute in day-to-day work by optimally using available resources.	5.1 Explain the concept of energy conservation, global warming, pollution and utilize the available resources optimally & remain sensitive to avoid environment pollution.
	5.2 Dispose waste following standard procedure.
6. Explain personnel finance, entrepreneurship and manage/organize related task in day-to-day work for personal & societal growth.	6.1 Explain personnel finance and entrepreneurship.
	6.2 Explain role of various schemes and institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non-financing support agencies to familiarize with the policies/ programmes, procedure & the available scheme.
	6.3 Prepare Project report to become an entrepreneur for submission to financial institutions.

SPECIFIC LEARNING/ ASSESSABLE OUTCOME	
LEARNING/ ASSESSABLE OUTCOME	ASSESSMENT CRITERIA
7. Recognize different breeds of Cows & buffaloes.	7.1 Recognize different breeds of cows and buffaloes.
	7.2 Recognize external anatomy of cow and buffalo.
8. Handle the new born calf, its sanitation etc.	8.1 Demonstrate care of new born calf/handling of new born calf.
	8.2 Explain sanitation to be maintained for new born calf.
	8.3 Explain cutting and sealing of naval cord.
9. Plan the floor arrangement after different animal houses.	9.1 Draw sketch of floor plan for different animal houses.
10. Groom & wash the animals along with cleaning & sanitation of sheds.	10.1 Demonstrate grooming and washing of animals.
	10.2 Demonstrate cleaning and sanitation of sheds.
11. Observe & identify symptoms of certain specific disease in animals.	11.1 Explain signs of good health of dairy animals.
	11.2 Explain symptoms of certain specific diseases in animals.
12. Prepare feed and fodder for Dairy.	12.1 Identify various feeds, fodders, feed supplements and additives in different seasons.
	12.2 Identify animal feed adulterants by physical methods. Grinding and mixing of feed ingredients.
	12.3 Calculate feed and fodder requirements for various categories of dairy animals viz. Growing, heifers, bull calves, bulls, pregnant cows, lactating cows etc.
	12.4 Demonstrate cleaning and fumigation of feed stores. Storing of prepared feed.
	12.5 Carry out mixing of feed ingredients.
	12.6 Perform packaging of mineral and concentrate mixture storing of prepared feed.
13. Use different types of	13.1 Perform chipping, surface & sides. Use of different files.

	13.2	Exercise drilling, tapping etc. Grinding of drill bits.
	13.3	Measure with precision measuring instrument e.g. Vernier caliper, micrometer, bevel protractor, dial test indicator etc.
	13.4	Perform simple joints by using T-bends, elbow, coupler, reduction of pipe, bending of pipe, copper tube fitting.
	13.5	Explain maintenance of different types of pumps and compressors.
	13.6	Perform checking and correcting the alignment of shaft and couplings of motors.
	13.7	Perform fitting of bearing, oil seals, packing, gaskets and locking devices.
14. Maintain electrical wiring and other electrical machinery used in Dairy.	14.1	Work in compliance with electrical safety.
	14.2	Demonstrate use of electrician hand tools.
	14.3	Demonstrate formation of simple electrical circuit, series circuit and parallel circuit.
	14.4	Fix and connect electrical switches, holders, fuses, plug sockets on T.W. Board and testing.
	14.5	Explain care, maintenance and running of ac single and poly phase motor, starters and transformers.
15. Use and maintain boilers and associated system machinery used in Dairy.	15.1	Work in compliance with boiler safety.
	15.2	Perform operation of boiler feed water pumps, fans etc.
	15.3	Perform operation of fuel feeding mechanism
	15.4	Perform control of steam pressure temperature and stem flow.
Semester II		
16. Use and maintain the Refrigeration and Air Conditioning system used in Dairy.	16.1	Identify refrigeration system components and refrigeration service tools.
	16.2	Perform dismantling of compressor.
	16.3	Perform servicing of air cooled condenser.
	16.4	Perform checking of leak repair and testing of evaporator, removal of oil.
	16.5	Perform checking of automatic and thermostatic expansion switches, valves and capillary tube.
	16.6	Perform oil charging in compressor, installing compressor, electric wiring of refrigeration system
17. Use and maintain instrumentation system used in Dairy.	17.1	Calibrate pressure gauge on dead weight tester and by standard calibration.
	17.2	Explain construction and operation of pressure regulating valve and filter.
	17.3	Calibrate different types of pressure recorder.
18. Carryout various test by collecting milk	18.1	Perform chemical quality of milk, Reception, weightment and sampling of milk.

sample.	18.2 Platform tests for milk, sampling of milk and milk products for microbiological and chemical analysis
	18.3 Explain preservation process of milk samples.
19. Determine the specific gravity of milk samples and carry out test using various testing techniques.	19.1 Explain filters & clarifiers of milk and various parts of separator.
	19.2 Carry out different SNF tests for milk.
	19.3 Determine specific gravity of milk by lactometer.
	19.4 Determine titratable acidity of milk.
20. Count different types of microorganisms and milk samples.	20.1 Identify and count different types of microorganism.
	20.2 Carry out presumptive test.
21. Carry out COB and MBR tests.	21.1 Carry out sediment test,
	21.2 Carry out clot-on-boiling test (COB).
	21.3 Carry out methyl blue reduction (MBR) test.
22. Carryout Pasteurization of milk.	22.1 Demonstrate separation, Standardization and Homogenization of milk.
	22.2 Perform pasteurization of milk by HTST method.
	22.3 Perform pasteurization of milk by LTLT method.
23. Prepare sterilized, toned and double toned milk followed by packing.	23.1 Perform packaging of milk in bottles, cans and sachets.
	23.2 Prepare Toned and Double Toned milk.
	23.3 Prepare flavoured milk and chocolate milk.
	23.4 Prepare sterilized milk by batch Methods.
	23.5 Prepare butter.
25. Maintain of records, balance sheet and other related documents used in dairy industry.	24.1 Demonstrate handling of Audio-Visual Aids.
	24.2 Explain milk Co-operative Society and dairy entrepreneur.

SYLLABUS –DAIRYING			
FIRST SEMESTER – 06 Months			
Week No.	Reference Learning Outcome	Professional Skills (Trade Practical) With Indicative Hours	Professional Knowledge (Trade Theory)
1-2	Recognize different breeds of Cows & buffaloes.	<ol style="list-style-type: none"> 1. Visit to different dairy farms. (30 Hrs) 2. Recognize different breeds of cows and buffaloes. External anatomy of cow and buffalo. (30 Hrs) 	<p>Present status and future prospects of dairy industry. Role of dairy animals in Indian farming.</p> <p>Important Indian and exotic dairy breeds of cattle and buffaloes, their origin, distribution and characteristics.</p>
3	Handle the new born calf and its sanitation etc.	<ol style="list-style-type: none"> 3. Care of new born calf/ handling of new born calf, its sanitation, cutting and sealing of naval cord. (30 Hrs) 	<p>Economic characters of dairy animals. Control of dairy animals. Dairy animal improvement through breeding.</p>
4	Plan the floor arrangement for different animal houses.	<ol style="list-style-type: none"> 4. Drawing sketch of floor plan for different animal houses. (30 Hrs) 	<p>Principles and design of animal housing. Location and layouts of animal sheds. Sanitation in dairy farm.</p>
5	Groom & wash the animals along with cleaning & sanitation of sheds.	<ol style="list-style-type: none"> 5. Grooming & washing of animals. Cleaning & sanitation of sheds. (30 Hrs) 	<p>Animal response to environment changes, protection against heat & cold. Farm washes, availability, collection and utilization. Disposal of dead animals.</p>
6	Observe & identify symptoms of certain specific disease in animals.	<ol style="list-style-type: none"> 6. Observing signs of health in dairy animals. Observing and identifying symptoms of certain specific diseases in animals. Pressing of wounds. (30 Hrs) 	<p>First aid for common animals. Knowledge of common contagious and infectious diseases, preventive measures.</p>
7-13	Prepare, feed and fodder for Dairy.	<ol style="list-style-type: none"> 7. Identification of various feeds, fodders, feed supplements and additives in different seasons. (30 Hrs) 8. Identification of animal feed adulterants by physical methods. Grinding and mixing of feed ingredients (30 Hrs) 	<p>Importance of feeding of dairy animal. Classification of feeds:</p> <ol style="list-style-type: none"> A. Roughages- leguminous and <ul style="list-style-type: none"> - non-leguminous - succulent and dry B. Concentrates- energy and protein feeds

		<p>9. Calculation of feed and fodder requirements for various categories of dairy animals viz. Growing, heifers, bull calves, bulls, pregnant cows, lactating cows etc. (30 Hrs)</p> <p>10. Visits to feed laboratory and cattle Feed manufacturing units. Feeding and watering of calves, heifers, pregnant & lactating cows and bulls. (30 hrs)</p> <p>11. Visit to markets for assessing availability and knowing prices of feed ingredients. (30 Hrs)</p> <p>12. Cleaning and fumigation of feed stores. Storing of prepared feed. (30 hrs)</p> <p>13. Mixing of feed ingredients. Packaging of mineral and concentrate mixture storing of prepared feed. (30 Hrs)</p>	<p>C. Feed supplements- minerals and vitamins.</p> <p>Classification of nutrients and their role in animal body, water, carbohydrates, proteins, lipids, minerals and vitamins.</p> <p>Feeding of various categories of dairy animals, pregnant and newly calved cows, new born calf, growing calves, heifers bull-calves, lactating cows, dry cows and bulbs.</p> <p>Methods of purchasing, procurement of feed ingredients and their physical evaluation. Compounding of feeds-objectives, advantages, methods and machinery for compounding.</p> <p>Major nutritional disorders and their preventive-milk fever, grass tetany , rickets, bloat etc.</p> <p>Packaging and forwarding of feeds-materials for packaging methods of packaging and transportation.</p> <p>Storage of concentrates-storage types, space requirement, cleaning and fumigation of stores, precautions in use of pesticides.</p>
14-17	Use different types of cutting drilling, tapping, grinding & other required tools, coupler and valves used in Dairy.	<p>Mechanical maintenance:</p> <p>14. Cutting of mild steel flat, marking of job. Practice on chipping, surface & sides. Use of different files. (30 Hrs)</p> <p>15. Exercise on drilling, tapping etc. Grinding of drill bits. Measurement with precision measuring instrument e.g. Vernier caliper, micrometer, bevel protractor, dial test indicator etc. (30 Hrs)</p> <p>16. Threading on pipes. Simple joints by using T-bends, elbow, coupler, reduction of</p>	<p>General tools used in the workshop. Types and classification of chisels and files. Types of filing, types of working tools and their uses. Drills, taps and dies - use and classification. Calculation of tap drill size. Construction, care and maintenance of precision measuring instruments.</p> <p>Pipe grade and material, use of T-bend, elbow, coupler, reducer, ripple, different types of valves, leakage of pipe fitting. Different sealing materials. Working of pressure test instruments bending procedure, use of PVC</p>

		<p>pipe, bending of pipe, copper tube fitting practice, use of bending and seating tools. Pneumatic construction. Simple job on soldering and brazing. (30 Hrs)</p> <p>Different types of Valves:-</p> <p>17. Fitting and assembly of different gear boxes. Assembly and maintenance of different types of pumps and compressors. Checking and correcting the alignment of shaft and couplings of motors. Fitting of bearing and oil seals. Use of packing, gaskets and locking devices. (30 Hrs)</p>	<p>tube and fittings. Use of pipe cutter and tube cutter. Soldering iron, types of solders and their compositions, flux.</p> <p>Construction and use of different types of valves.</p> <p>Types of gears, their uses.</p> <p>Types of pumps and compressor and their construction and uses. Causes of misalignment, different methods of checking alignment, effects of misalignment of shaft and couplings. Types of bearing, construction and uses.</p>
18-20	Maintain electrical wiring and other electrical machinery used in Dairy.	<p>Electrical maintenance:</p> <p>18. Use of electrician hand tools. Safety precaution and first aid. (25 Hrs)</p> <p>19. Formation of simple electrical circuit, series circuit and parallel circuit. Fixing and connecting electrical switches, holders, fuses, plug sockets on T.W. Board and testing. (35 hrs)</p> <p>20. Care, maintenance and running of ac single and poly phase motor, starters and transformers. (30 Hrs)</p>	<p>Fundamentals of electricity, electron theory, free electrons, fundamental terms, definitions, units and effects of electric current. Conductors and insulators. Electrical work, power, energy, their calculation in simple electrical circuit, types and construction of common electrical measuring instruments calculation.</p> <p>Simple electrical circuit, essential requirement of electrical circuit, series and parallel circuit.</p> <p>Ac motor, starters and transformers, their working principles, specification and use. Care and safety.</p>
21	Use and maintain boilers and associated system machinery used in Dairy.	<p>Boiler:</p> <p>21. Boiler safety precautions. Operation of boiler feed water pumps, fans etc. Operation of fuel feeding mechanism. (10 Hrs)</p> <p>22. Reading and control of steam pressure temperature and stem flow. (10 Hrs)</p> <p>23. Working in steam boiler and</p>	<p>Steam - its heating and power properties. Principles of steam and application in boilers. Steam generation, steam distribution, condensate handling etc.</p> <p>Boiler mounting and fittings. Description and use of safety valves and other types of valves. Types of boilers, their brief study.</p>

		economizer. (10 Hrs)	
22-23	Project work/ industrial visit		
24-25	Revision		
26	Examination		

Note: -

1. *At least one industrial visit in every two weeks shall be arranged.*
2. *An activity report to be submitted by the trainees and internal assessment marks (Max 10) will be awarded based on it.*
3. *One hour soft skill classes to be arranged on a daily basis. Some of the sample project works (indicative only) are given against each semester.*
4. *The instructor may design their own project and also inputs from local industry may be taken in designing such new project.*
5. *The project should broadly cover maximum skills in the particular trade and must involve some problem solving skill. Emphasis should be on Teamwork: Knowing the power of synergy/ collaboration, work to be assigned to a group (Group of at least 4 trainees). The group should demonstrate Planning, Execution, Contribution and Application of Learning. They need to submit a project report.*
6. *If the instructor feels that for the execution of specific project more time is required than he may plan accordingly to produce components/ sub-assemblies in appropriate time, i.e., may be in the previous semester or during execution of normal trade practical.*

Skill India
कौशल भारत - कुशल भारत

SYLLABUS – DAIRYING			
SECOND SEMESTER – 06 Month			
Week No.	Learning outcome Reference	Professional Skills (Trade Practical) With Indicative Hours	Professional Knowledge (Trade Theory)
27-31	Use and maintain the Refrigeration and Air Conditioning system used in Dairy.	<p>Refrigeration and air conditioning :-</p> <p>24. Identification of refrigeration system. Stripping components, care and safety. Use of refrigeration service tools - care and safety. (20 Hrs)</p> <p>25. Dismantling of different types of compressors. Checking and servicing of components. Assembly and testing. (25 Hrs)</p> <p>26. Servicing air cooled condenser. Checking leak repair and testing. Servicing evaporator, removal of oil, checking, leak repair and testing. (35 Hrs)</p> <p>27. Checking automatic and thermostatic expansion switches, valves and capillary tube. Servicing and testing. (30 Hrs)</p> <p>28. Oil charging to compressor, installing compressor, electric wiring of refrigeration system. (10 Hrs)</p> <p>29. Testing leak in the refrigeration system. Effect of over charge and under charge. (15 Hrs)</p> <p>30. Operation and servicing cold store cooling system. Control and instrument. (10 Hrs)</p> <p>31. Repair and maintenance of refrigerator and deep freezer. Bottle coolers and water coolers. (15 Hrs)</p>	<p>Principle system and application of refrigeration. Refrigeration components -type specification and use.</p> <p>Refrigeration compressor. Its function, mode of drive, types of compressors -classification and application. Construction and function. Advantages and disadvantages of different types.</p> <p>Condenser - its function, type, classification, construction and application. Evaporator - its function, type, classification, construction and application.</p> <p>Refrigeration control - function and type. Automatic, thermostatic and capillary control, Construction, operation and application.</p> <p>Oil used in refrigeration system, their desirable properties. Leak detectors -their type, specification, use and care.</p> <p>Refrigerants - their properties and use.</p> <p>Food preservation spoilage agents control of spoilage agents. Cold storage plant operation refrigerator, deep freezer, bottle cooler and water cooler, its common trouble and remedies.</p>

32 – 35	Use and maintain instrumentation system used in Dairy.	Instrumentation: 32. Calibration of pressure gauge on dead weight tester and by standard calibration. (30 Hrs) 33. Study construction and operation of pressure regulating valve and filter. (35 hrs) 34. Calibration of different types of pressure recorder. (25 Hrs) 35. Maintenance and reconditioning of different types of thermometers and Thermocouples. (30 Hrs)	Different types of pressure gauges and their application. Types of manometer and their use. Construction and operation of differential Pressure transmitter. Pressure recorder - its type and construction. Construction of different types of thermometer and thermocouple. Know how of VFD/ Automation/ Self Starters
36-38	Carryout various tests by collecting milk sample.	36. Chemical quality of milk. Reception, weightment and sampling of milk. (30 Hrs) 37. Platform tests for milk. Sampling of milk and milk products for microbiological and chemical analysis. (35 Hrs) 38. Preservation of milk samples for Chemical (10 Hrs) 39. Analysis, Sensory evaluation of milk. (25 Hrs)	Pricing of milk, composition of milk, factors affecting composition of milk; nutritive value of milk. Sensory and physio-Chemical properties of milk. Types of micro-organisms present in milk and their relation with public health. Grading and testing of milk for quality.
39 – 41	Determine the specific gravity of milk samples and carry out test using various testing techniques.	40. Study of an immersion cooler, plate chiller, surface cooler and farm milk COOLER. (30 Hrs) 41. Study of Filters & clarifiers of milk and various parts of separator. (30 hrs) 42. Different SNF test for milk. Determination of specific gravity of milk by lactometer. (15 Hrs) 43. Determination of titratable acidity of milk (15 Hrs)	Functioning of BMC, milk reception, different methods of chilling and storage, handling of milk at BMC, modes of transportation of chilled milk. Straining, filtration and clarification of milk. Principle of cream separation. Sampling procedures and testing the quality of milk at reception dock, chilling center; maintenance of milk receipt register
42	Count different types of	44. Identification and counting of different types	Milk borne disease. Pathozenes and causative organism. Water

	microorganisms and milk samples.	of microorganism. Presumptive test. (30 Hrs)	borne disease, air borne disease, zoonotic diseases.
43-44	Carry out COB and MBR tests.	45. Sediment test, Clot-on-boiling test. (COB) (30 hrs) 46. Methyl blue reduction (MBR) test. (30 Hrs)	Principle of homogenization of milk, packaging of milk storage of processed milk. Importance of pasteurization, methods of pasteurization (LTLT, HTST).
45	Carryout Pasteurization of milk.	47. Separation, Standardization and Homogenization of milk. (15 hrs) 48. Pasteurization of milk by HTST and LTLT methods. (15 Hrs)	Dispensing of milk through bulk vending machines, cans, cartons, sachets and bottles. Handling losses and factors affecting milk solids losses.
46 – 47	Prepare sterilized, toned and doubled toned milk followed by packing. Prepare of butter, ghee and other dairy products.	49. Packaging of milk in bottles, cans and sachets. (10 Hrs) 50. Preparation of Toned and Double Toned milk. (15 Hrs) 51. Preparation of flavored milk and chocolate milk. (10 hrs) 52. Preparation of sterilized milk by batch Methods. (15 Hrs) 53. Preparation of butter. (10 hrs)	Method of preparation of flavored, chocolate and sterilized milk, ghee, butter etc. And various milk products. Problems of storage, transportation and marketing of Dairy products.
48-49	Maintain of records, balance sheet and other related documents used in dairy industry.	54. Handling of Audio-Visual Aids. (25 Hrs) 55. Case study of a milk Co-operative Society and Dairy entrepreneur. (35 Hrs)	Dairy Economics in large and small size dairy farm. Accounts keeping, Maintenance of Registers & Records, preparation of Balance Sheets etc. Marketing of milk and milk products.
50	Project work/ Industrial visit Broad area: Report on latest technologies used in Dairy industries.		
51	Revision		
52	Examination		

Note: -

1. At least one industrial visit in every four weeks shall be arranged.
2. An activity report to be submitted by the trainees and internal assessment marks (Max 10) will be awarded based on it.

3. *One hour soft skill classes to be arranged on a daily basis. Some of the sample project works (indicative only) are given against each semester.*
4. *The instructor may design their own project and also inputs from local industry may be taken in designing such new project.*
5. *The project should broadly cover maximum skills in the particular trade and must involve some problem solving skill. Emphasis should be on Teamwork: Knowing the power of synergy/ collaboration, work to be assigned to a group (Group of at least 4 trainees). The group should demonstrate Planning, Execution, Contribution and Application of Learning. They need to submit a project report.*
6. *If the instructor feels that for the execution of specific project more time is required than he may plan accordingly to produce components/ sub-assemblies in appropriate time, i.e., may be in the previous semester or during execution of normal trade practical.*
7. *Instructors may plan to visit of Cattle food mfg. factories.*



Skill India
कौशल भारत - कुशल भारत

8. SYLLABUS - CORE SKILLS

CORE SKILL – EMPLOYABILITY SKILL	
First Semester	
1. English Literacy	Duration : 20 hrs Marks : 09
Pronunciation	Accentuation (mode of pronunciation) on simple words, Diction (use of word and speech)
Functional Grammar	Transformation of sentences, Voice change, Change of tense, Spellings.
Reading	Reading and understanding simple sentences about self, work and environment
Writing	Construction of simple sentences Writing simple English
Speaking/ Spoken English	Speaking with preparation on self, on family, on friends/ classmates, on known people, picture reading, gain confidence through role- playing and discussions on current happening, job description, asking about someone's job, habitual actions. Cardinal (fundamental) numbers, ordinal numbers. Taking messages, passing on messages and filling in message forms, Greeting and introductions, office hospitality, Resumes or curriculum vita essential parts, letters of application reference to previous communication.
2. IT Literacy	Duration : 20 hrs Marks : 09
Basics of Computer	Introduction, Computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down of the computer.
Computer Operating System	Basics of Operating System, WINDOWS, The user interface of Windows OS, Create, Copy, Move and delete Files and Folders, Use of External memory like pen drive, CD, DVD etc. Use of Common applications.
Word Processing and Worksheet	Basic operating of Word Processing, Creating, Opening and Closing Documents, Use of shortcuts, Creating and Editing of Text, Formatting the Text, Insertion & Creation of Tables. Printing document. Basics of Excel worksheet, understanding basic

	commands, creating simple worksheets, understanding sample worksheets, use of simple formulas and functions, Printing of simple excel sheets.
Computer Networking and Internet	Basic of Computer Networks (using real life examples), Definitions of Local Area Network (LAN), Wide Area Network (WAN), Internet, Concept of Internet (Network of Networks), Meaning of World Wide Web (WWW), Web Browser, WebSite, Web page and Search Engines. Accessing the Internet using Web Browser, Downloading and Printing Web Pages, Opening an email account and use of email. Social media sites and its implication. Information Security and antivirus tools, Do's and Don'ts in Information Security, Awareness of IT - ACT, types of cyber crimes.
3. Communication Skills	
	Duration : 15 hrs Marks : 07
Introduction to Communication Skills	Communication and its importance Principles of effective communication Types of communication - verbal, non-verbal, written, email, talking on phone. Non-verbal communication -characteristics, components-Para-language Body language Barriers to communication and dealing with barriers. Handling nervousness/ discomfort.
Listening Skills	Listening-hearing and listening, effective listening, barriers to effective listening, guidelines for effective listening. Triple- A Listening - Attitude, Attention & Adjustment. Active listening skills.
Motivational Training	Characteristics essential to achieving success. The power of positive attitude. Self awareness Importance of commitment Ethics and values Ways to motivate oneself Personal goal setting and employability planning.
Facing Interviews	Manners, etiquettes, dress code for an interview Do's & don'ts for an interview

Behavioral Skills	Problem solving Confidence building Attitude
Second Semester	
4. Entrepreneurship Skills	Duration : 15 hrs Marks : 06
Concept of Entrepreneurship	Entrepreneur - Entrepreneurship - Enterprises: Conceptual issue Entrepreneurship vs. management, Entrepreneurial motivation. Performance & record, Role & function of entrepreneurs in relation to the enterprise & relation to the economy, Source of business ideas, Entrepreneurial opportunities, The process of setting up a business.
Project Preparation & Marketing Analysis	Qualities of a good entrepreneur, SWOT and risk analysis. Concept & Application of PLC, Sales & Distribution management. Difference between small scale & large scale business, Market survey, Method of marketing, Publicity and advertisement, Marketing mix.
Institution's Support	Preparation of project. Role of various schemes and institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non-financing support agencies to familiarize with the policies / programmes, procedure & the available scheme.
Investment Procurement	Project formation, Feasibility, Legal formalities i.e., Shop act, Estimation & costing, Investment procedure - Loan procurement - Banking processes.
5. Productivity	Duration : 10 hrs Marks : 05
Benefits	Personal/ Workman - Incentive, Production linked Bonus, Improvement in living standard.
Affecting Factors	Skills, Working aids, Automation, Environment, Motivation - How it improves or slows down productivity.
Comparison with Developed Countries	Comparative productivity in developed countries (viz. Germany, Japan and Australia) in select industries, e.g. Manufacturing, Steel, Mining, Construction etc. Living standards of those countries, wages.
Personal Finance Management	Banking processes, Handling ATM, KYC registration, safe cash handling, Personal risk and insurance.
6. Occupational Safety, Health and Environment Education	Duration : 15 hrs Marks : 06

Safety & Health	Introduction to occupational safety and health Importance of safety and health at workplace.
Occupational Hazards	Basic hazards, chemical hazards, vibroacoustic hazards, mechanical hazards, electrical hazards, thermal hazards. occupational health, occupational hygiene, occupational diseases/ disorders & its prevention.
Accident & Safety	Basic principles for protective equipment. Accident prevention techniques - control of accidents and safety measures.
First Aid	Care of injured & sick at the workplaces, First-aid & transportation of sick person.
Basic Provisions	Idea of basic provision legislation of India. Safety, health, welfare under legislative of India.
Ecosystem	Introduction to environment. Relationship between society and environment, ecosystem and factors causing imbalance.
Pollution	Pollution and pollutants including liquid, gaseous, solid and hazardous waste.
Energy Conservation	Conservation of energy, re-use and recycle.
Global Warming	Global warming, climate change and ozone layer depletion.
Ground Water	Hydrological cycle, ground and surface water, Conservation and harvesting of water.
Environment	Right attitude towards environment, Maintenance of in-house environment.
7. Labour Welfare Legislation	
	Duration : 05 hrs Marks : 03
Welfare Acts	Benefits guaranteed under various acts- Factories Act, Apprenticeship Act, Employees State Insurance Act (ESI), Payment Wages Act, Employees Provident Fund Act, The Workmen's Compensation Act.
8. Quality Tools	
	Duration : 10 hrs Marks : 05
Quality Consciousness	Meaning of quality, Quality characteristic.
Quality Circles	Definition, Advantage of small group activity, objectives of quality

	circle, Roles and function of quality circles in organization, Operation of quality circle. Approaches to starting quality circles, Steps for continuation quality circles.
Quality Management System	Idea of ISO 9000 and BIS systems and its importance in maintaining qualities.
House Keeping	Purpose of housekeeping, Practice of good housekeeping.
Quality Tools	Basic quality tools with a few examples.



Skill India
कौशल भारत - कुशल भारत

LIST OF TOOLS & EQUIPMENT			
DAIRYING (for batch of 20 Candidates)			
S No.	Name of the Tools and Equipment	Specification	Quantity
A. TRAINEES TOOL KIT			
1.	Stiff Brushes		5 Nos
2.	Floor Brushes		6 Nos
3.	Ear tags		100 Nos
4.	Bull nose ring		2 Nos
5.	Bull rope		10 ft.
6.	Milk strainer		1 No
7.	Drenching bamboo		1 No
8.	Enamel tray		2 Nos
9.	Tongs		2 Nos
10.	Mouth gag		1 No
11.	Cattle Travis (wooden)		1 No
12.	Sanitary Milking pails		2 Nos
13.	Buckets		3 Nos
14.	Milk feeding pail with nipple		1 No
15.	Strip cup		1 No
16.	Chains for cows		5 Nos
17.	Chains for calves		5 Nos
18.	Chaff cutter hand operated		1 No
19.	Wheel harrows		1 No
20.	Grinder (Elec. Operated)		1 No
21.	Centrifuge		1 No
22.	Refrigerator		1 No
23.	Water distillation apparatus		1 No
24.	Spirit Lamp		10 Nos
25.	Hot air oven		1 No
26.	pH meter		1 No
27.	Stiff Brushes		2 Nos
28.	Student's microscope		1 No
29.	Water bath		1 No
30.	Gerber centrifuge		15 Nos
31.	Lactometer with jars		1 No
32.	Milk plunger		1 No
33.	Sediment testing equipment		1 No
34.	Klett Colorimeter		1 No

35.	Cream separator a) Hand operated b) Electricity operated		1 No. each
36.	Butter churn		1 No
37.	Butter worker		2 Nos
38.	Butter paper		1 (Ream)
39.	Sampler		1 No
40.	Butter scoop		1 No
41.	Weighing balance Double pan		1 No
42.	Ice cream freezer (Hand operated)		1 No
43.	Ice cream cutter		2 Nos
44.	Frying pan	2 litres	2 Nos
45.	Steel Bhagona	5 litres	1 No
46.	Bottle capper		1 No
47.	Milk	measures - 250 ml - do - 500 ml	1 No
48.	Sterilizer		1 No
49.	Stacking Trolley		1 No
50.	Homogenizer		1 No
51.	Trolley lift		1 No
52.	Butter moisture balance		1 No
53.	Measuring tape		1 No
54.	Khurpi		2 Nos
55.	Knife		3 Nos
56.	Iron pans		3 Nos
57.	Crowbar		5 Nos
58.	Muffle furnace		1 No
B. SHOP TOOLS & EQUIPMENT			
i. List of Tools of GLASSWARE:			
59.	Clinical thermometer		5 Nos
60.	Thermometer		10 Nos
61.	Automatic tilt measure for sulphuric acid		5 Nos
62.	Automatic tilt measure for amyl alcohol		5 Nos
63.	Pipette for milk	11.05 ml	10 Nos
64.	Lactometer		5 Nos
65.	Dairy Thermometer		5 Nos
66.	Lactometer jars (aluminium)		5 Nos
67.	Burettes	(0.01 sub-division)	10 Nos
68.	Pipette	10 ml	10 Nos
69.	Porcelain dish	10 ml cap.	5 Nos
70.	Beakers	100 ml, 250 ml, 500 ml, 1000 ml	10 Nos each

71.	Test tubes	cap. 15 ml	50 Nos
72.	Milk bottles	250 ml	100 Nos
73.	Kjeldhal flask	500 ml cap.	10 Nos
74.	Round bottom Flask	1000 ml	10 Nos
75.	Conical Flask	1000 ml	10 Nos
76.	Funnels	10 cm dia	10 Nos
77.	Measuring Cylinders	100 ml, 500 ml, 1000 ml	2 Nos each
78.	Volumetric flask	100 m	2 Nos
79.	Reagent bottles	250 ml, 500 ml	10 Nos each
80.	Soxhlet apparatus		6 SET
81.	Wash bottles	cap. 500 ml	10 Nos
82.	Glass rods		1 Kg.
83.	Indicator bottles		10 Nos
84.	Sample bottles		50 Nos
85.	Pipette, graduated	10ml 0.1 ml div.	5 Nos
86.	Pipette, graduated	10 ml	5 Nos
87.	1 ml division		
88.	Jar with over lapping lid	10 dia 12" high	5 Nos
89.	Spirit lamp		10 Nos
90.	Syringe	5 ml	2 Nos
91.	Rubber bulbs for suction		10 Nos
92.	Physical Balan		1 No
93.	Test tube stand		15 Nos
94.	Test tube hold		10 Nos
95.	Alkali detergents		1 Kg.
96.	Gerber centrifuge		1 Nos
97.	Filter paper	(11 cm dia)	2 BOXES
98.	Brushes to clean glasswar		6 Nos
99.	Plastic aprons		6 Nos
100.	Microscope		6 Nos
101.	Cotton apron		10 Nos
102.	Gloves with sleeves		10 Nos
103.	Plastic tubing		10 Nos
104.	Sediment tester		2 Nos
C. LIST OF CHEMICALS, DETERGENTS AND PESTICIDES ETC.			
105.	Sulphuric Acid (C. Grade)		5 lit.
106.	Sulphuric acid (a.r)		500 ml
107.	Sodium hydroxide		5 kg.
108.	Litmus paper		As required
109.	Filter paper (Whatman no. 1 and 40)		As required
110.	Petroleum ether (40° - 60° C)		500 ml
111.	Copper sulphate		500 gm
112.	Sodium sulphate		500 gm

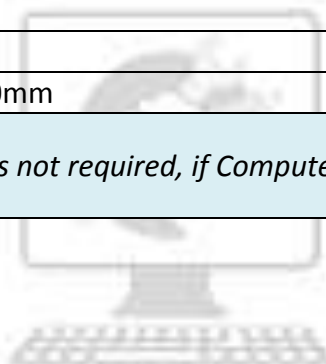
113.	Potassium dichromate	500 gm
114.	Sodium bicarbonate	500 gm
115.	Petroleum jelly/liquid paraffin	50 gm
116.	Spirit	5 Ltr
117.	Glucose	250 gm
118.	Salt	250 gm
119.	Urea	500 gm
120.	Petroleum ether	500 gm
121.	Mustard oil	1 Ltr
122.	Zinc oxide	500 gm
123.	Caustic potash	5 kg
124.	Phenol	500 gm
125.	Alcohol	450 ml

Note: All the tools and equipment are to be procured as per BIS specification.



Skill India
कौशल भारत - कुशल भारत

TOOLS & EQUIPMENTS FOR EMPLOYABILITY SKILLS		
S No.	Name of the Equipment	Quantity
1.	Computer (PC) with latest configurations and Internet connection with standard operating system and standard word processor and worksheet software.	10 nos.
2.	UPS - 500VA	10 nos.
3.	Scanner cum Printer	01 no.
4.	Computer Tables	10 nos.
5.	Computer Chairs	20 nos.
6.	LCD Projector	01 no.
7.	White Board 1200mm x 900mm	01 no.
<p>Note: Above Tools & Equipments not required, if Computer LAB is available in the institute.</p>		



Skill India
कौशल भारत - कुशल भारत

FORMAT FOR INTERNAL ASSESSMENT

Name & Address of the Assessor:						Year of Enrollment:								
Name & Address of ITI (Govt./Pvt.):						Date of Assessment:								
Name & Address of the Industry:						Assessment location: Industry/ ITI								
Trade Name:			Semester:			Duration of the Trade/course:								
Learning Outcome:														
S No.	Maximum Marks (Total 100 Marks)		15	5	10	5	10	10	5	10	15	15	Total Internal Assessment Marks	Result (Y/N)
	Candidate Name	Father's/Mother's Name	Safety Consciousness	Workplace Hygiene	Attendance/ Punctuality	Ability to Follow Manuals/ Written Instructions	Application of Knowledge	Skills to Handle Tools & Equipment	Economical Use of Materials	Speed in Doing Work	Quality in Workmanship	VIVA		
1														
2														