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

COMPETENCY BASED CURRICULUM

HONEY PROCESSING TECHNICIAN

(Duration: Six Months)
Revised in July 2022

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 3

SECTOR – FOOD INDUSTRY

Directorate General of Training

HONEY PROCESSING TECHNICIAN

(Non-Engineering Trade)

(Revised in July 2022)

Version: 2.0

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 3

Developed By

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

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1. COURSE INFORMATION

During the six months duration of 'Honey Processing Technician' trade a candidate is trained on professional skill, professional knowledge and Employability skill related to job role. In addition to this a candidate is entrusted to undertake project work, extracurricular activities and on job training to build up confidence. The broad components covered under Professional Skill subject are as below: -

During the six months the trainee learns about the collection procedure of honey by bees into bee hive, perform sampling of honey and analyse the honey collected for quality assurance, visually inspects honey, does Sensory evaluation and Quality analysis of honey according to FSSAI standards. The trainee operates the honey processing equipment like Liquefaction equipment, filters, moisture reduction equipment, pasteurizers and homogenizers, determines the moisture content for grading of honey and analyses the colour of honey with the help of colorimeter. The learner can differentiate between processed and unprocessed honey by determining the HMF content of honey, determines the amount of total reducing sugars and non reducing sugar content in honey, calculates the acidity of honey by the process of titration against base solution and the effect of heat processing for poor or rich enzyme activity in honey. Calculates the pH value of honey by digital pH meter, performs collection of Pollen, Propolis, royal jelly, bee wax and study their properties, operates nozzle filling and bottling machines, labeling and induction sealing and capping machine. He applies the knowledge of basic and advanced adulterations in honey as per the Standards of FSSAI and performs maintenance & cleaning of honey processing equipment and processing area. The main motive of this course is to train farmers / unemployed youth to set up Bee Keeping Unit as a business enterprise. According to NSSO Data (2013) among workers in rural areas, 54.2% are self-employed and 38.6% work as casual labor, whereas only 7.2% have regular wage employment. Most of the self employed are engaged in agriculture and have very little formal skills both in farm and non-farm occupations. Hence, the need to skill youth so that the next generation of workers become skilled, productive and contribute positively for the growth of the economy.

2. TRAINING SYSTEM

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 economy/ Labour market. The vocational training programmes are delivered under the aegis of Directorate General of Training (DGT). Craftsman Training Scheme (CTS) with variants and Apprenticeship Training Scheme (ATS) are two pioneer schemes of DGT for strengthening vocational training.

'Honey Processing Technician'trade under CTS is delivered nationwide through network of ITIs. The course is of six months duration. It mainly consists of Domain area and Core area. The Domain area (Trade Theory & Practical) imparts professional skills and knowledge, while Core area (Employability Skills) imparts requisite core skill & knowledge and life skills. After passing out the training program, the trainee is awarded National Trade Certificate (NTC) by DGT which is recognized worldwide.

Candidates need broadly to demonstrate that they are able to:

- Read and interpret technical parameters/ documents, plan and organize work processes, identify necessary materials and tools;
- Perform task 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 PROGRESSION PATHWAYS

- Can join as Apicultural technician and commercial Beehive keeper in Honey processing industry and will progress further as Senior Technician, Supervisor and can rise up to the level of Manager.
- Can become Entrepreneur in the related field.
- Can join Apprenticeship programme in different types of industries leading to National Apprenticeship certificate (NAC).
- Can join Crafts Instructor Training Scheme (CITS) in the trade for becoming instructor in ITIs.
- Can join Advanced Diploma (Vocational) courses under DGT as applicable.

2.3 COURSE STRUCTURE

Table below depicts the distribution of training hours across various course elements during a period of Six Months: -

S No.	Course Element	Notional Training Hours
1	Professional Skill (Trade Practical)	420
2	Professional Knowledge (Trade Theory)	120
3	Employability Skills	60
	Total	**600**

2.4 ASSESSMENT & CERTIFICATION

The trainee will be tested for his skill, knowledge and attitude during the period of course through formative assessment and at the end of the training programme through summative assessment as notified by the DGT from time to time.

a) The **Continuous Assessment** (Internal) 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 formative assessment template provided on www.bharatskills.gov.in.

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 **Controller of examinations, DGT** as per the guidelines. The pattern and marking structure are being notified DGT 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

For the purposes of determining the overall result, weightage of 100% is applied for six months and one-year duration courses and 50% weightage is applied to each examination for two years courses. The minimum pass percent for Trade Practical and Formative assessment is 60% & for all other subjects is 33%.

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 some of 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
- Computer based multiple choice question examination
- Practical examination

Evidences and records of internal (Formative) assessments are to be preserved until forthcoming examination for audit and verification by examining body. The following marking pattern to be adopted for formative assessement:

Performance Level	Evidence
(a) Marks 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	• Demonstration of good skills and accuracy in the field of work/ assignments. • A fairly good level of neatness and consistency to accomplish job activities. • Occasional support in completing the task/ job.
(b) Marks 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	• Good skill levels and accuracy in the field of work/ assignments. • A good level of neatness and consistency to accomplish job activities. • Little support in completing the task/job.
(c) Marks in the range of more than 90% to be allotted during assessment	

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.	• High skill levels and accuracy in the field of work/ assignments. • A high level of neatness and consistency to accomplish job activities. • Minimal or no support in completing the task/ job.

3. JOB ROLE

Honey Processing Technician plan, organize and perform operations to breed, raise and tend insects such as honey bees, silkworms, and other species to produce honey, beeswax, silk and other products for sale or delivery to wholesale buyers, marketing organizations or at markets.

Bee-Keeper; rears honey bees for production of honey, bee-wax, beevenom, royal jelly, pollination of crops etc. Selects suitable place for rearing bee colonies. Purchases complete beehive box provided with frames for forming honey combs. Purchases and affixes foundation wax in half portion of each frame and places them in beehive boxes. Catches and induces bees into box and transfer bees from over subscribed bee hives. Creates beehive colony consisting of queen-bee, worker-bees and drones. Inspects hives to locate formation of surplus queen-shells. Catches or destroy surplus queen-shells. Remains vigilant to catch swarming queen and bees with help of swarming net and keeps them in hives to start new colonies. Cleans hives and remove dirt. Detects and removes wax moth before it spreads into different combs. Feeds bees with sugar solution when necessary. Keeps hives on stools with their legs dipped in water bowls to prevent ants from attacking hive. Covers hives with wire nets for protection against birds. Wears hand gloves and beeveil while at work to protect self against bee-stings. Watches flow of honey into upper chamber and frequently checks process of sealing of frames. Removes honey filled frames from upper chamber of beehive box and replaces fresh unfilled ones periodically depending on flow of honey. Brushes bees surrounding comb and removes seal of comb using knife. Places cut comb into honey extractor. Presses extractor on honey filled comb to extract honey into its chambers. May apply crude method of extracting honey from beehives located on roof or tree by keeping off bees with help of fire smoke, gaining access to hive and opening comb with knife for extracting honey.

Apiarists and sericulturists, other; include all other who plan and carry out the necessary operations to breed, raise and tend insects, for sale or delivery of honey, bees wax, silk cocoons, on a regular basis to wholesale buyers, marketing organizations or at markets not else where classified.

Reference NCO-2015:

(i) 6123.0101 Bee-keeper
(ii) 6123.9900 Apiarists and Sericulturists, Other

Reference NOS: - NOS: FIC/N9427, NOS: FIC/N9428, NOS: FIC/N9429, NOS: FIC/N9430, NOS: FIC/N9431, NOS: FIC/N9432, NOS: FIC/N9433, NOS: FIC/N9434, NOS: FIC/N9435, NOS: FIC/N9436, NOS: FIC/N9437, NOS: FIC/N9438, NOS: FIC/N9439, NOS: FIC/N9440

4. GENERAL INFORMATION

Name of the Trade	**HONEY PROCESSING TECHNICIAN**
Trade Code	DGT/2022
NCO - 2015	6123.0101, 6123.9900
NOS Covered	NOS: FIC/N9427, NOS: FIC/N9428, NOS: FIC/N9429, NOS: FIC/N9430, NOS: FIC/N9431, NOS: FIC/N9432, NOS: FIC/N9433, NOS: FIC/N9434, NOS: FIC/N9435, NOS: FIC/N9436, NOS: FIC/N9437, NOS: FIC/N9438, NOS: FIC/N9439, NOS: FIC/N9440
NSQF Level	Level-3
Duration of Craftsmen Training	Six Months (600 Hours)
Entry Qualification	Passed class 10thexamination
Minimum Age	14 years as on first day of academic session.
Eligibility for PwD	LD, CP, LC, DW,AA,LV,DEAF,HH,AUTISM,ID,SLD
Unit Strength (No. of Student)	24 (There is no separate provision of supernumerary seats)
Space Norms	1000 Sq. m
Power Norms	2 KW
Instructors Qualification for:	
(i) Honey Processing Technician Trade	Post graduate (Entomology & Apiculture) from AICTE/UGC recognized university with one-year experience in the relevant field. **OR** B.Sc. (Entomology & Apiculture) from UGC recognised university with two years' experience in the relevant field. **OR** Advanced Post Graduate Diploma (Minimum 2 years)(With any Government Certificate Program in Bee Keeping/ Honey processingwith two years' experience in the relevant filed. **OR** NTC/NAC passed in the trade of "Honey Processing Technician" with three years' experience in the relevant field. **Essential Qualification:** Relevant Regular/RPL variants of National Craft Instructor Certificate (NCIC) under DGT. ***Note:-Out of two Instructors required for the unit of 2(1+1), one must have Degree/Diploma and other must have NTC/NAC***

	qualifications. However, both of them must possess NCIC in any of its variants.
(ii) Employability Skill	MBA/ BBA / Any Graduate/ Diploma in any discipline with Two years' experience with short term ToT Course in Employability Skills. (Must have studied English/ Communication Skills and Basic Computer at 12th / Diploma level and above) **OR** Existing Social Studies Instructors in ITIs with short term ToT Course in Employability Skills.
(iii) Minimum Age for Instructor	21 Years
List of Tools and Equipment	As per Annexure-I

5. LEARNING OUTCOME

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

5.1 LEARNING OUTCOMES

1. Identify the source of honey and perform sampling of honey. (NOS: FIC/N9427)
2. Carry out visual inspection of honey, Sensory evaluation and Quality analysis of honey according to FSSAI standards. (NOS: FIC/N9428)
3. Operate the honey processing equipment like liquefaction equipment, filters, pasteurizers and homogenizers. (NOS: FIC/N9429)
4. Determine the moisture content for grading of honey. (NOS: FIC/N9430)
5. Analyse the colour of honey with the help of colorimeter. (NOS: FIC/N9431)
6. Differentiate between processed and unprocessed honey by determining the HMF content of honey. (NOS: FIC/N9432)
7. Determine the amount of total reducing sugars and non reducing sugar content in honey. (NOS: FIC/N9433)
8. Determine the fructose to glucose ratio in honey and calculate the acidity of honey by the process of titration against base solution. (NOS: FIC/N9434)
9. Determine the effect of heat processing for poor or rich enzyme activity in honey. (NOS: FIC/N9435)
10. Determine the density of honey by optical rotation and check the colour density and calculate the pH value of honey by digital pH meter. (NOSFIC/N94236)
11. Perform collection of Pollen, Propolis, royal jelly, bee wax and study their properties. (NOS: FIC/N9437)
12. Perform operation of nozzle filling and bottling machines, labelling and induction sealing and capping machine. (NOS : FIC/N9438)
13. Apply the knowledge of basic and advanced adulterations in honey as per the Standards of FSSAI. (NOS: FIC/N9439)
14. Perform maintenance & cleaning of honey processing equipment and processing area. (NOS: FIC/N9440)

6. ASSESSMENT CRITERIA

LEARNING OUTCOMES	ASSESSMENT CRITERIA
1. Identify the source of honey and perform sampling of honey. (NOS: FIC/N9427)	Explain Storage of Nectar & its conversion to honey.
	Process of Extraction of Honey from beehives.
	Report of honey processing plant visit.
	Draw out Sample of Honey for visual inspection.
	Explain the Hygienic conditions of vehicle and plant.
2. Carry out visual inspection of honey, Sensory evaluation and Quality analysis of honey according to FSSAI standards. (NOS: FIC/N9428)	Sensory Evaluation of quality of honey for flora identification by tasting.
	Carry out Physico-chemical analysis of honey.
	Check for Fermentation and crystallization of honey.
	Apply FSSAI standards of quality evaluation of honey.
3. Operate the honey processing equipment like Liquefaction equipment, filters, moisture reduction equipment, pasteurizers and homogenizers. (NOS: FIC/N9429)	Perform Liquefaction of honey.
	Straining and Filtration of honey.
	Demonstrate moisture reduction by using equipment.
	Demonstrate pasteurizers.
	Carry out packaging of honey.
4. Determine the moisture content for grading of honey. (NOS: FIC/N9430)	Determine the moisture content in Honey.
	Use Abbey`s moisture meter to check the moisture content
5. Analyse the colour of honey with the help of colorimeter. (NOS: FIC/N9431)	Perform colour analysis of honey.
6. Differentiate between processed and unprocessed	Determine HMF content in honey.
	Differentiate between processed and unprocessed honey.

honey by determining the HMF content of honey. (NOS: FIC/N9432)	
7. Determine the amount of total reducing sugars and non reducing sugar content in honey. (NOS: FIC/N9433)	Determine total reducing sugars in honey.
	Determine the Sucrose content in honey.
8. Determine the fructose to glucose ratio in honey and calculate the acidity of honey by the process of titration against base solution. (NOS: FIC/N9434)	Determine Fructose: Glucose ratio in honey.
	Carry out titration process and check the result
	Determine Total acidity in honey.
9. Determine the effect of heat processing for poor or rich enzyme activity in honey. (NOS: FIC/N9435)	Determine enzyme activity like Diastase in honey.
10. Determine the density of honey by optical rotation and check the colour density and calculate the pH value of honey by digital pH meter. (NOS: FIC/N9436)	Determine optical rotation of honey.
	Determine the pH of honey.
11. Perform collection of Pollen, Propolis,	Collect Pollen, Propolis and royal jelly.
	Separate Bee wax from raw honey.

royal jelly, bee wax and study their properties. (NOS: FIC/N9437)	
12. Perform operation of nozzle filling and bottling machines, labeling and induction sealing and capping machine. (NOS: FIC/N9438)	Use of food grade quality bottles or any other containers or packing material of food grade quality.
	Demonstrate bottling where the tip of funnel should touch the bottle and should remain submerged in honey to check the air trapping.
	Check that Bottled honey should be free of air bubbles or any foreign particles and the containers must be spotlessly clean.
	Carry out induction sealing of the filled bottles.
	Carry out capping of the bottles through automated machine.
	Select labels that are attractive and help in effective marketing of honey.
13. Apply the knowledge of basic and advanced adulterations in honey as per the Standards of FSSAI. (NOS: FIC/N9439)	Check the differentiations between pure honey and sugar syrup.
	Check honey adulteration by applying Stable carbon isotope ratio analysis and NMR technique.
	Compliance to Prevention of Food Adulteration Rules (PFA), which is a mandatory standard.
	Adhere to Bureau of Indian Standards (BIS) norms for adulterations in extracted honey.
14. Perform maintenance & cleaning of honey processing equipment and processing area. (NOS: FIC/N940)	Clean the hive following the sequence: roof, super chamber, brood chambers and bottom board.
	Check equipment free from any defects to make sure that honey produced is the best in every way.
	Clean equipment free from any dirt and diseases.
	Use detergents to wash the equipment properly after every use.
	Use sanitizers to disinfect the equipment and plant.

7. TRADE SYLLABUS

SYLLABUS FORHONEY PROCESSING TECHNICIAN TRADE			
DURATION: SIX MONTHS			
Duration	**Reference Learning outcome**	**Professional Skills (Trade Practical) With Indicative Hours**	**Professional Knowledge (Trade Theory)**
Professional Skill 42 hrs Professional Knowledge 12 Hrs	Identify the source of honey and perform sampling of honey. (NOS: FIC/N9427)	1. Visit to APIARY. (16 Hrs) 2. Industrial visit of honey processing plant. (16 Hrs) 3. Drawing out Sample of Honey. (10 Hrs)	Types of Hives, Species of Bees, Storage of Nectar and its conversion to honey, Extraction of Honey, Definition of honey, Blossom Honey, Honeydew honey, Cream honey, Crystallization of honey, Properties of honey products, Basic concepts of Honey farming. Other bee products, propolis, pollen and royal jelly. Medicinal properties of honey and other bee products and its application in various food and pharmaceutical. Receiving of raw honey, Condition and kind of the honey buckets, Capacity of the bucket, Hygienic conditions of vehicle and

			plant, Sampling techniques of honey, Sample storage for traceability.(12 hrs)
Professional Skill 42 hrs Professional Knowledge 12 Hrs	Carry out visual inspection of honey, Sensory evaluation and Quality analysis of honey according to FSSAI standards. (NOS: FIC/N9428)	4. Sensory Evaluation of honey for flora identification. (14 Hrs) 5. Physico-chemical of analysis of honey. (14 Hrs) 6. Fermentation and crystallization of Honey.(14 Hrs)	Identification of Honey by, organoleptic analysis Appearance, Taste and smell), Visual inspection of fermentation by smell and bubble formation, to ascertain the composition of honey. FSSAI standards of quality evaluation of honey. (12 hrs)
Professional Skill 42 hrs Professional Knowledge 12 Hrs	Operate the honey processing equipment like liquefaction equipment, filters, pasteurizers and homogenizers. (NOS: FIC/N9429)	7. Liquefaction of honey. (07Hrs) 8. Straining and Filtration of honey. (10 Hrs) 9. Practical demonstration moisture reduction equipment.(11 Hrs) 10. Practical Demonstration of pasteurizers.(07 Hrs) 11. Packaging of honey.(07 Hrs)	Equipment used in honey processing, filters, Vacuum Evaporators, pasteurizers, Settling Tanks, Different types of packaging material for honey and packaging machines. (12 hrs)
Professional Skill 21 hrs Professional Knowledge 06 Hrs	Determine the moisture content for grading of honey. (NOS: FIC/N9430)	12. Determination of moisture content in Honey.(21 Hrs)	Effect of moisture content on quality of honey, Abbeys refractometer. (06 Hrs)
Professional Skill 21 hrs Professional Knowledge 06 Hrs	Analyse the colour of honey with the help of colorimeter. (NOS: FIC/N9431)	13. Colour analysis of honey. (21 Hrs)	Colour of honey, Relation of colour and flora of honey, category of honey on the basis of colour. pfund units and its relation with colour of honey. (06 Hrs)

Professional Skill 21 hrs Professional Knowledge 06 Hrs	Differentiate between processed and unprocessed honey by determining the HMF content of honey. (NOS: FIC/N9432)	14. Determination of HMF content in honey.(21 Hrs)	Hydroxy methyl Furfural Content of honey, Relation of HMF with Heat treatment of honey. Maximum limit allowed in honey according to FSSAI. (06 Hrs)
Professional Skill 21 hrs Professional Knowledge 06 Hrs	Determine the amount of total reducing sugars and non-reducing sugar content in honey. (NOS: FIC/N9433)	15. Determination of total reducing sugars in honey.(10 Hrs) 16. Determination of Sucrose content.(11 Hrs)	Basic introduction to Carbohydrates, Reducing sugar, non-reducing sugars, Maximum limit of sucrose and minimum amount of apparent sugars allowed in honey according to FSSAI. (06 Hrs)
Professional Skill 42 hrs Professional Knowledge 12 Hrs	Determine the fructose to glucose ratio in honey and calculate the acidity of honey by the process of titration against base solution. (NOS: FIC/N9434)	17. Determination of Fructose Glucose ratio in honey.(21 Hrs) 18. Determination of Total acidity in honey.(21 Hrs)	To understand the concept of crystallization. Effect of acidity on fermentation of honey. (12 hrs)
Professional Skill 21 hrs Professional Knowledge 06 Hrs	Determine the effect of heat processing for poor or rich enzyme activity in honey. (NOS: FIC/N9435)	19. Determination of Diastase activity in honey.(21 Hrs)	Effect of heat processing on honey enzymatic activity and freshness of honey. (06 Hrs)
Professional Skill 42 hrs Professional Knowledge 12 Hrs	Determine the density of honey by optical rotation and check the colour density and calculate the pH value of honey by digital pH meter. (NOS: FIC/N9436)	20. Determination of optical rotation of honey.(21 Hrs) 21. Determination of pH of honey.(21 Hrs)	Relationship of optical rotation of honey and its composition and origin. Effect of pH levels on honey quality. (12 hrs)
Professional Skill 21 hrs	Perform collection of Pollen, Propolis, royal jelly, bee wax and	22. Collection of Pollen, Propolis and royal jelly.(11 Hrs)	Utilization and Economic importance of other bee products like Royal Jelly,

Professional Knowledge 06 Hrs	study their properties. (NOS: FIC/N9437)	23. Separation of Bee wax from raw honey.(10 Hrs)	Pollens, Propolis, Bee Wax. (06 Hrs)
Professional Skill 21 hrs Professional Knowledge 06 Hrs	Perform operation of nozzle filling and bottling machines, labeling and induction sealing and capping machine. (NOS: FIC/N9438)	24. Practical demonstration of honey filling machine.(07 Hrs) 25. Practical demonstration of labelling machine.(07 Hrs) 26. Practical demonstration of Induction sealing and capping machine.(07 Hrs)	Bottling, Packaging and labelling of honey. (06 Hrs)
Professional Skill 42 hrs Professional Knowledge 12 Hrs	Apply the knowledge of basic and advanced adulterations in honey as per the Standards of FSSAI. (NOS: FIC/N9439)	27. Syrups from C3 and C4 Plants.(14 Hrs) 28. Practical differentiations between pure honey and sugar syrup.(14 Hrs) 29. Stable carbon isotope ratio analysis and NMR technique to check honey adulteration.(14 Hrs)	Adulteration in honey by Glucose syrup, fructose Syrup, Rice Syrup, Cone syrup. Standards of FSSAI to identify the adulteration in honey. (12 hrs)
Professional Skill 21 hrs Professional Knowledge 06 Hrs	Perform maintenance & cleaning of honey processing equipment and processing area. (NOS: FIC/N940)	30. Use detergents and sanitizers used for cleaning of equipment and plant. (21 Hrs)	Preparation and concentration of different detergents and sanitizers. Cleaning techniques of equipments and plants. Types of detergents and sanitizer used for cleaning of equipments and plant.(06 Hrs)
Project Work			
Revision & Examination			

SYLLABUS FOR CORE SKILLS
1. Employability Skills (Common for all CTS trades) (60 Hrs)

Learning outcomes, assessment criteria, syllabus and Tool List of Core Skills subjects which is common for a group of trades, provided separately in www.bharatskills.gov.in / dgt.gov.in

List of Tools & Equipment			
HONEY PROCESSING TECHNICIAN (For batch of 24 Candidates)			
S No.	**Name of the Tools and Equipment**	**Specification**	**Quantity**
A. EQUIPMENT, MACHINE & TOOLS			
1.	Honey Heating tank double jacket with agitator	Capacity 100 Kg	1 no
2.	Pre Filter	60 mesh	1 no
3.	Vacuum Evaporator (For moisture reduction)	100 liters of honey	1 no
4.	Cooling Condenser	5 Tr.	1 no
5.	Raw Storage Tank	Capacity 100 Kg	1 no
6.	Micron Filter	5 micron	1 no
7.	Finished Product Storage Tank	Capacity 100 Kg	1 no
8.	Hot Water Tank with water heaters	Capacity 30 Litre	1 no
9.	Cold Water Tank	Capacity 10 Litre	1 no
10.	Vacuum Pump With Motor,	2 HP Motor	1 no
11.	Honey Transfer Screw Pump Motor	2 HP Motor	1 no
12.	Cold Water Circulation Pump	0.5 HP	1 no
13.	Hot Water Circulation Pump	0.5 HP	1 no
14.	Electric Panel With Temperature indicators	0 - 350 degree Celsius	1 no
15.	UV- Visible Spectrophotometer	Latest Configuration	1 no
16.	Elisa Micro-plate Reader	Latest Configuration	1 no
17.	Centrifuge	Rotor capacity 16x15 ml, no of tubes 16, Angle Rotor head type, Max speed 5250 RPM, 220-240 Volts 50Hz Single Phase	1 no
18.	Nitrogen Evaporator	Test Tube type round surface, Water tank capacity 6.5 litre not over flow, dimension 30 cm x 40cm x 55cm, Laboratory grade nitrogen gas supply, inlet pressure 60 PSI-100PSI,Exhaush duct outlet.	1 no
19.	Electric Heating Plate(605 x 605mm) (300x455mm)	Temperature controller Temperature range up to 350°C	01 each
20.	Multi Tube Vortex	Speed 500-2500 rpm, with time setting and input	01 no

		power 60 W, Outer dimension 426 x 250 x 480 mm.	
21.	Magnetic Stirrer	Stirring Capacity 2-5 litre, heating capacity 300-500 watts, Stirring Paddle PTFE Coated	01 no
22.	Distillation Unit	Double distillation Assembly	01 no
23.	Refractometers (Pocket)	0-32,28-62,58-920 Brix Sugar Scale	2 no/each
24.	pH Meter (Latest configuration)	Digital	2 no
25.	Thermometer	Digital	4 no
26.	Crown corking machine.	Hand operated	1 no
27.	Weighing balance of different size	Digital	1 each
28.	Refrigerator double door	200 litre (Branded)	1 no
29.	HPLC system for analysis of different samples	Specifications: • Computer controlled High Performance liquid chromatograph system equipped with a Isocratic Pump, Autosampler, Column Compartment, Refractive Index Detector, Chromatography Software and column for Sugar profiling/ Analysis • high-performance ligand-exchange chromatography column for the analysis of sugars, sugar alcohols, and organic acids. • Isocratic Pump, maximum pressure 600 bar includes, column, connecting capillaries, solvent cabinet, solvent bottles, and CAN cable • Integrated 2-channel Degasser and solvent	1 no

		selection valve • superficially porous microparticulate column packing • Vial sampler for use up to 600 bar includes 100 µL metering device and a 100 µL sample loop plus integrated needle. • Standard drawer (6 x 11 vials) • Integrated column compartment for up to 2 columns with 6 µL heater volume; capillaries for standard analytical flow rates up to 5 mL/minute and higher recommended for routine analysis. • Refractive index detector up to 72 Hz data rate, with integrated 8 µL standard flow cell. • Solvent Selection Valve: Solvent Selection Valve for automatic switching between analysis and washing or Suitable arrangement as per system requirement • Column Capacity: 2 Columns of up to 250 mm length. • PC and Standard Licensed Chromatography Software with original CDs based on latest Windows version capable of controlling the entire HPLC system, data acquisition, analysis & storage.	

30.	Auto claves with Automatic temperature & Pressure controller with safety valve. Made up of stainless steel	Double walled, Inner Chamber i.e. boiler, outer chamber made of Stainless Steel. Lid is made of thick Stainless Steel tightened by Radial locking system with neoprene. With paddle lifting device to open or to close the lid. Fitted with water level indicator, pressure gauge, steam release cock, safety valves, spring loaded safety valves etc. Autoclave can be set at any pressure in between 5 to 22 P.s.i. Provided with drain valve to emptying the autoclave and mostly it is operated on 15 psi. Provided with PRESSURE CONTROL DEVICE (PIEZOSTAT) Provided with SS Basket.	1 no
31.	Hot Air Oven	Temp (0-250 C) digital Display, with auto temperature controller, suitable insulated, fans , Heating elements.	1 no
32.	Bottle Stand	For 1 gross bottle	4 no
33.	Baby Boiler/Diesel fuel/capacity of boiler as per capacity of equipments required steam.	Fully Automatic Steam pressure : 10.5-15.0Kg/cm2g Time required to produce steam : 5 – 10 min. Fuel used : HSD Efficiency : 84% + 2 Technology : Reversed flame Heat recovery device : Built in Membrane wall design : Yes Unique economizer and optimizer : Yes Special circulation type burners : Yes	1 no

		Power coated well-lit control panel : Yes Built in ladder : Yes Total connected load : 2.3 KW Burner Control : Automatic Safety : Warning alarm, lockout MCB Ignition : Auto	
34.	Abbeys Moisture meter	Latest configuration	1 no
35.	Conduuctivity meter	Latest configuration	1 no
36.	Honey colorimeter	Latest configuration in pfund value	1 no
37.	Lidding machine	For lidding of Glass (Jar/bottles)	1 no
38.	Moisture box: Aluminium,	100gm capacity.	1 no
39.	Bottle/Jar filling machine	For Filling of Honey, made up of stainless steel.	1 no
40.	Continuous water supply	Water Supply in Lab	As per requirement
41.	Computer/laptop for Faculty with Internet Connection with, colour Printer and photo copy Scanner	Latest Configuration	1 no
42.	LED multimedia Projector	Latest Configuration	1 no
43.	UPS 650 VA	Latest Configuration	1 no
B. CONSUMABLES TOOLS, CHEMICALS & ITEMS			
44.	Beaker	50ml	As per Requirement
45.	Beaker	100ml	As per Requirement
46.	Beaker	250ml	As per Requirement
47.	Beaker	500ml	As per Requirement
48.	Beaker	1000ml	As per Requirement
49.	Vol. flak	25 ml	As per Requirement
50.	Vol. flak	50 ml	As per Requirement
51.	Vol. flak	100 ml	As per Requirement
52.	Vol. flak	250 ml	As per Requirement
53.	Vol. flak	500 ml	As per Requirement
54.	Vol. flak	1000 ml	As per Requirement
55.	Con. Flask	250 ml	As per Requirement
56.	Sto. Flask	250 ml	As per Requirement
57.	Measuring cylinder	5 ml	As per Requirement
58.	Measuring cyl.	10 ml	As per Requirement
59.	Measuring cyl.	25 ml	As per Requirement
60.	Measuring cyl.	50 ml	As per Requirement

61.	Measuring cyl.	100 ml	As per Requirement
62.	Measuring cyl.	250 ml	As per Requirement
63.	Measuring cyl.	500 ml	As per Requirement
64.	Measuring cyl.	1000 ml	As per Requirement
65.	Pipette	1 ml	As per Requirement
66.	Pipette	5 ml	As per Requirement
67.	Pipette	10 ml	As per Requirement
68.	Pipette	25 ml	As per Requirement
69.	Test tube	15 ml	As per Requirement
70.	Test tube	27 ml	As per Requirement
71.	Test tube co.	54 ml	As per Requirement
72.	Funnel-1		As per Requirement
73.	Funnel-2		As per Requirement
74.	Burette	10ml	As per Requirement
75.	Burette	50ml	As per Requirement
76.	Burette	100ml	As per Requirement
77.	Wash bottle	250	As per Requirement
78.	Wash bottle	500	As per Requirement
79.	Reagent Bottle	100ML	As per Requirement
80.	Reagent Bottle	250ML	As per Requirement
81.	Reagent Bottle	500ML	As per Requirement
82.	Reagent Bottle	1000ML	As per Requirement
83.	Spatula-1 small		As per Requirement
84.	Spatula-2		As per Requirement
85.	Glass road		As per Requirement
86.	Culter Petri Dish		As per Requirement
87.	Silica Dish		As per Requirement
88.	Watch Glass		As per Requirement
89.	Moter-Pestle		As per Requirement
90.	Beaker	50ml	As per Requirement
91.	Beaker	100ml	As per Requirement
92.	Copper Sulphate(Cupric Sulpate)		As per Requirement
93.	Potassium Sodium tartrate		As per Requirement
94.	Sodium Hydroxide		As per Requirement
95.	Hydrochloric Acid		As per Requirement
96.	Methylene Blue Indicator		As per Requirement
97.	Sucrose		As per Requirement
98.	Sodium Carbonate		As per Requirement
99.	Felling A		As per Requirement
100.	Felling B		As per Requirement

101.	Iodine sol		As per Requirement
102.	Sulphuric Acid		As per Requirement
103.	Sodium Thiosulphate		As per Requirement
104.	Resorcinal		As per Requirement
105.	Barbutaric Acid		As per Requirement
106.	p-Toluidine		As per Requirement
107.	Isopropanol(PROPAN-2-OL)		As per Requirement
108.	Glacial Acetic Acid		As per Requirement
109.	Sodium Chloride		As per Requirement
110.	Hydrochloric Acid Sol (N/10)		As per Requirement
111.	nHexane		As per Requirement
112.	Acetonitrile		As per Requirement
113.	Diethye Ether		As per Requirement
114.	Glyceral		As per Requirement
115.	Ethanol		As per Requirement
116.	Potassium Iodide		As per Requirement
117.	Sodium Tungstate		As per Requirement
118.	Ultra Pure Water		As per Requirement
119.	Ethye Acetate		As per Requirement
120.	Sodium Acetate		As per Requirement
121.	N,N-Dimethylformamide		As per Requirement
122.	Silica Gel		As per Requirement
123.	Starch		As per Requirement
124.	ANILINE		As per Requirement
125.	Formaldihide		As per Requirement
126.	Methanol		As per Requirement
127.	Olive oil		As per Requirement
128.	Benedicts Reagent		As per Requirement
129.	Phenolphthalein Indicater		As per Requirement
130.	Ec Standard		As per Requirement
131.	Ninhydrine Solution		As per Requirement
132.	Ninhydrine Powder		As per Requirement
133.	Phloroglucinol		As per Requirement
134.	FORMIC ACID		As per Requirement
135.	Copper Sulphate(Cupric Sulpate)		As per Requirement
136.	Potassium Sodium tartrate		As per Requirement
C. FURNITURE			
137.	Instructor Chair & Table with Glass		01 no
138.	Magnetic White Board		01 no
139.	Display Board		01 no

140.	Table for computer/printer/scanner with chair		01 no
141.	Dual Desk		10 no

ABBREVIATIONS

CTS	Craftsmen Training Scheme
ATS	Apprenticeship Training Scheme
CITS	Craft Instructor Training Scheme
DGT	Directorate General of Training
MSDE	Ministry of Skill Development and Entrepreneurship
NTC	National Trade Certificate
NAC	National Apprenticeship Certificate
NCIC	National Craft Instructor Certificate
LD	Locomotor Disability
CP	Cerebral Palsy
MD	Multiple Disabilities
LV	Low Vision
HH	Hard of Hearing
ID	Intellectual Disabilities
LC	Leprosy Cured
SLD	Specific Learning Disabilities
DW	Dwarfism
MI	Mental Illness
AA	Acid Attack
PwD	Person with disabilities


कौशलं बलम्