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

COMPETENCY BASED CURRICULUM

TEXTILE WET PROCESSING TECHNICIAN

(Duration: Two Years)
Revised in July 2022

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 4

SECTOR –TEXTILE AND HANDLOOM

Directorate General of Training

TEXTILE WET PROCESSING TECHNICIAN

(Engineering Trade)

(Revised in July 2022)

Version: 2.0

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 4

Developed By

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

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1. COURSE INFORMATION

During the two-year duration of Textile Wet Processing Technician trade, a candidate is trained on Professional Skill, Professional Knowledge, Engineering Drawing, Workshop Calculation & Science and Employability Skill related to job role. In addition to this, a candidate is entrusted to undertake project work and extracurricular activities to build up confidence. The broad components covered under Professional Skill subject are as below:-

FIRST YEAR – During this year the candidates will acquire the skill on identifying various types of hand tools, observe the safety precautions during filing, marking, punching and drilling practices. He will be aware of various types of gauges, types of lathes and its functions. Turning tool, grinding tool setting and job setting, facing and chamfering, plain turning etc. He will also develop skill on various types of welding and welding process. He will apply range of skill to execute different carpentry work. He will also identify different electrical and electronic measuring instruments and test electrical assembly. The candidates will be familiar with institution, observe the safety precaution during performing various jobs. They will recognize different raw materials, properties and machinery equipment used in the trade. Trainees will develop analytical skills related to the testing of water quality and efficiency of wetting agent. Identify various types of fibers and various lubricants used for different parts of the machineries, machineries used for finishing of various functional processes and maintenance of general observation. They will also develop skill on various chemical preparatory processes carried out for yarn and grey cloth. Wash and dry different textiles and machineries used for washing and drying processes. Trainees will be able to recognize damages after preparatory process using various methods of detection and prevention. They will also develop skill on starching of fabric, chemical softening biochemical/enzyme assisted processes carried for textile fabrics.

SECOND YEAR – In this year the trainees will run a model effluent treatment plant with chemical dosing, filtration and aerations with situation of clear choice& calculations of steam energy. They will Plan and execute the operation of boiler. They will also identify, select the dyeing process and troubleshoot various machineries involved. The trainees will Select and organize the dyeing process of wool, silk, flax and jute with suitable dyes using appropriate machines with situation of clear choice. They will Plan and execute the working method of screen printing machines. They will be also able to Troubleshoot and maintain the electronic controller used in dyeing and printing machine using appropriate rules & tools.

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.

The Textile Wet Processing Technician trade under CTS is one of the popular newly designed courses delivered nationwide through a network of ITIs. The course is of two-year duration. It mainly consists of Domain area and Core area. The Domain area (Trade Theory & Practical) imparts professional skills and knowledge, while Core area (Workshop Calculation science, Engineering Drawing and Employability Skills) imparts requisite core skill & knowledge and life skills. After passing out of the training programme, the trainee is awarded National Trade Certificate (NTC) by DGT which is recognized worldwide.

Trainee broadly needs to demonstrate that they are able to:

- Read & interpret technical parameters/documentation, 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 knowledge, core skills & employability skills while performing the job, and repair & maintenance work.
- Check the job with circuit diagrams/components as per drawing for functioning, diagnose and rectify faults in the components/module.
- Document the technical parameters in tabulation sheet related to the task undertaken.

2.2 PROGRESSION PATHWAYS:

- Can join industry as Technician 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 take admission in the diploma course in notified branches of Engineering by lateral entry.

- Can join Apprenticeship programs in different types of industries leading to a National Apprenticeship certificate (NAC).
- Can join Crafts Instructor Training Scheme (CITS) in the trade for becoming an 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 two-years: -

S No.	Course Element	Notional Training Hours	
		1st Year	2nd Year
1	Professional Skill (Trade Practical)	840	840
2	Professional Knowledge (Trade Theory)	240	300
5	Employability Skills	120	60
	Total	**1200**	**1200**

Every year 150 hours of mandatory OJT (On the Job Training) at nearby industry, wherever not available then group project is mandatory.

4	On the Job Training (OJT)/ Group Project	150	150

Trainees of one-year or two-year trade can also opt for optional courses of up to 240 hours in each year for 10th/ 12th class certificate along with ITI certification, or, add on short term courses.

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. 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 is being notified by 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 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 assessment:

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 skill in the use of hand tools, machine tools and workshop equipment. • 60-70% accuracy 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) 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 in the use of hand tools, machine tools and workshop equipment. • 70-80% accuracy 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) 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 in the use of hand tools, machine tools and workshop equipment. • Above 80% accuracy 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.

3. JOB ROLE

Brief description of job roles:

Singeing Machine Man/Singeing Machine Operator; tends singeing machine to burn fluff and rough protruding fibers on cloth to get better finish. Adjusts cloth roll at feed-end of machine. Runs loose end of cloth through guides and feeds it through rollers. Lights burners in machine and regulates flow of gas to obtain desired flame. Starts machine and observes cloth as it runs over burner flames. Avoids scorching of cloth, ensuring burning of fluff and unwanted threads and better finish to it. Adjust machine where necessary for creaseless flow and proper singeing of cloth. Cleans and oils machine.

Stentering Machine Man/Stentering Operator; Tenter Machine Man; Tentering Machine Man (Textile) tends stentering machine or frame which dries and restores original width of cloth after dyeing, washing or finishing. Adjusts stenter frames according to width of cloth. Starts machine. Ensures that cloth passes through machine without damage from stenter clips and is properly stretched. May be known as ASSISTANT STENTERING MACHINE MAN or BACK STENTERING MACHINE MAN if working at delivery end of machine. Cleans and oils machine.

Jigger Man (Cotton Textile)/Jigger Machine Operator; dyes cloth by operating jigger machine. Fits undyed cloth rolls on machine and passes one end of rolled cloth carefully through vat on to other roller for making rolls of dyed cloth. Prepares dyeing solution of required shade, pours it into jigger vat and ensures that cloth passing through vat is completely dipped in dyeing solution. Starts machine. Allows undyed cloth to unroll from roller, pass through colouring solution in jigger vat to get dyed and then get rolled on other roller. Takes proper care to maintain temperature and level of dye liquor and ensures proper dyeing of cloth without spots and creases. Gets sample of dyed cloth approved. Cleans and oils jigger machine. May operate automatic or ordinary jigger machine.

Padding Machine Man/Padding Mangle Operator; tends padding machine for treating cloth with light preliminary coat of dye or chemicals preparatory to further processing. Mounts cloth roll on machine and passes loose end of cloth through guide-rollers and trough to roller at opposite side. Pours dye or chemical solution into trough of machine and ensures that cloth is completely dipped in it. Opens steam valve to heat dye or chemical solution to required temperature. Starts machine. Adjusts pressure on rollers and ensures smooth flow of cloth through solution on to roller at opposite side. Cleans and oils machine. May rinse dyed material and pass it on to Drier for further processing.

Kierman (Textile)/Package Dyeing Machine Operator; tends kier (vat for boiling yarn or cloth) for bleaching and dyeing. Puts chemicals in tanks and lets in water and opens steam to boil chemical solution. Puts cloth or yarn into kier with help of Piler ensuring that cloth or yarn is properly piled. Closes and secures mouth of kier and pumps chemical solution from tank into kier. Checks level and circulation of solution, controls temperatures and pressure in kier and ensures that yarn or cloth is properly boiled.

Printing Master (Textile); organize, direct and supervise printing of cloth in various designs ensuring quality, output and smooth running of printing department. Arrange for supply of necessary chemicals and dyes. Check mixing of colours in required proportions for printing purpose. Examine printed sample to check its quality and carries out chemical tests to ensure its fastness. Ensure regular supply or required quantity of cloth for printing in their department. Get printing rollers with required engraving of pattern fitted in printing machines. Supervises work of Printers, Textile to ensure quality output. Maintains record of job orders completed, and batches of colours used. May check operations of printing machines to ensure optimum output and may make arrangements for repair of defects in machines or replacements of parts.

Reference NCO-2015:

(i) 8154.2700 – Singeing Machine Man/Singeing Machine Operator
(ii) 8154.2100 – Stentering Machine Man/Stentering Operator
(iii) 8154.1000 – Jigger Man (Cotton Textile)/Jigger Machine Operator
(iv) 8154.2300 – Padding Machine Man/Padding Mangle Operator
(v) 8154.0200 – Kierman (Textile)/Package Dyeing Machine Operator
(vi) 2141.1700 – Printing Master (Textile)

Reference NOS: -

i) TSC/N5702
ii) TSC/N9015
iii) TSC/N5703
iv) TSC/N5108
v) TSC/N5214
vi) TSC/N5215
vii) TSC/N5216
viii) TSC/N5410
ix) TSC/N5411
x) TSC/N5107
xi) TSC/N5412
xii) TSC/N5413
xiii) TSC/N5414
xiv) TSC/N5415
xv) TSC/N5416
xvi) TSC/N5417
xvii) TSC/N5418
xviii) TSC/N5220
xix) TSC/N5221
xx) TSC/N5222
xxi) TSC/N5223
xxii) TSC/N5224
xxiii) TSC/N9401
xxiv) TSC/N9402
xxv) TSC/N9409
xxvi) TSC/N9410
xxvii) TSC/N9411
xxviii) TSC/N9412
xxix) TSC/N9413
xxx) TSC/N9414

4. GENERAL INFORMATION

Name of the Trade	**TEXTILE WET PROCESSING TECHNICIAN**
Trade Code	DGT/1077
NCO - 2015	8154.2700, 8154.2100, 8154.1000, 8154.2300, 8154.0200, 2141.1700
NSQF Level	Level-4
NOS Covered	TSC/N5702, TSC/N9015, TSC/N5703, TSC/N5108, TSC/N5214, TSC/N5215, TSC/N5216, TSC/N5410, TSC/N5411, TSC/N5107, TSC/N5412, TSC/N5413, TSC/N5414, TSC/N5415, TSC/N5416, TSC/N5417, TSC/N5418, TSC/N5220, TSC/N5221, TSC/N5222, TSC/N5223,TSC/N5224,TSC/N9401,TSC/N9402 TSC/N9409, TSC/N9410, TSC/N9411, TSC/N9412, TSC/N9413, TSC/N9414
Duration of Craftsmen Training	Two Years (2400 Hours+300 hours OJT/Group Project)
Entry Qualification	Passed 10th class examination with Science and Mathematics or with vocational subject in same sector or its equivalent.
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 Students)	20 (There is no separate provision of supernumerary seats)
Space Norms	104 Sq. m
Power Norms	8 KW
Instructors Qualification for:	
1. Textile Wet Processing Technician Trade	B.Voc/ Degree in Textile Technology /Textile Chemistry from AICTE/UGC recognized university/ college with one year experience in the relevant field. **OR** 03 years Diploma in Textile Technology/Textile Processing from AICTE recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years Experience in the relevant field. **OR** NTC/NAC passed in the Trade of "Textile Wet Processing Technician" with three years experience in the relevant field. **<u>Essential Qualification</u>:** 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.***
2. Workshop Calculation & Science	B.Voc/Degree in Engineering from AICTE/UGC recognized Engineering College/ university with one-year experience in the relevant field. OR 03 years Diploma in Engineering from AICTE /recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years' experience in the relevant field. OR NTC/ NAC in any one of the engineering trades with three years' experience. **Essential Qualification:** Regular / RPL variants of National Craft Instructor Certificate (NCIC) in relevant trade OR NCIC in RoDA or any of its variants under DGT Regular / RPL variants NCIC in RoDA or any of its variants under DGT
3. Engineering Drawing	B.Voc/Degree in Engineering from AICTE/UGC recognized Engineering College/ university with one-year experience in the relevant field. **OR** 03 years Diploma in Engineering from AICTE / recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years' experience in the relevant field. **OR** NTC/ NAC in any one of the Mechanical group (Gr-I) trades categorized under Engg. Drawing'/ D'man Mechanical / D'man Civil' with three years' experience. **Essential Qualification:** Regular / RPL variants of National Craft Instructor Certificate (NCIC) in relevant trade **OR** Regular / RPL variants of NCIC in RoDA / D'man (Mech /civil) or any of its variants under DGT.
4. 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
5. 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 (TRADE SPECIFIC)

FIRST YEAR

1. Plan and organize the work to make job as per specification applying different types of basic fitting operations and check for dimensional accuracy following safety precautions. *[Basic fitting operations – marking, Hack-sawing, punching, Chiselling, Filing, Drilling, Grinding and job setting]* (TSC/N5702, TSC/N9015)
2. Plan and organize the work to make job on facing, chamfering, plain turning, taper turning and simple thread. (TSC/N5702, TSC/N9015)
3. Plan and identify different types of skill related to sheet metal work and on various types of welding practices like square butt joint, single V butt joint, arc welding and gas welding. (TSC/N5702, TSC/N9015)
4. Apply a range of skill to execute different carpentry work. (TSC/N5702, TSC/N9015)
5. Plan, identify and test on electrical /electronic measuring instruments. (TSC/N5702, TSC/N9015)
6. Observe safety precautions for various practice related to the trade, machines and materials used in each processes. (TSC/N5702, TSC/N9015)
7. Recognize different raw materials, properties and machinery equipment used in the trade. (TSC/N5703, TSC/N9015)
8. Develop analytical skills related to the testing of water quality and efficiency of wetting agent. (TSC/N9409)
9. Identify various types of fibers and apply physical and chemical methods in practice. (TSC/N9410)
10. Develop skill on various chemical preparatory processes carried out for yarn and grey cloth. Washing and drying of different textiles and machineries used for washing and drying. Recognize damages after preparatory process using various methods of detection and prevention. (TSC/N5108, TSC/N5214, TSC/N5215, TSC/N5216, TSC/N5410, TSC/N5411)
11. Develop skill on starching of fabric, chemical softening biochemical/enzyme assisted processes carried over for textile fabrics and Identify machineries used to finishing work of various functional processes. (TSC/N5107, TSC/N5412, TSC/N5413, TSC/N5414, TSC/N5415, TSC/N5416, TSC/N5417, TSC/N5418)

12. Identify various lubricants used for different parts of the machineries and maintenance of these machineries. (TSC/N5702, TSC/N5703, TSC/N9015)
13. Read and apply engineering drawing for different application in the field of work. 13
14. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study(TSC/N9402)

SECOND YEAR

15. Perform running a model effluent treatment plant with chemical dosing and filtration and aerations with situation of clear choice and calculations of steam & energy. (TSC/N9411)
16. Plan and execute the operation of boiler. (TSC/N9412)
17. Identify and select the dyeing process and troubleshoot various machineries involved. (TSC/N5220, TSC/N5221, TSC/N5222)
18. Select and organize the dyeing process of wool, silk, flax and jute with suitable dyes using appropriate machines. (TSC/N9413)
19. Plan and execute the working method of screen printing machines, troubleshoot and test the machinery. (TSC/N5223, TSC/N5224, TSC/N9015)
20. Troubleshoot and maintain the electronic controller used in dyeing and printing machine using appropriate rules & tools. (TSC/N9414)
21. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study(TSC/N9402)

6. ASSESSMENT CRITERIA

LEARNING OUTCOMES	ASSESSMENT CRITERIA
FIRST YEAR	
1. Plan and organize the work to make job as per specification applying different types of basic fitting operations and Check for dimensional accuracy following safety precautions. *[Basic fitting operations – marking, Hack-sawing, punching, Chiselling, Filing, Drilling, Grinding and job setting].* (TSC/N5702, TSC/N9015)	Observe the safety precautions during filing, marking and punching, internal fitting and drilling practice.
	Identify the type of hand tools, care and maintenance during various practices.
	Identify the cutting and measuring tools used for filing, marking and punching practice.
	Identify the types and specifications of drills, cutting angles, tap drills and dies used for internal fitting and drilling.
	Identify the geometrical construction of various types of grinding machine.
	Identify the various types of gauges, uses, care and maintenance.
	Identify the types of lathes, parts and its functions of lathe machinery.
	Identify the specification and different accessories of lathe machinery.
2. Plan and organize the work to make job on facing, chamfering, plain turing, taper turning and simple thread. (TSC/N5702, TSC/N9015)	Select the different types of operations performed in lathe.
	Identify the cutting tool materials, types and selection of cutting angles.
	Select the uses and applications of various types of cutting angles.
	Identify the different types of threads and its application for tapping and dyeing process.
3. Plan and identify different types of skill related to sheet metal work and on various types of welding practices like square butt joint, single V butt joint, arc welding and gas welding. (TSC/N5702,	Identify the various types of hand tools, marking and cutting tools used for sheet metal work.
	Identify soft and hard soldering operations used in sheet metal joint.
	Identify the types of sheets used for folding, notching, wiring and hemming operations.
	Identify the allowances and uses of sheets for folding, notching, wiring and hemming operations.
	Identify the tools, equipments and types of welding joints.
	Identify the various types of welding practices, electrodes and

TSC/N9015)	current selection for the welding process.
	Observe the specifications and safety precautions during welding practice.
	Observe the type of gases, pressure and nozzle selection used in gas welding.
	Perform the edge preparation for arc and gas welding process.
4. Apply a range of skill to execute different carpentry work. (TSC/N5702, TSC/N9015)	Identify the hand and measuring tools, work holding devices used in carpentry.
	Identify the types of clamps, sizes and its uses in carpentry.
	Identify the plan and setting parameters for sharpening.
	Identify the different types of saws, setting parameters and its uses in carpentry.
	Familiar on specifications and uses of wood working machine.
	Identify adhesive types and identify its uses in carpentry.
5. Plan, identify and test on electrical /electronic measuring instruments. (TSC/N5702, TSC/N9015)	Select the different electrical measuring instrument.
	Identify the instruments used for testing.
	Identify the fundamental terms of work power, energy, units, voltage, current resistance, and colour codes.
	Identify the types of cables, standard wire gauge, ohm's law and Kirchoffs law.
	Identify the concepts of series and parallel connection.
	Identify the properties of conductor, semi-conductor and insulator.
	Identify the primary and secondary cells, common electrical accessories and their specification.
	Demonstrate the functioning of domestic appliances.
	Measure and record the data by using the testing instrument like ammeter, voltmeter and multimeter of AC and DC.
6. Observe safety precautions for various practice related to the trade, machines and materials used in each processes. (TSC/N5702, TSC/N9015)	Follow safety precautions related to the trade, machines and materials used in various processes.
	Safe Handling of corrosive chemicals and other materials related to the processes.
	Safe Handling of various machines used in wet processing.
	Safe Handling of electrical installation for machines in the trade.
7. Recognize different raw materials, properties and machinery equipment used in the trade.	Identify different fibre, yarn and fabrics.
	Know the application of various textile fibers.
	Know the various machinery used in the trade.
	Know the different equipments used in the trade.

(TSC/N5703, TSC/N9015)	
8. Develop analytical skills related to the testing of water quality and efficiency of wetting agent. (NOS: TSC/N9409)	Know the various inorganic and organic chemicals used in the processes.
	Know the various kinds of acids, alkalies and salts used in the processes.
	Safe Handling of different chemicals using their commercial names.
	Know the water quality used in processing.
9. Identify various types of fibers and apply physical and chemical methods in practice. (NOS: TSC/N9410)	Know the classification of different textile fibers and blends.
	Carry out physical test methods for identifying different textile fibers.
	Carry out chemical test methods for identifying different textile fibers.
	Know the properties of different textile fibers.
10. Develop skill on various chemical preparatory processes carried out for yarn and grey cloth in practice. Washing and drying of different textiles and machineries used for washing and drying. Recognize damages after preparatory process using various methods of detection and prevention. (TSC/N5108, TSC/N5214, TSC/N5215, TSC/N5216, TSC/N5410, TSC/N5411)	Operate singeing, desizing, scouring and bleaching machinery.
	Inspect grey fabrics and identify basic faults.
	Identity fabric damages in different processes and rectify.
	Know the application of optical brightening agents.
	Know the washing of yarns after preparatory processes.
	Know the washing of fabrics after preparatory processes.
	Washing the yarns and fabrics using suitable washing machines.
	Drying of yarns and fabrics using suitable drying machines.
	Check the fabric faults and quality after shearing, singeing, desizing, scouring, bleaching, mercerizing of cotton materials.
	Check the fabric faults and quality of blended fabrics.
	Check the fabric defects after degumming of silk and scouring of wool.
	Know the various chemicals and auxiliaries used for preparatory process.
11. Develop skill on starching of fabric, chemical softening biochemical/enzyme assisted processes carried over for textile fabrics and Identify machineries used to do	Check the calendaring speed and drying temperature of the starching process.
	Know the type of stentering required for suitable materials.
	Know the ingredients used for softening and stiffening of cotton materials.
	Know the properties and application of enzymes used for bio softening process.
	Know different type of finishing machines for particular

finishing work of various functional processes. (TSC/N5107, TSC/N5412, TSC/N5413, TSC/N5414, TSC/N5415, TSC/N5416, TSC/N5417, TSC/N5418)	process.
	Know the chemicals and auxiliaries used for anti-crease, anti-shrink, waterproof and water repellant, fire retardant finish.
	Know the process sequence and process parameters of heat setting of synthetic and polyester, blended materials.
	Know different types of finishing used for silk and wool fabrics.
	Know the chemicals and auxiliaries used for processing and finishing of linen fabrics.
12. Identify various lubricants used for different parts of the machineries and maintenance of machineries. (TSC/N5702, TSC/N5703, TSC/N9015)	Know the type of lubricants used for wet processing machineries.
	Identification of broken parts of the machine.
	Check the routine maintenance of the machines and record it.
	Know the general schedule of maintenance of various wet processing machineries.
13. Read and apply engineering drawing for different application in the field of work. (NOS: TSC/N9401)	Read & interpret the information on drawings and apply in executing practical work.
	Read &analyze the specification to ascertain the material requirement, tools and assembly/maintenance parameters.
	Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/ parameters to carry out the work.
14. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study(NOS: TSC/N9402)	Solve different mathematical problems
	Explain concept of basic science related to the field of study
SECOND YEAR	
15. Perform running a model effluent treatment plant with chemical dosing and filtration and aerations with situation of clear choice, and calculations of steam and energy. (NOS: TSC/N9411)	Identify the stages of effluent treatment plant.
	Know the chemicals used in effluent treatment process.
	Demonstrate the model effluent treatment plant in laboratory.
	Know the amount of steam and other energy utilized for effluent treatment process.
	Know the water and air pollution parameters
	Know the permissible limits for noise pollution
	Check the eco parameters in the processed fabric

	Know the list of banned azo dyes from the usage of dyeing
	Know the importance of water conservation
16. Plan and execute the operation of boiler. (NOS: TSC/N9412)	Check the water and steam flow to the boilers.
	Carry out the working of boilers.
	Know the consumption of water and heat for steam production.
	Know the calculation of boiler efficiency.
	Identify the methods used for water circulation in boilers.
	Know the different heating and drying systems involved in boilers.
17. Identify and select the dyeing process and troubleshoot various machineries involved. (TSC/N5220, TSC/N5221, TSC/N5222)	Know the dyes used for cotton and other natural fibers.
	Know the method used to prepare dye bath for dyeing.
	Know the conditions used for dyeing.
	Know the dyeing procedure adopted in dyeing of cotton and other natural fibers.
	Identify the dyes preferred for dyeing of synthetic fibers.
	Know the dyeing conditions adopted for dyeing polyester and nylon.
	Demonstrate the dyeing process used for dyeing of synthetic fibers.
	Identify the various operating parts available in jigger and padding mangle.
	Carry out dyeing process with jigger dyeing machine for cotton fabric.
	Know the usage of padding mangle in dyeing of textile fabric.
	Carry out preparation of dye bath for dyeing of cotton fabric.
	Identify the dyes used for natural and synthetic fibers.
	Know the properties of dyes preferred for dyeing of cotton fabric.
	Know the dyeing auxiliaries and conditions preferred for dyeing of textile fabric.
	Demonstrate the working of loose stock dyeing machine.
	Know the material preparation for package dyeing machine.
	Carry out the material loading to package dyeing machine.
	Know the machine particulars used for fibre and package dyeing.
	Know the need for stripping and redyeing of dyed fabric.
	Know the chemicals used for stripping of dyes from dyed fabric.
	Know the precautions followed in redyeing of material.

18. Select and organize the dyeing process of wool, silk, flax and jute with suitable dyes using appropriate machines. (TSC/N9413)	Know the machine particulars used for different materials.
	Know the dyes used for wool, silk, flax and jute.
	Carry out dye bath preparation for dyeing process.
	Know the conditions of the dyeing process.
	Know the machine particulars used for blended materials.
	Know the dyes used for blended fabrics.
	Know the testing methods involved to check color fastness.
	Know the norms and particulars used for testing.
	Carry out testing of color fastness to UV-light and perspiration.
	Know the standards for testing the fabric.
	Know the working principle of dyeing machines.
	Know the material particulars given for dyeing.
19. Plan and execute the working method of screen printing machines, troubleshoot and test the machinery. (TSC/N5223, TSC/N5224, TSC/N9015)	Identify the machine used for printing.
	Know the dyes and ingredients used for printing.
	Carry out print paste preparation for screen printing process.
	Know the conditions of the printing process.
	Know the style of printing.
	Know the quality concepts of printing.
	Prepare fabric for the printing process.
20. Troubleshoot and maintain the electronic controller used in dyeing and printing machine using appropriate rules & tools. (NOS: TSC/N9413)	Know the working concept of Electronic controller.
	Identify the places where Electronic controller is used.
	Carry out controlling operation of temperature and programmer.
	Know the tools and rule used.
	Know the quality parameters of pretreatment process.
	Know the various processes involved in pretreatment process.
	Carry out quality checking of dyed, printed and finished materials.
	Know the quality standards and norms with regard to processing.
21. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS: TSC/N9402)	Solve different mathematical problems
	Explain concept of basic science related to the field of study

7. TRADE SYLLABUS

SYLLABUS FOR TEXTILE WET PROCESSING TECHNICIAN TRADE			
FIRST YEAR			
Duration	**Reference Learning Outcome**	**Professional Skills (Trade Practical) With Indicative Hours**	**Professional Knowledge (Trade Theory)**
Professional Skill 126 Hrs.; Professional Knowledge 27 Hrs.	Plan and organize the work to make job as per specification applying different types of basic fitting operations and Check for dimensional accuracy following safety precautions. *[Basic fitting operations – marking, Hack-sawing, punching, Chiseling, Filing, Drilling, Grinding and job setting]* (Mapped NOS: TSC/N5702, TSC/N9015)	1. Observe the safety precautions during filing, marking and punching, internal fitting and drilling practice. (09 hrs.) 2. Identify the type of hand tools, care and maintenance during various practices. (04 hrs.) 3. Identify the cutting and measuring tools used for filing, marking and punching practice. (08 hrs.) 4. Identify the types and specifications of drills, cutting angles, tap drills and dies used for internal fitting and drilling. (08 hrs.) 5. Identify the geometrical construction of various types of grinding machine. (14 hrs.) 6. Identify the various types of gauges, uses, care and maintenance. (08 hrs.) 7. Identify the types of lathes, parts and its functions of lathe machinery. (14 hrs.) 8. Identify the specification and different accessories of lathe machinery. (04 hrs.) 9. Filing to size and chipping. (04 hrs.) 10. Marking and Punching, Hack	Trade instruction-safety-types of safety workshop safety- Hand Tools safety-personal safety. Hand tools-Types of hand tools- Types of tools used, Vices-specification-uses, care and maintenance. Accident-Prevention-machine men- Industry -Marking tools-calipers- Dividers-Surface plates-Angle plates-Scribers-punches- Surface gauges-Types-Uses, Care & maintenance. Cutting tools-Files-Chisels-Hacksaw blades-Scrapper-Various cutting angles and their uses-care &maintenance. Specification of steels flats & strips-specification steel flats & strips-specification of steel angles -Specification of steel sections. Measuring tools-Precision and non-precision-steel rule calipers- Vernier caliper-micrometer-Vernier Height gauge-depth gauge types-uses and Specification-

		sawing. (08 hrs.) 11. Checking of different surfaces Open fitting of sized metals. (08 hrs.) 12. Scrapping to rough and size. (08 hrs.) 13. Internal Fitting. Drilling & Fitting. (08 hrs.) 14. Grinding practice. (13 hrs.) 15. Snap gauge filing. (08 hrs.)	calibration and setting as per standard. Measurement of angles-Vernier Bevel protractor-Graduation on universal Bevel protractor- Reading of universal Bevel Protractor. Drilling machine types-Drill chuck-specification Drill types – reamer types-various cutting angles-tapes and dies-types - uses-tap drills and dies calculation. Grinding m/c practice types method of drill bit and chisel grinding. Gauges- types- Uses- care & Maintenance - tolerance-limits - fits-definitions & applications. (27 hrs.)
Professional Skill 84 Hrs.; Professional Knowledge 17 Hrs.	Plan and organize the work to make job on facing, chamfering, plain turning, taper turning and simple thread. (Mapped NOS: TSC/N5702, TSC/N9015)	16. Turning Tool grinding tool setting & job setting. (12 hrs.) 17. Facing and chamfering, plain turning. (08 hrs.) 18. Different types of shoulder and small radius turning. (13 hrs.) 19. Taper turning and simple thread forming. (13 hrs.) 20. Select the different types of operations performed in lathe. (13 hrs.) 21. Identify the cutting tool materials, types and selection of cutting angles. (08 hrs.) 22. Select the uses and applications of various types of cutting angles. (13 hrs.) 23. Identify the different types of threads and its application for tapping and dyeing process. (04 hrs.)	Lathe-types-construction-parts - functions-specification. Lathe accessories. Different types of operations performed in lathe. Cutting tools materials-types selection-various cutting angles-uses and applications. Types of threads-application tapping and dyeing process metrics and inch threads. Different process of taper Turning & calculation. (17 hrs.)
Professional	Plan and identify different types of	24. Identify the various types of hand tools, marking and cutting tools	Welding types-Arc Welding-Gas Welding- Welding tools

Skill 42 Hrs.; Professional Knowledge 08 Hrs.	skill related to sheet metal work and on various types of welding practices like square butt joint, single V butt joint, arc welding and gas welding. (Mapped NOS: TSC/N5702, TSC/N9015)	used for sheet metal work. (04 hrs.) 25. Identify soft and hard soldering operations used in sheet metal joint. (04 hrs.) 26. Identify the types of sheets used for folding, notching, wiring and hemming operations. (04 hrs.) 27. Identify the allowances and uses of sheets for folding, notching, wiring and hemming operations. (04 hrs.) 28. Identify the tools, equipments and types of welding joints. (05 hrs.) 29. Identify the various types of welding practices, electrodes and current selection for the welding process. (08 hrs.) 30. Observe the specifications and safety precautions during welding practice. (04 hrs.) 31. Observe the type of gases, pressure and nozzle selection used in gas welding. (04 hrs.) 32. Perform the edge preparation for arc and gas welding process. (05 hrs.)	and equipments Types of welding joints-Electrode and current selection-Specifications and safety precautions Types of gases used in gas welding oxy acetylene flame setting Gas pressure and nozzle selection. Edge preparation for Arc & Gas Welding process. (08 hrs.)
Professional Skill 42 Hrs.; Professional Knowledge 08 Hrs.	Apply a range of skill to execute different carpentry work. (Mapped NOS: TSC/N5702, TSC/N9015)	33. Identify the hand and measuring tools, work holding devices used in carpentry. (04 hrs.) 34. Identify the types of clamps, sizes and its uses in carpentry. (04 hrs.) 35. Identify the plan and setting parameters for sharpening. (08 hrs.) 36. Identify the different types of saws, setting parameters and its uses in carpentry. (06 hrs.) 37. Familiar on specifications and uses of wood working machine. (03 hrs.) 38. Identify adhesive types and its uses in carpentry. (08 hrs.)	Carpentry hand tools-Measuring tools-Work holding devices- Bench vice. Work Bench - Clamps types-sizes - uses- safety methods saws-Plan types- setting Sharpening- Uses etc. Different types of saws-Saw setting-Types of joints-Application –wood working machine- specification and their uses. Adhesives type and uses. (08 hrs.)

		39. Simple mortise and Ten on joints practice. (9 hrs.)	
Professional Skill 126 Hrs.; Professional Knowledge 26 Hrs.	Plan, identify and test on electrical /electronic measuring instruments (Mapped NOS: TSC/N5702, TSC/N9015)	40. Identify the fundamental terms of work power, energy, units, voltage, current resistance, and colour codes. (13 hrs.) 41. Identify the types of cables, standard wire gauge, ohm's law and Kirchoffs law. (13 hrs.) 42. Select the different electrical measuring instrument. (13 hrs.) 43. Soldering practice-Series- Parallel connection Measurement of electrical energy- Multi-meter. (08 hrs.) 44. Identify the properties of conductor, semi-conductor and insulator. (13 hrs.) 45. Identify the primary and secondary cells, common electrical accessories and their specification. (13 hrs.) 46. Demonstration & practice on fixing common electrical accessories. (04 hrs.) 47. Identify the instruments used for testing. (04 hrs.) 48. Testing of domestic appliances-Building layout assemble of small electrical circuits. (04 hrs.) 49. Constructional of calling bell (Electromagnet) Testing. (04 hrs.) 50. Rewinding of electromagnet identification of DC generator. (04 hrs.) 51. Use of Ohmmeter and merger. (04 hrs.) 52. Demonstration and Reading of Electrical Measuring Instruments. (04 hrs.) 53. Testing of active & passive component with suitable meters like Ammeter, Voltmeter & Multimeter. (08 hrs.)	Atom & Atomic structure electrons- Fundamental terms, work, power, energy units voltage- current, resistance colour codes. Types of cables-standard wire Gauge-Ohm's law-Kirchoff s law. Series and parallel connection-Simple problems properties of conductor, semi conductor and insulator. Primary and secondary cells common electrical accessories and their specification. Demonstration and description of domestic appliances. Magnetism and Electro magnetism-simple-Motors Generators - Principles and rules applied. Explanation of electrical measuring instruments - Ammeter-Voltmeter-Wattmeter-Energy meter. Electronic Activities-Passive components- Resistors-Capacitors-inductors-coils-Simple rectifiers, power supply, amplifier-logic gates-Principle of operations (26 hrs.)

		54. Testing of DC & AC Assembly and testing of simple electronic circuits(power supply)Testing of amplifier. (08 hrs.) 55. Measure and record the data by using the testing instrument like ammeter, voltmeter and multimeter of AC and DC. (09 hrs.)	
Professional Skill 21 Hrs.; Professional Knowledge 05 Hrs.	Observe safety precautions for various practice related to the trade, machines and materials used in each processes. (Mapped NOS: TSC/N5702, TSC/N9015)	56. Introduction and Familiarization with the Institute. (10 hrs.) 57. Demonstration of all types of Safety precautions to be taken in practice. (11 hrs.)	Safety precautions related to the trade, machines, materials used in various processes such as under - (i) For steaming, hot air drying, exhaust arrangement, use of gases etc. (ii) Handling of corrosive chemicals and other materials concerned. (iii) Handling of electrical installation for machines in the trade (iv) Introduction and Familiarization and Handling of various machines used for Wet Processing. Fire - hazards and Fire - Extinguisher. (05 hrs.)
Professional Skill 21 Hrs.; Professional Knowledge 05 Hrs.	Recognize different raw materials, properties and machinery equipment used in the trade. (Mapped NOS: TSC/N5703, TSC/N9015)	58. Identify & familiar with different raw materials, properties and machinery equipment used in the trade. (21 hrs.)	Orientation programme for recognizing different fibers, yarns and fabric and then-properties. (05 hrs.)

(Professional Skill 42 Hrs.; Professional Knowledge 07 Hrs.	Develop analytical skills related to the testing of water quality and efficiency of wetting agent. (Mapped NOS: TSC/N9409)	59. Test of hardness and **P**H of water and to find out efficiency of given wetting agent. (21 hrs.) 60. Calculation for use of Water and steam in general. (21 hrs.)	Studies on General utilities. Definition of inorganic chemicals, organic chemicals, acids, alkalies, salts - Use of Oxidizing agents, reducing agents, surfactants, sequestering agents in textile processing with commercial names. **P**H and it's importance in textile processing. Water used for Textile processing and its specification. Water - soft water and hard water, water softening,(07 hrs.)
Professional Skill 42 Hrs.; Professional Knowledge 07 Hrs.	Identify various types of fibers and apply physical and chemical methods in practice. (Mapped NOS: TSC/N9410)	61. Identification of different fibers, physical & chemical methods in practice. (42 hrs.)	Classification of Textile Fibers, description & properties of fibers, cotton, jute, flax, silk, wool, nylon, polyester, acrylic & viscose rayons, Identification of textile fibers & their blends.(07 hrs.)
Professional Skill 147 Hrs.; Professional Knowledge 30 Hrs.	Develop skill on various chemical preparatory processes carried out for yarn and grey cloth in practice. Washing and drying of different textiles and machineries used for washing and drying. Recognize damages after preparatory process using various methods	62. Preparatory Chemical Processing. (10 hrs.) 63. Bleaching of yarn & grey cloth in practice.(10 hrs.) 64. Desizing of cotton.(10 hrs.) 65. Scouring of cotton & wool, Degumming of silk.(15 hrs.) 66. Bleaching –using hypochlorite & per oxide for cotton. (10 hrs.) 67. Per oxide bleaching methods for silk and wool.(21 hrs.) 68. Use of optical whitening Agents.(10 hrs.) 69. Washing &drying of different textiles.(11 hrs.)	Inspection of grey fabric and repairing/mending, stitching and marking, cropping. Study of shearing, Singeing, Desizing, Scouring Bleaching, Mercirizing, souring process for cotton and other textile fibers and their blended materials. Degumming of silk, Scouring of wool etc. Study of various chemicals and auxiliaries involved in bleaching processes. Study of damages during bleaching, their methods of detection by physical methods and their prevention.

	of detection and prevention. (Mapped NOS: TSC/N5108, TSC/N5214, TSC/N5215, TSC/N5216, TSC/N5410, TSC/N5411)	70. Apply various methods of detection and prevention of damages after preparatory process.(28 hrs.) 71. Identify & operate washing &drying machines.(11 hrs.) 72. Identify damages after preparatory process. (11 hrs.)	Use of optical whitening agents. Washing of Yarns/fabrics after desizing / scouring / bleaching using suitable washing machines. Drying of yarns and fabrics. Stentering.(30 hrs.)
Professional Skill 105 Hrs.; Professional Knowledge 22 Hrs.	Develop skill on starching of fabric, chemical softening biochemical/enzyme assisted processes carried over for textile fabrics and Identify machineries used to do finishing of various functional processes. (Mapped NOS: TSC/N5107, TSC/N5412, TSC/N5413, TSC/N5414, TSC/N5415, TSC/N5416, TSC/N5417, TSC/N5418)	73. Chemical Softening of textile fabrics, Wash - n - wear finishing. (Ant crease Finish)Water repellent and water proofing finish.(42 hrs.) 74. Fire retardant and Fire proof finishes. (42 hrs.) 75. Biochemical/ Enzyme assisted softening. (21 hrs.)	Damping, Calendaring, Drying and Preshrinking of cotton. Calendaring & roller coating / grinding &inspection. Ingredients used in softening &stiffening, their properties and application. Bio-polishing or Enzymatic softening. Study of various functional finishing processes and machine used there of: -Anti crease and antishrink finishes, water proofing & water repellency, fire ret ardency and Ore proofing finish. Heat setting process for synthetic or polyester cotton blended fabric. Finishing of silk and woolen fabric like Decatizing, Weighting of silk, Tampering &breaking of silk, Scroopy finish of silk, Carbonization of wool, Milling, Shrink proofing of woollen fabric etc. Moth proofing. Chemical processing & finishing of Linen fabric. B rief idea about Nano finishes & Plasma Technology.

			(22 hrs.)
Professional Skill 42 Hrs.; Professional Knowledge 08 Hrs.	Identify various lubricants used for different parts of the machineries and maintenance of machineries. (Mapped NOS: TSC/N5702, TSC/N5703, TSC/N9015)	76. Lubrication of various parts and machine. (21 hrs.) 77. Maintenance, general observation. (21 hrs.)	i) Lubrication of various parts of machinery, High density oil, Light oil, Heat resistant oil, and grease etc. ii) Runtime maintenance of various processing machines used in bleaching and finishing sections.(08 hrs.)
ENGINEERING DRAWING: (40 Hrs)			
Professional Knowledge ED- 40 Hrs.	Read and apply engineering drawing for different application in the field of work. (Mapped NOS: TSC/N9401)	**<u>ENGINEERING DRAWING:</u>** Introduction to Engineering Drawing and Drawing Instruments – ▪ Conventions ▪ Sizes and layout of drawing sheets ▪ Title Block, its position and content ▪ Drawing Instrument Free hand drawing of – ▪ Geometrical figures and blocks with dimension ▪ Transferring measurement from the given object to the free hand sketches. ▪ Free hand drawing of hand tools. Drawing of Geometrical figures: ▪ Angle, Triangle, Circle, Rectangle, Square, Parallelogram. ▪ Lettering & Numbering – Single Stroke Dimensioning Practice ▪ Types of arrowhead Symbolic representation – ▪ Different symbols used in the Spinning / Textile wet processing / weaving Technician trades. Reading of chemical plant Circuit Diagram Reading of Chemical plant Layout drawing	
WORKSHOP CALCULATION & SCIENCE: (30 Hrs.)			
Professional Knowledge - WCS 30 Hrs.	Demonstrate basic mathematical concept and principles to perform practical	**<u>WORKSHOP CALCULATION & SCIENCE:</u>** **Unit, Fractions** • Classification of unit system • Fundamental and Derived units F.P.S, C.G.S, M.K.S and SI units • Measurement units and conversion • Factors, HCF, LCM and problems	

	operations. Understand and explain basic science in the field of study. (Mapped NOS: TSC/N9402)	• Fractions - Addition, subtraction, multiplication & division • Decimal fractions - Addition, subtraction, multiplication & division • Solving problems by using calculator **Square root, Ratio and Proportions, Percentage** • Square and square root • Simple problems using calculator • Applications of Pythagoras theorem and related problems • Ratio and proportion • Ratio and proportion - Direct and indirect proportions • Percentage • Percentage - Changing percentage to decimal and fraction **Material Science** • Types metals, types of ferrous and non ferrous metals • Physical and mechanical properties of metals **Mass, Weight, Volume and Density** • Mass, volume, density, weight and specific gravity • Related problems for mass, volume, density, weight and specific gravity **Heat & Temperature and Pressure** • Concept of heat and temperature, effects of heat, difference between heat and temperature, boiling point & melting point of different metals and non-metals • Scales of temperature, Celsius, Fahrenheit, kelvin and conversion between scales of temperature • Heat &Temperature - Temperature measuring instruments, types of thermometer, pyrometer and transmission of heat - Conduction, convection and radiation • Thermal conductivity and insulators • Concept of pressure - Units of pressure, atmospheric pressure, absolute pressure, gauge pressure and gauges used for measuring pressure **Basic Electricity** • Introduction and uses of electricity, molecule, atom, how electricity is produced, electric current AC,DC their comparison, voltage, resistance and their units • Conductor, insulator, types of connections - series and parallel • Ohm's law, relation between V.I.R & related problems **Trigonometry** • Measurement of angles • Trigonometrical ratios
Project work / Industrial visit		

SYLLABUS FOR TEXTILE WET PROCESSING TECHNICIAN TRADE			
SECOND YEAR			
Duration	**Reference Learning Outcome**	**Professional Skills (Trade Practical) With Indicative Hours**	**Professional Knowledge (Trade Theory)**
Professional Skill 84 Hrs.; Professional Knowledge 28 Hrs.	Perform running a model effluent treatment plant with chemical dosing and filtration and aerations with situation of clear choice, and calculations of steam and energy. (Mapped NOS: TSC/N9411)	78. Running of a model effluent treatment plant in a laboratory with chemical dosing and filtration and aerations.(42 hrs.) 79. Calculations of energy consumption.(21 hrs.) 80. Calculation for Steam requirement. (21 hrs.)	Awareness about environmental pollution in water/ effluent and air in industry and their control. Working principle of Effluent treatment plant and its running. Water & air pollution parameters and their permissible limits. Noise pollution & it scontrol. Permissible limit of noise in different cases. Health hazards for water, air & noise pollution. Measures for prevention or reduction of level of water/air/noise pollution. Energy saving in Textile Chemical Processing. Awareness about eco friendliness (eco-mark scheme) of textile products. Eco-parameters and their permissible limits for textiles. Ban of certain azo dyes. (28 hrs.)
Professional Skill 42 Hrs.; Professional Knowledge 14 Hrs.	Plan and execute the operation of boiler. (Mapped NOS: TSC/N9412)	81. Demonstration of running of boilers. (30 hrs.) 82. Calculation of water, heat,& steam consumption. (12 hrs.)	Boilers and its efficiency. Efficient, use of steam. Efficient utilization of water & water circulation system. Different heating system and drying system and their efficient uses.(14 hrs.)
Professional Skill 294 Hrs.; Professional Knowledge 99 Hrs.	Identify and select the dyeing process and troubleshoot various machineries involved. (Mapped NOS: TSC/N5220,	83. Dyeing practice in laboratory by beaker dyeing process for the following – (294 hrs.) a) Dyeing with Direct, Basic Sulphur, vat, solubilised vat, azoic	Brief study of Theory of colour. Definitions of Chromophore, Auxochrome, affinity, substantively, exhaustion, Expression, Percentage of Shade, Leveling. Classification of dyes & Pigments, Study of

	TSC/N5221, TSC/N5222)	and reactive dyes on cotton, jute and viscose rayon. b) Dyeing of Polyester, nylon and acrylics with suitable dyes and dyeing machines. c) Dyeing of cotton fabric using jigger machine and padding mangle with vat, solubilised vat and reactive dyes and pigment colours etc. d) Stripping at of dye, redyeing, correction of dyeing defects etc. e) Familiarization with fabric and yarn dyeing machines.	various dyes used for natural and man made fibers and their blends such as Direct, Basic, Sulphur, vat, solubilised vat, azoics, Mordant & Mineral colours, Aniline Black and metal complex acid dyes, disperse dyes, pigment colours, reactive dyes Trouble shooting in dyeing. Dyeing defects and their causes and remedial measures. Introduction to Dyeing machines for loose fibers yarns and their uses. Yarn hank dyeing and yarn package-dyeing machines.(99 hrs.)
Professional Skill 189 Hrs.; Professional Knowledge 64Hrs.	Select and organize the dyeing process of wool, silk, flax and jute with suitable dyes using appropriate machines. (Mapped NOS: TSC/N9413)	84. Dyeing of wool, silk, flax, jute with suitable dyes, using suitable machines.(38 hrs.) 85. Dyeing of different blended textiles.(38 hrs.) 86. Familiarization with fabric dyeing machines.(38 hrs.) 87. Testing of colour fastness properties to different agency.(38 hrs.) 88. Matching of shades (Both manual and by computer aided colour matching instrument). (37 hrs.)	Study of tests for colour fastness for dyed textiles against washing, rubbing, hot ironing, UV-light or sunlight exposure and perspiration etc. Detailed Study of Fibre Dyeing machine like Rotary and package dyeing machines. Yarn Dyeing machines. Fabric dyeing machines like jigger, Padding mangle, winch, soft flow, Air flow and multi flow dyeing machines, Continuous dyeing ranges, beam dyeing machine, HTHP, jet dyeing machine, etc. Brief study of Garment dyeing machines. Study of steaming, soaping and developing for dyeing and after treatment. Manual colour matching and computer aided colour matching. Measurement of colour parameters.(64hrs.)
Professional	Plan and execute	89. Printing of	Definition of Textile Printing.

Skill 189Hrs.; Professional Knowledge 63 Hrs.	the working method of screen printing machines, troubleshoot and test the machinery. (Mapped NOS: TSC/N5223, TSC/N5224, TSC/N9015)	white/coloured fabrics with different dyes/ colorant. (38 hrs.) 90. Direct/Discharge and resist styles of printing by screen printing method.(38 hrs.) 91. Screen making for printing (38 hrs.) 92. Printing defects and Trouble shooting in Printing. (38 hrs.) 93. Familiarization with Printing Machines.(37 hrs.)	Difference between Printing and Dyeing. Fabric requirements for Printing. Methods of Printing and Styles of Printing. Study of various printing machines like roller printing, flat bed printing, rotary screen printing machines. Concept of Transfer printing machine. Brief study of Garment Printing machine. Printing with direct, azoic, vats, pigments and reactive dyes on cotton. Printing with acid dyes/pigment colours on Nylon and with disperse dyes/ pigment colours on Polyester fabric. Printing of blended textiles. Specialized printing - Raised printing, Rubber printing, Brasso printing, Bronze printing etc. Principles and applications of CAD systems and their advantages. Brief study on the principles of Laser engraving, wax jet engraving and ink jet engraving. Brief study of Digital Inkjet Printing machine for fabric and garments.(63 hrs.)
Professional Skill 42 Hrs.; Professional Knowledge 14 Hrs.	Troubleshoot and maintain the electronic controller used in dyeing and printing machine using appropriate rules & tools. (Mapped NOS: TSC/N9414)	94. Electronic maintenance of programmer & temperature controller in dyeing machines and Printing machines.(42 hrs.)	Maintenance of pneumatic controls in Padding mangle Routine maintenance of various processing machines used in dyeing and printing sections. Fire-hazards Extinguisher Need of Quality Control in Textile Wet processing. Flow charts indicating Process Control and Quality Control tests to be carried out in Desizing, Scouring, Bleaching, Mercirizing, Souring, Dyeing, Printing and Finishing. Brief study of ISO 9000, ISO 14000 certification and SA 8000 Certification.(14hrs.)
WORKSHOP CALCULATION & SCIENCE (18 Hrs)			

Professional Knowledge WCS- 18 Hrs.	Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (Mapped NOS: TSC/N9402)	**WORKSHOP CALCULATION & SCIENCE** **Friction** Friction - Advantages and disadvantages, Laws of friction, co-efficient of friction, angle of friction, simple problems related to friction Friction - Lubrication Friction - Co- efficient of friction, application and effects of friction in workshop practice **Algebra** Algebra - Addition , subtraction, multiplication & division Algebra - Theory of indices, algebraic formula, related problems **Estimation and Costing** Estimation and costing - Simple estimation of the requirement of material etc., as applicable to the trade Estimation and costing - Problems on estimation and costing
Project work/ Industrial Visit		

SYLLABUS FOR CORE SKILLS
1. Employability Skills (Common for all CTS trades) (120Hrs. + 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

ANNEXURE-I

List of Tools & Equipment			
TEXTILE WET PROCESSING TECHNICIAN (For batch of 20 Candidates)			
S No.	**Name of the Tools and Equipment**	**Specification**	**Quantity**
A. TOOLS AND EQUIPMENT:			
1.	Cement or iron tanks for storing water	1200x1200x1200mm	2 Nos.
2.	Thermometer ranging	0-110°C and 0-300QC	3 Nos. each
3.	Wooden vats	2100x750x600mm height	4 Nos.
4.	Electric water/heater	GiserJ 45 litres	1 Nos.
5.	Water bath for 6 dye pots with electrical heating and temperature control		8 Nos.
6.	Stainless steel dye pots of	500 ml each	40 Nos.
7.	Yam reeling arrangement (one big and one small)		2 Nos.
8.	Electronic Weighing balance with capacity	1 gm to 200gm and 5gm to 1kg.	4 Nos.
9.	Kit boxes with locks for keeping cloth /dyes etc.		21(20+1)Nos.
10.	Prepared Screens for Printing for single colour with rubber squeeze		10 Nos.
11.	Small Capacity Electrode boiler (lab model)		1 No.
12.	Buckets (enamelled and plastics)	10 litres	10 Nos.
13.	Basins (enamelled and plastics)		10 Nos.
14.	Wooden Almirah for dyes and chemicals		2 Nos.
15.	Scissors, Measuring Tape, Transparency Sheet.		3 Nos.
16.	Inclined Table	1.5m length x 1.5 breadth 0.75 m depth) for screen and spray printing covered with PVC sheet and padded cloth	2 Nos.
17.	Instructor's table and chair		1Set
18.	Scientific microscope	10 to 200 magnification	2 Nos.
19.	Fibre staining solution and solvents for solubility tests for fibre identification		As required
20.	Electric oven/ air circulating drying woven		1 No.
21.	Lab model jigger machine		1 No.
22.	Lab model padding mangle with one chamber hot air drying machine		1 No.
23.	High temperature (i.e. 130 degree C)		6 Nos.

	glycerin bath lab dyeing machine for polyester dyeing with the dye pots.		
24.	Crock meter		1 No.
25.	First Aid box		As required
26.	Fire extinguisher	Operate and test clinical equipment/ instruments used in hospital.	2 Kg
27.	Glass rods 200mm long, with ends rounded, thick quality	10mm dia	20 Nos.
28.	Tables with glass top and 440-Watt tube light for exposure of Printing screen		1 No.
29.	Twaddle - Hydrometers	No. 1 to IV (full set)	2 Sets
30.	Measuring cylinders capacity	1000, 500, 250, 100, 25, 10 ml	10 sets
31.	Monopan Lab-model Electronics balance having 200grm Capacity, With Accuracy of minimum: O.lgm		4 No.
32.	Precision electronic weighing balance Accuracy minimum :	0.0 lgm	2 Nos.
33.	Stainless steel vessels capacity	2 lits., 3 lits., 5 lits. With cover	2 Nos.
34.	Kerosene stoves (industrial types) - 4 in each lab. Or Gas cylinder and Gas Burners		4 Nos.
35.	Stainless steel rods	12 mm thickness with wooden handle 300mm length	4 Nos.
36.	Bowls with rods for mixing dyes (Stainless steel)	500 ml	32 Nos.
37.	Glass beakers capacity	100,250,400,500 ml. (Thick glass quality) Corning / Borosil	21(20+1)Nos.
38.	Steaming Chest (Cotteage type) Lab model	500 X 500 X 500 mm, or Lab model steamer	1 No.
39.	Pressure cooker (domestic type)	5 &10 lit. Capacity with stainless steel container	2 Nos.
40.	Measuring pipette (Graduated)		10 Nos. each Capacity 0ml, 25 ml, 50 ml
41.	Measuring flasks with glass cork	capacity 250ml, 500ml, 1000ml (for preparing standard solutions)	10 Nos.
42.	Asbestos sheets	250x100mm or 200x200mm	40 Nos.
43.	Wire gauges	150x150mm or 250x250mm	40 Nos.
44.	Test tubes (thick class)	150mm (glass)	144 Nos.

45.	Funnels	75mm dia. (glass)& 150mm dia. (glass)	40 Nos. & 6 nos.
46.	Watch glasses	(75mm dia.) & 150mm dia. (glass) for weighing dyes etc.	40 Nos. & 6 nos.
47.	Plastic Spatulas (flat type)	150 mm long	40 Nos.
48.	Test tube holders		40 Nos.
49.	Pair of tongs (copper or stainless steels)		40 Nos.
50.	Brushes for cleaning apparatus		40 Nos.
51.	Plastic bottle with nozzles (spray bottles)	500ml capacity	21(20+1)Nos.
52.	Reflectance Spectro-photometer & P - IV computer, printer and associated colour-matching software.	CPU: 32/64 Bit i3/i5/i7 or latest processor, Speed: 3 GHz or Higher. RAM:-4 GB DDR-III or Higher, Wi-Fi Enabled. Network Card: Integrated Gigabit Ethernet, with USB Mouse, USB Keyboard and Monitor (Min. 17 Inch. Licensed Operating System and Antivirus compatible with trade related software.	1 No.
53.	MBTF - Light fastness tester		1 No.
54.	SASMIRA Lander-o-meter		1 No.
55.	Grey scale (staining & loss of depth), and Blue wool standard cloth		As required
56.	Lab hank dyeing machine/Beaker dyeing open bath machine		1 No.
57.	Wooden A4 size frame for print screen making.		1 No.
58.	Nails and Coarse cotton twine threads, cello tape		As required
59.	Sona-coat (Gelatin) or Polyvinyl alcohol gel		As required
60.	Binder and Ammonium diachrometer (sensatizer)		As required
B. FOR LABORATORY STORES/STUDENTS LAB			
61.	Plastic jars capacity for storing chemicals	10-15 liters	12 Nos.
62.	Glass bottles with stopper	3 lit.	12 Nos.
63.	Glass jars with stopper	10-12 lits.	12 Nos.
64.	Glass siphones for transferring acids/alkalis etc		3 Nos.

65.	Rubber gloves (big size not medical type)		3 Nos.
66.	Gum boots		3 Nos.
67.	Reagent bottles capacity table	200ml. with stopper for 2N standard solution on each	144 Nos.
68.	Small water baths (copper) mm.	dia 150 - 200	20 Nos.
69.	Sand baths (iron) dia.	150mm (for direct heating on burner/stove etc.)	20 Nos.
70.	Glass bottles (embered/dark coloured)	3 lits, (for storing chemicals which may be affected by light)	6 Nos.
71.	Pastle and mortars	150mm dia. Porcelain (for making powders 150 dia iron of solids)	10 Nos.
72.	Indicator bottles	50 ml capacity	10 Nos.
73.	Porcelain beakers	1 lit. capacity for preparing caustic soda solution	3 Nos.
74.	Goggles for safety precaution while handling corrosive chemicals		3 Nos.
75.	Burette	50 ml capacity	3 Nos.
76.	Conical flasks	250 ml	12 Nos.

Note: -

1. *All the tools and equipment are to be procured as per BIS specification.*

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