

**COURSE CURRICULUM**

**OF**

**ADVANCED MODULES**

**IN SECTOR**

**“TEXTILE PROCESSING AND TECHNOLOGY”**

**(To be implemented in ITIs offering Multiskill courses under Craftsmen Training Scheme or ITIs Upgraded as Centre of Excellence )**

**Directorate General of Employment & Training (DGE&T)  
M/o Labour & Employment**

## Upgradation of ITIs into Centers of Excellence

Under the CoE Scheme the Syllabus of TEXTILE PROCESSING & TECHNOLOGY has been prepared by the following Trade Expert Committee Members under the guidance of Chairmanship of Mr. Naveen Sharma, Vice –President , M/s Nahar Industrial Enterprises Ltd, Lalru and is forwarded for information and necessary action.

### **Trade Expert Committee Members**

1	Mr. Naveen Sharma, Vice –President, M/s Nahar Industrial Enterprises Ltd, Lalru	<b>Chairman (IMC)</b>	
2.	Mr. S.S Aich , Chief Executive M/s Nahar Industrial Enterprises Ltd, Lalru	<b>Technical Member</b>	
3	Mr. Pankaj Arora , B.Tech (Textile) Executive, M/s Nahar Industrial Enterprises Ltd, Lalru	<b>Technical Member</b>	
4.	Mr. Siriram Goyal , B.E (Textile) Executive, M/s Nahar Industrial Enterprises Ltd, Lalru	<b>Technical Member</b>	
5	Mr.Vishal Bhojgi, B.E (Textile) Deputy Manager M/s Nahar Industrial Enterprises Ltd, Lalru	<b>Technical Member</b>	
6	Mr.Avinash Kath, Diploma (Textile) Deputy Manager M/s Nahar Industrial Enterprises Ltd, Lalru	<b>Technical Member</b>	
7.	Mr. Sarvjit Singh Singh, Supdt. (Tech), I.T.I. Lalru	<b>Secretary</b>	
8.	Mr. Harbinder Singh, Instructor , ITI Lalru	<b>Coordinator</b>	

**Upgradation of ITIs into Centres of Excellence-**  
**Broad guidelines for implementation of Advanced Module of Sector**  
**“Textile processing and Technology”.**

These Centers will be providing multiskill training to meet the skill requirement of particular sector of industry with their active involvement in all aspects of training. The training will be provided in three parts as given below:

- Training in Basic skill areas for a period of one year.
- Training in Advanced modules of six months duration after Broad based basic Training (BBBT)
- Testing & Certification both for the Broad Based Basic Training & Advanced Module Training during subsequent six months will be conducted under the aegis of NCVT .
- Training in specialized modules mainly by the industry (The course curricula, duration etc will be designed in consultations with the IMC/local industry). The trade testing & certification for specialized module will be done jointly by the State Government & Industry. Said certificate will have recognition from NCVT
- As per the recommendations of the EFC, Training in the shop floor should constitute atleast 25-40% of the curriculum.

**The training programme will have multi-entry and multi-exit provisions as given below:**

- Trainee can opt to go to the labour market after completing broad based basic training of one year duration or after completing advanced module/s.
- Multi-entry and multi-exit provisions would enable a trainee to take admission for advanced/ additional advanced /specialized module as per his/her need .

**Guidelines for Training in Advanced modules**

- A minimum of three modules would be essentially needed , so as to ensure that all the 96 trainees are accommodated in the three modules may be selected in consultation with IMC for which in two shifts .
- If it is felt that available modules for which the course curricula has been developed at National Level are not sufficient to cater to the needs of local industry in a particular state, States are free to select module as per need in consultation with industry . They may develop suitable module(s) accordingly in consultations with the industry clearly indicating tool & equipment list , instructor qualifications , space norms etc. & forward the same to DGE&T for seeking approval of NCVT .
- A trainee at a time can opt only for one Advanced Module .
- Admission Criteria, Space requirement, Qualification of instructor of the various modules of “**Textile Processing and Technology**” sector are attached herewith.

### **Admission to Advanced Module for the graduates of ITI in related trades:**

There is a provision for lateral entry for graduates of ITIs (NTC /NAC passed outs from conventional system ) of the related trades subject to availability of seats in Advanced Module. Trades of conventional system mentioned against each advanced module in the enclosed statement, could be offered admission in Advanced Module.

### **Classrooms Infrastructure:-**

Three theory classrooms ( One each for 1 module) should have latest infrastructure including AV aids as per details given below:

1. Suitable Chairs/ tables /dual desks - As required
2. Instructor Chairs – 03 Nos
3. Instructor table – 3 Nos.
4. Over Head Projector - 3 Nos.
5. Epidiascope- 3 Nos
6. Laptop computer/PC (latest) & LCD projector - 1 No.
7. Multimedia Projector - 01 No
8. Magnetic white board - 03 No.
9. White board - 03 No.
10. Flip chart – 03 No.
11. Storage Almirah - As required

### **Admission Criteria**

Admission to Advanced Module for the graduates of ITI in related trades:  
There is a provision for lateral entry for graduates of ITIs (NTC /NAC passed outs from conventional system ) of the related trades subject to availability of seats in Advanced Module. Trades of conventional system mentioned against each advanced module in the enclosed statement, could be offered admission in Advanced Module

<b>Module No</b>	<b>Name of Module</b>	<b>Admission Criteria</b>	<b>Minimum Space required</b>	<b>Duration</b>	<b>Qualification of Instructors</b>
I	Advance Spinning and Weaving Technology	Completed BBT in Textile Processing and Technology or or NTC /NAC in related trade or Diploma in Textile Technology	80 Sq. mts	26 weeks	Diploma in Textile Technology with 4 year experience in Teaching /industry in relevant field Or Degree in Textile Technology with minimum of 2 years experiment in Teaching /Industrial in relevant field
II	Advance Bleaching finishing and dying Technology	Completed BBT in Textile Processing and Technology or or NTC /NAC in related trade or Diploma in Textile Technology	80 Sq. mts	26 weeks	Diploma in Textile Processing with 4 year experience in Teaching /industry in relevant field Or Degree in Textile Processing with minimum of 2 years experiment in Teaching /Industrial in relevant field
III	Repair and Maintenance of Textile Machinery and Equipments	Completed BBT in Textile Processing and Technology or or NTC /NAC in related trade or Diploma in Textile Technology	80 Sq. mts	26 weeks	Diploma in Mechanical Engineering with 4 year experience in Teaching /industry in relevant field Or Degree in Mechanical Engineering with minimum of 2 years experiment in Teaching /Industrial in relevant field

## UP GRADATION OF ITI'S INTO CENTRE OF EXCELLENCY (CoE)

**SECTOR / AREA : Textile Processing and Technology**

### **Advance Module**

<b>MODULE NO.</b>	<b>NAME OF THE MODULE</b>	<b>DURATION IN WEEK</b>
I	Advance Spinning and Weaving Technology	26 weeks
II	Advance Bleaching finishing and dying Technology	26 weeks
III	Repair and Maintenance of Textile Machinery and Equipments	26 weeks

**ADVANCED SPINNING & WEAVING TECHNOLOGY**  
**(ADVANCE MODULE – I)**  
**DURATION : 26 WEEKS**

<b>WEEK</b>	<b>THEORY</b>	<b>PRACTICAL</b>
1st	Blowroom Modern blowroom line, diff. blenders, lap/chute feed systems, effect of diff. settings on opening & cleaning	Models of various machines, grid bars/mote knife setting.
2nd	Carding Diff. between conventional and modern card, diff. changes for higher production and better quality, calculation related to waste and production.	Diff. rollers motions and their effects on quality, generation of trailing hook and their minimization
3rd	Draw frame and combing Sliver lap, ribbon lap, comber, diff. drafting systems (use of apron etc.), autolevelling, breaker/finisher draw frames. high speed draw frames.	Draft and production calculation, diff. models, change pinions.
4th	Simplex False twisting mechanism, builder motion and drafting system, automation in simplex.	Change pinions, draft and production calculation
5 <sup>th</sup> /6th	Ring frame Ring and traveller mechanism, modification in process (slub yarn, lycra yarn, compact yarn, elitwist yarn manufacturing), spinning triangle and its effect on yarn properties, limitation of ring frame	Diff drafting systems, production/draft calculations, change pinions, diff. types of ring yarns
7th	Winder Diff. modern winding machines, yarn faults and their removal techniques, automation in modern winders, diff. stop motions	Splicer settings and their effects on yarn properties
8 <sup>th</sup>	Quality assurance Yarn properties—count, csp, rkm, uster classimat, hairiness, tpi, twist factor and cv	Study of various systems, to find out diff. yarn properties from given yarn sample

	calculations	
9th	Different yarns Introduction to diff. types of yarns-carded, combed, open-end, fancy yarn(lycra, textured filament etc. compact yarn, elitwist yarn etc	Familiarization to diff. types of yarns.
10th	Conventional spinning . Comparison of ring spun yarn and open end yarn properties.	Study of diff. in properties of ring yarn and open end yarn
11 <sup>th</sup> /12th	Modern spinning. Diff. modern spinning tech.(airjet spinning bobtex spinning , Dref spinning. etc.)	Sketching of diff. types of spinning tech.
13 th	Industrial spinning techniques Comparison and suitability of diff. spinning techniques for industrial purpose	Use of diff. types of yarns in diff. end products
<p><b>ACHIEVEMENTS</b> At the end of 1- 13 weeks trainees should be :</p> <ol style="list-style-type: none"> <li>1) Aware of all spinning calculations and their uses.</li> <li>2) Aware of Modern spinning techniques used for industrial purposes.</li> </ol>		
14th	Yarn joints: - knotting, splicing, types of knots, characteristics of good knot, comparison, applications, method of plicing/ mechanism, importance of splicing, Classimat classification of yarn faults, its use. Common package faults:- patterning, conditions for patterning, anti patterning devices, soft packages, wild yarn, snarls etc. Yarns quality requirements for high speed automatic shuttle looms and shuttle less looms. Warp and weft Preparation for high speed looms.	To visit autoconer ,splicers machines and see their working. to visit R & D having various instrument of yarn classifications
15th	Designing and cloth construction-Symbolic representation of weave, drafting, drawing and lifting plan. Basic and other fabric designs. Working on CAD/CAM. automatic drawing –in machine working. Constructional details: - Warp /weft count, thread densities,	Fabric analysis of a given fabric. Finding warp, weft count epi ,ppi weave and other reqd things.to See automatic drawing-in machine. making of bit loom sample

	width, length, selvages; light, medium, & heavy constructions, capability of weaving machines to weave different constructions, warp and weft cover, cloth cover crimp, contraction in warp and weft way during weaving.	
16 <sup>th</sup>	Dobby: Objectives Parts and Functions, Purpose and Principle, Card Cylinder, Single and double lift dobbies, Paper and wooden lattice Dobbies, pick finding with Dobbies, return spring box Types of doobby pick finding Devices for doobby, different types of doobys. Maintenance schedule, Settings, etc.	Knife setting – selector pirn Setting –return spring boxes-shed setting, Lubrication, schedule etc Calculation, i.e. production, Efficiencies, etc..
17 <sup>th</sup>	Jacquard: Functions-types of Jacquards-card punching –Single and double lift type Jacquards for power looms-Simple wooden peg type-Drives-types of lingoes*Synchronizing with loom-Return spring type-harness Comber bored-drafts-principle Parts of the jacquard Machine-sizes and figuring Capacities of jacquard-types of Sheds-lift and cylinder, types-Casting out process-greasing and oiling-maintenance Schedule –introduction to Electrical Jacquards.	Card punching –synchronizing with loom-lift setting of jacquard-cam Throw setting-harness setting and trying-lubrication. Pirn alignment and firmness in shuttle-picking force and Timing-shuttle checking in Shuttle box-belt fork setting. Loom brake function-warp Protector motion function-anti crack motion-reed alignment and firmness-loom parts lubrication-shuttle box, swell setting –picker centering-reed.
18 <sup>th</sup>	Loom timing diagram & setting of temple and selvedge Objectives, parts and Functions, types of drive sley eccentricity Profile of sley cams sley dwell and loom timing diagram and weaving cycle relation between sley dwell and picking. Types of various temples and their end use, fabric selvedge-importance and its effect on working.	To make fabric with different selvages. Difference between fringe and tuck-in selvedge. types of temples according to quality and see sley cam.
19 <sup>th</sup>	Projectile Loom: Introduction –main features-Advantages-Essential setting, etc. Rapier Loom:	Torsion rod setting-guide, Tooth-setting-receiving until And break setting- deciding no. of projectiles as per cloth width-assembly of cams for different weaves-warp and weft stop

	<p>Introduction-main features –Advantages-method of weft Insertion-types of weft stop-Remedy for each type of weft stop-weft feeder introduction- rapier head-drive – classification of rapier weaving machines-working principle of rapier-maintenance schedule essential settings.</p>	<p>motion settings-Mechanical and electronic let-off assembly a–setting of picks/Inch –emery roll covering –essential settings-</p> <p>Setting of rapier as per nominal width –change of Throw-deciding rapier loom Speed-shed height alignment – rapier weft transfer setting – periodic check of rapier guides and resetting –picks-inch setting-warp tension setting slay drive checking –lubrication-machine setting avoiding warp and weft defects.</p>
20 <sup>th</sup>	<p>Fabric damage and remedies: types of various fabric damages And their cause on different types of looms. fabric checking system, grading of fabric, packing of fabric. importance of roll length. classification of weaver wise, machine wise damages.</p>	<p>To see some fabric damages samples analysis report to make Visit of folding deptt. And see their working</p>
21 <sup>st</sup>	<p>Air-jet Loom- Introduction-main features-advantages-drive-clutch-Brake-weft transfer –deciding no of nozzles required –technique of measuring air consumption –picking mechanism-method of air –jet control-maintenance schedule-essential settings.</p>	<p>Air insertion setting-solenoid Valve setting –deciding no. of nozzles required-settings Through microprocessor – Measuring air consumption-changing of speeds-shedding-Change of weaves-setting picks/inch-lubrication-Attending weft breaks.</p>
22 <sup>nd</sup>	<p>Manufacturing of special fabrics Denim-warp preparations, weaving Terry fabric, technical textiles— transportation, paper, geotextile, medical, agriculture, safety and others, carpet weaving, velvet weaving, narrow fabric weaving</p>	<p>Plant visit of these various textile weaving products and their idea. difference from normal weaving process.</p>
23 <sup>rd</sup>	<p>Fabric structure, properties and testing Woven fabric structure, woven fabric properties, woven fabric testing</p>	<p>Visit of lab having various testing instruments and their working to do testing of 2-3 type of fabrics</p>
24 <sup>th</sup>	<p>Weaving plant operations</p>	<p>To visit various departments of weaving and their function,</p>

	Improving productivity, plant layout, air conditioning in textile plants, computers and automation, function of various departments in weaving plant.	computer basics knowledge
25 <sup>th</sup>	Weaving calculations Various system for measuring length, weight of textile fabric .U.S. customary units, SI units, conversion between SI and US. units, Temperature conversions, fabric gsm ,glm, cover of cloth.	To do conversion of given factors Formulas for calculating weight of weft warp required and other weaving calculations
26 <sup>th</sup>	Environmental issue and waste management waste generation and control at various points in weaving .Hazardous waste and Bio-medical waste - Air pollution due to industries and vehicles; Global issues - Biodiversity, Climatic change, Ozone layer depletion.	To identify the various chemical used in weaving ,non-haz or hazardous, data of air pollution of an weaving mill
<p><b>ACHIEVEMENTS</b> At the end of 13 - 26 weeks trainees should be :</p> <ol style="list-style-type: none"> <li>1) Aware of all weaving calculations and their uses.</li> <li>2) Aware of Modern weaving techniques used for industrial purposes.</li> <li>3) Knowledge of waste management and their disposal.</li> </ol>		

## LIST OF TOOLS AND EQUIPMENTS FOR ADVANCE SPINNING AND WEAVING TECHNOLOGY

List of Tools for a batch of 16 trainees

Sl. No	Name of tool	Qty
1	Combination pliers 200mm insulated	17 Nos.
2	Screw driver 200 mm	17 Nos.
3	Screw driver 100 mm	17 Nos.
4	Hammer ball pein (0.75 kg)	17 Nos.
5	Firmer chisel 12 mm	17 Nos.
6	Firmer Chisel 6 mm	17 Nos.
7	Neon tester	17 Nos.
8	Tenon saw 250 mm	17 Nos.
9	File flat 250 mm 2 <sup>nd</sup> cut	17 Nos.
10	File flat 250 mm smooth	17 Nos.
11	Steel rule 300 mm to read metric	17 Nos.
12	Circlip opener	17 Nos.
13	Continuity tester	17 Nos.
14	Electric soldering Iron 65 W	17 Nos.

List of Shop General Outfit for 16 trainees

Sl No	Name of tool	Qty
1	Pliers side cutting 200 mm	5 Nos.
2	Pliers flat nose 150 mm	04 Nos.
3	Pliers long nose	04 Nos.
4	Screw driver heavy duty 250 mm	17 Nos.
5	Marking Gauge	04 Nos.
6	Combination bevel Protector	04 Nos.
7	Cold chisel Flat 25 x 200 mm	04 Nos.
8	Hammer Ball pein 0.80 kg	04 Nos.
9	Hammer Cross pein 0.5 kg	04 Nos.
10	File Flat 2 <sup>nd</sup> cut	04 Nos.
11	File Flat 250 bastard	04 Nos.

12	File Flat 250 mm smooth	04 Nos
13	File half round 300 mm 2 <sup>nd</sup> cut	04 Nos
14	File Triangular 150 mm 2 <sup>nd</sup> cut	04 Nos
15	Spanner double ended set of 6	4 sets
16	Adjustable spanner 250 mm	4 Nos
17	Allen Keys (metric & Inches)	4 sets
18	Steel rule 300 mm	4 Nos.
19	Steel measuring Tape ( 20 m)	4 Nos.
20	Hacksaw frame adjustable 200 mm to 300 mm	4 Nos.
21	Bench vice 100 mm	6 Nos.
22	Spanner (up to 32 mm)	4 Sets
23	Vernier caliper 200 mm – 300 mm	02 each
24	Ring spanner (6-32mm)	4 sets
25	12 “ grip Pliers	4 Nos.
26	Ratchet 25 to 160 Nm	2 Nos
27	Needle file set	3 sets
28	Nylon hammer	2 Nos
29	Puller 2 arm- 3 arm	2 each
30	Copper tube cutter	1 Nos.
31	Micrometer outside (0-25 mm), (25 – 50 mm)	2 each
32	Micrometer Inside (50-200 mm)	2 each
33	Tong tester	1 No.
34	Ohm meter	2 Nos.
35	Blow lamp	2 nos.
36	Multi meter	2 Nos.
37	Pipe vice 5”	1 Nos.

<b>S.No</b>	<b>Machinery</b>	<b>Required</b>
1	Warp Winding Machine	1 No
2	Pirn Winder	1 No
3	Plain loom with Dobby	1 No
4	Handloom with Jack & loom arrangement	1 No
5	Semi automatic Power Loom	1 No
6	Hand Knottier , Spicer etc.	1 No
7	Blow room (Miniature)	1 No
8	Carding (Miniature)	1 No
9	Sliver Lap	1 No
10	Ribbon Lap	1 No
11	Comber	1 No
12	Draw Frame (Miniature)	1 No
13	Simplex (Miniature)	1 No
14	Ring frame	1 No
15	TFO (Miniature)	1 No

Workshop furniture:

Sl. No.	Workshop furniture	Qty
1	Suitable Work Tables with vices	As required
2	Dual Desk	6 Nos
3	Discussion Table	1 No
4	Steel Almirah (1980 x 1010 x 560 mm)	4 Nos
5	Trainees locker ( of 8 drawrs)	2 Nos
6	Fire fighting equipment, first aid box etc	As required
7	Book shelf ( glass panel )	1 No.
8	Storage Rack	As required
9	Storage shelf	As required
10	Chair	2 each
11	Teacher Table	1 No

**ADVANCE BLEACHING FINISHING AND DYING TECHNOLOGY  
(ADVANCE MODULE – II)  
DURATION : 26 WEEKS**

## OPEN WIDTH CONTINUOUS BLEACHING

WEEK NO	PRACTICAL	THEORY
1-2 week	(a) Desizing , Scouring And Bleaching on Hot bath beaker machine	(a) Study of machines and their parameter 1. Singeing and Desizing 2. Desize Washer 3. Pre Treatment Range 4. Mercerize machine Trouble shooting in bleaching machines
3rd week	(b) Hot Mercerizing on padder with caustic soda.	(b) Chemical preparation , type of chemical used and their functioning , description of various hazardous chemical
4th week	c) Cold mercerising on padder. d) Precautions during pretreatment .	( c ) Damages and their control during Continuous Bleaching

## MECHANICAL AND CHEMICAL FINISHING (6 WEEKS)

5th week	(a) Chemical softening of textile fabrics. with silicones , softner	(a) Ingredients used in softening and stiffening their properties and application.
6 -7th week	(b) anty crease finish, wrinkle free finish and nano finish.	(b) study of vaious types of finishing machines like stenter,sanforiser sueding machines and their trouble shooting.
8-10th week	( c ) water repellant , water proofing stiff finish and study of their chemicals	( c ) study of various functional finishing process 1) antcrease, water proofing or water repellency, fire proofing or
	(d) fire retardant and fire proof finishes  e) mechanical finish , sueding , calendering	flame retardency. 2) heat setting process for synthetic or polyester cotton blend fabric a) decatizing b) weighting of silk

	and sanforising	c) tempering and breaking of silk d) scroopy finish of silk e) carbonisation of wool f) milling g) moth proofing of wool
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### WIDTH CONTINUOUS DYEING

WEEK NO	PRACTICAL	THEORY
11-12th week	(a) Dyeing of RFD Fabric with different dyes on pad dry padsteam , cold pad batch machine.	(a) Colour preparation , required parameters of RFD fabric ,class of dyes used , various type of fabric processed .
13th week	(b) Colour preparation of dispers vat reactive and sulphur dyes.	(b) Study of machines and their parameter 1. Pad Dry Thermosol 2. Pad Steam 3. Cold Pad Batch 4. Washing Range Trouble shooting in dyeing machines
<b>ACHIEVEMENTS</b> At the end of 1 - 13 weeks trainees should be : 1) Aware of all pre treatment techniques. 2) Have knowledge of colour preparation and dyeing machines.		
14th week	( c) Introduction to Computer Colour matching , spectro photo meter ,	( c) Study of Lab to Bulk Process .
15th week	Measurement of Colour parameters	(d) Damage and their control during continuous dyeing

### PRINTING, SCREEN MAKING AND TROUBLE SHOOTING

WEEK NO	PRACTICAL	THEORY
16-17 th week	(a) Printing of white /coloured fabric with different dyes . Direct/Discharge and Resist styles of printing by Screen printing method.	(a) Style of Printing ,study of various Printing Machines like roller printing , flat bed printing rotary screen printing, concept of transfer printing machines.

18-19th week	(b) Screen making for printing  ( c ) Printing defect and trouble shooting in printing .	(b) Printing with direct , Azoic , vat , pigments and reactive dyes on cotton. Printing with acid dyes /pigment colours on nylon and with disperse dyes / pigment colours on polyester fabric .  ( c ) Printing of blended textiles . Specialized printing -Raised printing , rubber printing, Brasso printing , bronze printing etc.
20th week	(d) Familiarization with Printing machines 1) rotary screen printing machine 2) flat bed printing machine 3) Steam ager 4) Curing range.	

### QUALITY CONTROL

WEEK NO	PRACTICAL	THEORY
21th week		(a) Introduction to quality control,need of quality control Physical testing and chemical testing
22th-24th week	same as above	(b) Physical testing - following tests are performed on fabric from different departments
		*For grey fabric - warp and weft count , EPI and PPI , GSM *For mercerized fabric-shrinkability test , tegwa test , PH , absorbancy test , whiteness test , residual test , GSM *For dyed fabric -washing fastness , water fastness , rubbing , light fastness *for finished fabric -skew test , tensile strength , tear strength abrasion , pilling , crease recovery angle

25th-26th week.	Revision of Practical done in 1 to 24 weeks Discussion and revisions	(c) Chemical testing- strength of hydrogen peroxide strength of sodium hydroxide strength of sodium silicate strength of acetic acid strength of caustic hydro solution
<p><b>ACHIEVEMENTS</b> At the end of 14 - 26 weeks trainees should be :</p> <ol style="list-style-type: none"> <li>1) Aware of screen making and printing techniques</li> <li>2) Have knowledge of all physical and chemical tests for quality controls.</li> </ol>		

**LIST OF TOOLS AND EQUIPMENTS FOR ADVANCE SPINNING AND WEAVING TECHNOLOGY**

List of Tools for a batch of 16 trainees

Sl. No	Name of tool	Qty
1	Combination pliers 200mm insulated	17 Nos.
2	Screw driver 200 mm	17 Nos.
3	Screw driver 100 mm	17 Nos.
4	Hammer ball pein (0. 75 kg)	17 Nos.
5	Firmer chisel 12 mm	17 Nos
6	Firmer Chisel 6 mm	17 Nos.
7	Neon tester	17 Nos.
8	Tenon saw 250 mm	17 Nos.
9	File flat 250 mm 2 <sup>nd</sup> cut	17 Nos.
10	File flat 250 mm smooth	17 Nos.
11	Steel rule 300 mm to read metric	17 Nos.
12	Circlip opener	17 Nos.
13	Continuity tester	17 Nos.
14	Electric soldering Iron 65 W	17 Nos.

## Machinery and Equipments for ADVANCE BLEACHING, FINISHING AND DYEING TECHNOLOGY

S.No	Name of machinery	Qty
1	Iron tanks for storing water (1200 mm x1200 mm x1200 mm)	1 No.
2	Thermometer 0-110 deg. C and 0-300 deg. C	3 Nos each
3	Electric water heater 45 lit	2 Nos.
4	Yarn reeling arrangements (Wrap reel)	2 Nos.
5	Kit box for keeping cloths /dyes	16 Nos.
6	Buckets	4 Nos.
7	Fire Extinguisher	6 Nos
8	Hydrometers	2 sets
9	Test tube holders	32nos
10	Test tubes	32 Nos
11	Brusher for cleaning apparatus	16 Nos
12	Plastic Bottles with nozzles	16 Nos
13	Glass Beakers	1 No
14	Computer with for colour matching software	

General installation:

S.No	Name of machinery	Qty
1	Open bath Beaker dyeing M/C	01
2	Infra Red Dyeing M/c	01
3	Glass shaking M/C	01
4	Padding M/c	01
5	Laundrometre	

Workshop furniture:

Sl. No.	Workshop furniture	Qty
1	Suitable Work Tables with vices	As required
2	Dual Desk	6 Nos
3	Discussion Table	1 No
4	Steel Almirah (1980 x 1010 x 560 mm)	4 Nos
5	Trainees locker ( of 8 drawrs)	2 Nos
6	Fire fighting equipment, first aid box etc	As required
7	Book shelf ( glass panel )	1 No.
8	Storage Rack	As required
9	Storage shelf	As required
10	Chair	2 each
11	Teacher Table	1 No

## REPAIR AND MAINTENANCE OF TEXTILE MACHINERY AND EQUIPMENTS

## (ADVANCE MODULE – III)

**DURATION : 26 WEEKS**

WEEK NO	PRACTICAL	THEORY
1-2th week	Functioning of lathe machine, milling, Drilling, shaper, grinder ,cutter & use of power hacksaw etc.	Basic overview of engineering functions in textile unit different types of bearing, Lubricants Types of maintenance (preventative, predicative , corrective, breakdown maintenance)
3-4th week	Functions of pneumatic system functions of load cell, dancer, gear box. functions of softening plant	Types of tools use in maintenance department Different types of drive (gear box, motor, pulley, chain and belt Types of pumps and their functioning (centrifugal, monoblock, reciprocating
5 <sup>th</sup> week	Safety valves, pressure reducing valve, non return valve functioning of thermopac, working of power plant	Different types of metals (Galvanized Iron, Stainless Steel, Mild Steel, Cast Iron, Brass, aluminum.) Welding (arc, argon, gas welding.)
6 <sup>th</sup> - 7 <sup>th</sup> week	Maintaince schedule study, greasing /lubrication of machines, belts, bearings used etc .	Pneumatic cylinder, valve [Gate valve, boll, cock, steam valve] Utility (Air, water, steam, thermic fluid, electricity, pressure release valve, steam trap, steam Condensate pump)
8-9th week	To study the preventive maintenance schedule of any warping machine in mill. practical experience of greasing and lubrication of machine bearing life etc.	Rubber roll (coating, grinding, hardness] types of dancer, load cell, Types of rolls [Stainless Steel, rubber 100 KN ,20 KN ,Guider, scroll Roll, Expander roll). Different types of assembling the pipes.
10-11th week	To see the air-flow instrument of reed and checking of flow on a reed. Hydraulic trolleys schedule	SCOPE OF MAINTENANCE IN WEAVING Study of accessories used in weaving, machine wear, serviceability, properties, performance, frequency of consumption, preventive maintenance schedule adopted/followed in various machines of weaving sections and knowledge of lubricants used in diff. machines.

12-13th week	To study the preventive maintenance schedule of any sizing machine in mill. Practical experience of greasing and lubrication of machine, bearing etc.	MAINTENANCE OF WARPING/DRAWING-IN SECTION Various sensors, gears, belts and bearings used in warping machine, type of lubricants used and their properties, tensioning devices and beam drive mechanism of warping machine
<b>ACHIEVEMENTS</b> At the end of 13 <sup>th</sup> week trainee should be :- 1) Aware of the basic engineering practices 2) Aware of basic engineering measurements		
14 <sup>th</sup> week	Practical study of various greasing and lubrication points of different machines. quantity of lubricants used.	Air-flow of reeds, cleaning of reed and various trollies, used in drawing and warping. Heald frame condition and parts of heald frame details.
15-16th week	Preventive maintenance schedule of different looms. Procedure of breakdown maintenance. To study the item wise consumption on various types of looms. ultrasonic cleaner, grinders and trollies used in weaving	MAINTENANCE OF SIZING SECTION— Various sensors, gears ,belts and bearings used in Sizing machine. Type of lubricants used and their properties. tensioning devices and beam drive mechanism of sizing machine. Mixing preparation area different types of joints of pipes. chain drive mechanism . storing of beams on stocker and cleaning of m/c.

17-18th week	Maintenance schedules Study, Greasing /Lubrication machines and their uses, Study of Lifecycle of Different Belts/Gears/Bearings etc.,	<p>MAINTENANCE OF LOOMS SECTION--</p> <p>Types of looms rapier ,projectile ,air-jet etc looms., Rapier take-up, let-off, rapier drive mechanism, diff. rapier parts bearings and belts used. leveling and gluing of m/c, Projectile working, rear front brake,picking stick,chian drive and various gears sprockets and Air jet picking system shedding parts, take-up let off motion and belts bearings used, leveling and gluing of m/c. Types of lubricants used.</p>
19-20th week	Spinning Mill. Follow-Up of Maintenance Schedule, Practical Experience of Lubrication and Greasing of Diff. Points, Study of effect of Maintenance on Quality of Lap/Flocks	<p>SCOPE OF MAINTENANCE IN SPINNING</p> <p>Study of various accessories used in spinning machines- wear, serviceability, properties, processing performance, frequency of consumption, specifications. Preventive maintenance, maintenance schedule adopted/followed in various machines of spinning sections and knowledge of lubricants used there mill training.</p>
21-22th week	CARD--Card Clothing Changing Practices, Feeler Gauge use and Gaps Checking, Practices of Changing Pinions,	<p>MAINTENANCE OF BLOWROOM MACHINERY</p> <p>Grid Bars Settings For Diff. Mixings and Quality, Beater Spikes checking and methods of clothing, Photo sensors Settings, Belts and Bearings Mounting and Play Checking, Dust Cage/Lattice/Vacume pressure Maintenance, Greasing and Oiling.</p>
23-24th week	Study of effect on web quality of clothing changing/grinding DRAW-FRAME, Top Roller Pressure Settings, Practice of changing pinions for different drafts. Setting of Autolevellers and Cots Buffing Practice	<p>CARD,DRAW-FRAME MAINTAINANCE</p> <p>L- IN,CYLINDER, DOFFER Wire Specifications and their changing techniques/schedule, Use of Feeler Gauges checking, oils/greasing schedules, Drive systems , Stop Motions</p> <p>DRAW-FRAME-- Top/Bottom Rollers Gauges, Play,Hardness Checking,Cots Buffing Technique and schedulesTop Rolls. Pressure Monitoring and Changing Methods, Drive System and Change Pinions for Diff. Drafts, Brake/Main Draft and Their Changing Points, Stop Motions and Their Functioning</p>

25-26th week	SPEED-FRAME--Practice of Changing Pinions for Diff. Counts,Lifts,Stop Motions Settings, Drafting Settings, RING-FRAME-- Collections of Diff. Rings and Travellers Samples, Settings of Seprators, Conveyer Belts settings and functioning	SPEED-FRAME/RING-FRAME MAINTAINANCE SPEED-FRAME--Builder Motion and Change Pinions, Differential Drive System and Its Mechanism, Magnetic Clutches, Drive System, Stop Motions and Their Functioning ,Drafting System and Settings ,Stop Motions RING-FRAME--Ring/Traveler Mechanism,Traveller Types/Numbering System and Use for Diff. Counts, Diff. Ring Profiles,Spindle Drive System/Belts Checking, Drafting Systems Settings/Stop Motions,Diff. Change Pinions and Their Combination for Diff. Counts
<b>ACHIEVEMENTS</b> At the end of 26 <sup>th</sup> week trainee should be :- 1) Knowledge of maintenance schedule of spinning & weaving machinery, 2) Must be able to operate spinning and weaving machinery independently		

### LIST OF TOOLS AND EQUIPMENTS

List of Tools for a batch of 16 trainees

Sl. No	Name of tool	Qty
1	Combination pliers 200mm insulated	17 Nos.
2	Screw driver 200 mm	17 Nos.
3	Screw driver 100 mm	17 Nos.
4	Hammer ball pein (0.75 kg)	17 Nos.
5	Firmer chisel 12 mm	17 Nos.
6	Firmer Chisel 6 mm	17 Nos.
7	Neon tester	17 Nos.
8	Tenon saw 250 mm	17 Nos.
9	File flat 250 mm 2 <sup>nd</sup> cut	17 Nos.
10	File flat 250 mm smooth	17 Nos.
11	Steel rule 300 mm to read metric	17 Nos.
12	Circlip opener	17 Nos.
13	Continuity tester	17 Nos.

14	Electric soldering Iron 65 W	17 Nos.
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List of Shop General Outfit for 16 trainees

Sl No	Name of tool	Qty
1	Pliers side cutting 200 mm	17 Nos.
2	Pliers flat nose 150 mm	04 Nos.
3	Pliers long nose	04 Nos.
4	Screw driver heavy duty 250 mm	17 Nos.
5	Marking Gauge	04 Nos.
6	Combination bevel Protector	04 Nos.
7	Cold chisel Flat 25 x 200 mm	04 Nos
8	Cold chisel Flat 18 x 200 mm	04 Nos
9	Hammer Ball pein 0.5 kg	04 Nos
10	Hammer Ball pein 1.00 kg	04 Nos
11	Hammer Cross pein 0.5 kg	04 Nos
12	File Flat 2 <sup>nd</sup> cut	04 Nos
13	File Flat 250 bastard	04 Nos
14	File Flat 250 mm smooth	04 Nos
15	File half round 300 mm 2 <sup>nd</sup> cut	04 Nos
16	File Triangular 150 mm 2 <sup>nd</sup> cut	04 Nos
18	Adjustable spanner 350 mm	8 Nos
19	Allen Keys (metric & Inches)	4 sets
20	Steel rule 300 mm	8 Nos.
21	Steel measuring tape (2 m)	4 Nos.
22	Steel measuring Tape ( 20 m)	4 Nos.
23	Hacksaw from adjustable 200 mm to 300 mm	8 Nos.
24	Bench vice 100	6 Nos.
25	Pipe wrench 18"	2 Nos.
26	Spanner (up to 32 mm)	4 Sets
27	Vernier caliper 200 mm – 300 mm	02 each
28	Ring spanner (6-32mm)	4 sets
29	12 " grip Pliers	4 Nos.
30	Inner caliper	06 Nos.
31	Outside caliper	06 Nos.
32	File Swiss type needle set	5 Nos.
33	Needle file	3 sets

34	Nylon hammer	5 Nos
35	Puller 2 arm- 3 arm	2 each
36	Copper tube cutter	1 Nos.
37	Micrometer outside (0-25 mm), (25 – 50 mm)	2 each
38	Micrometer Outside (0-1 inch), ( 1 – 2 inch)	2 each
39	Micrometer Inside (50-200 mm)	2 each
40	Tong tester	1 No
41	Ohm meter	2 Nos.
42	Blow lamp	2 nos.
43	Multi meter	2 Nos.
44	Pipe vice 5”	1 Nos.

**Machinery and Equipments for REPAIR AND MAINTENANCE OF TEXTILE MACHINERY AND EQUIPMENTS**

S.No	Name of machinery	Qty
1	Lathe 6 ft, 3 Phase, 5 HP Motor.	1 No.
2	Power Drilling Machine $\frac{3}{4}$ Inches , 2 HP motor,	1 No
3	Power hacksaw Hydraulic , 1 HP Motor	1 No
4	Grinder 6 “ wheel	1 No
5	Welding set	1 No

Workshop furniture:

Sl. No.	Workshop furniture	Qty
1	Suitable Work Tables with vices	As required
2	Dual Desk	6 Nos
3	Discussion Table	1 No
4	Steel Almirah (1980 x 1010 x 560 mm)	4 Nos
5	Trainees locker ( of 8 drawers)	2 Nos
6	Fire fighting equipment, first aid box etc	As required
7	Book shelf ( glass panel )	1 No.
8	Storage Rack	As required
9	Storage shelf	As required
10	Chair	2 each
11	Teacher Table	1 No