WEAVING TECHNICIAN

COMPETENCY BASED CURRICULUM

(Duration: 2 Yrs.)

APPRENTICESHIP TRAINING SCHEME (ATS)

NSQF LEVEL- 5

SECTOR – TEXTILE AND HANDLOOM

सत्यमेव जयते

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

WEAVING TECHNICIAN

(Designed in 2020)

APPRENTICESHIP TRAINING SCHEME (ATS)

NSQF LEVEL - 5

Developed By

Ministry of Skill Development and Entrepreneurship
Directorate General of Training
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1. BACKGROUND

1.1 Apprenticeship Training Scheme under Apprentice Act 1961

The Apprentices Act, 1961 was enacted with the objective of regulating the programme of training of apprentices in the industry by utilizing the facilities available therein for imparting on-the-job training. The Act makes it obligatory for employers in specified industries to engage apprentices in designated trades to impart Apprenticeship Training on the job in industry to school leavers and person having National Trade Certificate(ITI pass-outs) issued by DGT to develop skilled manpower for the industry**.** There are four categories of apprentices namely**; trade apprentice, graduate, technician and technician (vocational) apprentices.**

Qualifications and period of apprenticeship training of **trade apprentices** vary from trade to trade. The apprenticeship training for trade apprentices consists of basic training followed by practical training. At the end of the training, the apprentices are required to appear in a trade test conducted by DGT and those successful in the trade tests are awarded the National Apprenticeship Certificate.

The period of apprenticeship training for graduate (engineers), technician (diploma holders and technician (vocational) apprentices is one year. Certificates are awarded on completion of training by the Department of Education, Ministry of Human Resource Development.

1.2 Changes in Industrial Scenario

Recently we have seen huge changes in the Indian industry. The Indian Industry registered an impressive growth during the last decade and half. The number of industries in India have increased manifold in the last fifteen years especially in services and manufacturing sectors. It has been realized that India would become a prosperous and a modern state by raising skill levels, including by engaging a larger proportion of apprentices, will be critical to success; as will stronger collaboration between industry and the trainees to ensure the supply of skilled workforce and drive development through employment. Various initiatives to build up an adequate infrastructure for rapid industrialization and improve the industrial scenario in India have been taken.

1.3 Reformation

The Apprentices Act, 1961 has been amended and brought into effect from 22nd December, 2014 to make it more responsive to industry and youth. Key amendments are as given below:

- Prescription of number of apprentices to be engaged at establishment level instead of trade-wise.
- Establishment can also engage apprentices in optional trades which are not designated, with the discretion of entry level qualification and syllabus.
- Scope has been extended also to non-engineering occupations.
- Establishments have been permitted to outsource basic training in an institute of their choice.
- The burden of compliance on industry has been reduced significantly.

2. TRAINING SYSTEM

2.1 GENERAL

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

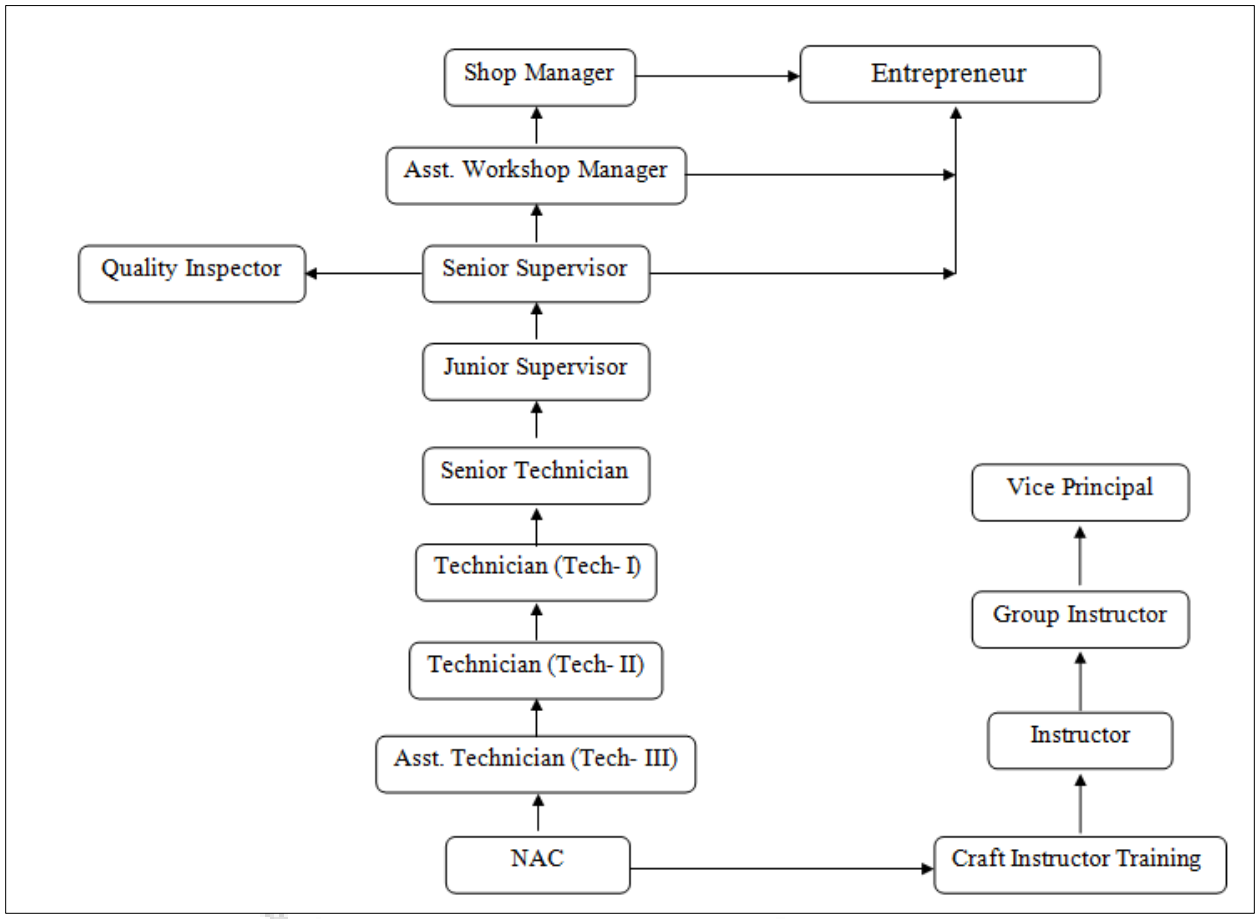
Weaving Technician trade under ATS is one of the most popular courses delivered nationwide through different industries. The course is of two years (02 Blocks) duration. It mainly consists of Domain area and Core area. In the Domain area Trade Theory & Practical impart professional - skills and knowledge, while Core area - Workshop Calculation and science, Engineering Drawing and Employability Skills imparts requisite core skills & knowledge and life skills. After passing out the training programme, the trainee is being awarded National Apprenticeship Certificate (NAC) by DGT having worldwide recognition.

Broadly candidates need to demonstrate that they are able to:

- Read & interpret technical parameters/document, plan and organize work processes, identify necessary materials and tools;
- Perform task with due consideration to safety rules, accident prevention regulations and environmental protection stipulations;
- Apply professional skill, knowledge, core skills & employability skills while performing jobs and solve problem during execution.
- Check the job/assembly as per drawing for functioning, identify and rectify errors in job/assembly.
- Document the technical parameters related to the task undertaken.

2.2 CAREER PROGRESSION PATHWAYS:

- Can join Crafts Instructor Training Scheme (CITS) in the trade for becoming instructor in ITIs.
- Indicative pathways for vertical mobility.



2.3 COURSE STRUCTURE:

Table below depicts the distribution of training hours across various course elements during a period of two years (*Basic Training and On-Job Training*): -

Total training duration details: -

Time (in months)	1-3	4-12	13-15	16-24
Basic Training	**Block– I**	**-----**	**Block – II**	**------**
Practical Training (On - job training)	**----**	**Block – I**	**------**	**Block – II**

A. Basic Training

For 02 yrs. course (Engg.):-(**Total 06 months:** 03 months in 1st yr. + 03 months in 2nd yr.)
For 01 yr. course (Engg.):-(**Total 03 months:** 03 months in 1st yr.)

SL. No.	Course Element	Total Notional Training Hours	
		For 02 Yrs. course	**For 01 Yr. course**
1.	Professional Skill (Trade Practical)	550	275
2.	Professional Knowledge (Trade Theory)	240	120
3.	Workshop Calculation & Science	40	20
4.	Engineering Drawing	60	30
5.	Employability Skills	110	55
	Total (Including internal assessment)	**1000**	**500**

B. On-Job Training:-

For 02 yrs. Course (Engg.) :-(**Total 18 months:** 09 months in 1st yr. + 09 months in 2nd yr.)

Notional Training Hours for On-Job Training: 3120 Hrs.

For 01 yr. course (Engg.) :-(**Total 12 months**)

Notional Training Hours for On-Job Training: 2080 Hrs.

C. Total training hours:-

Duration	Basic Training	On-Job Training	Total
For 02 yrs. course (Engg.)	1000 hrs.	3120 hrs.	4120 hrs.
For 01 yr. course (Engg.)	500 hrs.	2080 hrs.	2580 hrs.

2.4 ASSESSMENT & CERTIFICATION:

The trainee will be tested for his skill, knowledge and attitude during the period of course and at the end of the training programme as notified by Govt of India from time to time. The Employability skills will be tested in first two semesters only.

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

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

2.4.1 PASS REGULATION

The minimum pass percent for Practical is 60% & minimum pass percent for Theory subjects 40%. The candidate pass in each subject conducted under all India trade test.

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

Assessment will be evidence based comprising the following:

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

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

Performance Level	Evidence
(a) Weightage in the range of 60 -75% to be allotted during assessment	
For performance in this grade, the candidate with occasional guidance and showing due regard for safety procedures and practices, has produced work which demonstrates attainment of an acceptable standard of craftsmanship.	• Demonstration of good skill in the use of hand tools, machine tools and workshop equipment • Below 70% tolerance dimension/accuracy achieved while undertaking different work with those demanded by the component/job/set standards. • A fairly good level of neatness and consistency in the finish • Occasional support in completing the project/job.
(b)Weightage in the range of above75% - 90% to be allotted during assessment	
For this grade, the candidate, with little guidance and showing due regard for safety procedures and practices, has produced work which demonstrates attainment of a reasonable standard of craftsmanship.	• Good skill levels in the use of hand tools, machine tools and workshop equipment • 70-80% tolerance dimension/accuracy achieved while undertaking different work with those demanded by the component/job/set standards. • A good level of neatness and consistency in the finish • Little support in completing the project/job
(c) Weightage in the range of above 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% tolerance dimension/accuracy achieved while undertaking different work with those demanded by the component/job/set standards. • 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 role:

Weaving Master; organizes, controls and supervises weaving of clothes, calendaring and process preparatory to weaving such as winding, warping, sizing, etc. Instructs Jobbers for proper winding, warping and sizing of yarn. Ensures that required degree of temperature and humidity in various weaving sections is maintained. Visits sections periodically and supervises work of men in charge. Ensures that quality of cloth produced conforms to prescribed standard and suggests alterations and improvements wherever necessary. Gets machines repaired or replaced as necessary for restoration of work. Maintains quality and quantity of production and keeps machines, looms and equipment in good working order. Controls staff and maintains discipline. May introduce new methods and devices to improve quality of cloth. May conduct research for better methods of production.

Weaver, Handloom; weaves cloth from yarn on handloom. Mounts warp beam on loom. Sets healed frame in position. Draws ends of warp yarn from beam through comb and fastens them together to cloth winding roll. Places full bobbins of weft yarn in shuttle. Operates loom by pressing and relieving twofoot levers alternately to raise and lower heald, simultaneously pulling string with jerk with one hand so as to throw shuttle across warp yarn from side to side and by moving comb forward and backward with other hand to properly fill weft yarn. Draws broken ends of yarn through healed and comb and knots them. Replaces empty bobbins in shuttles. Removes cloth from roll when required length has been woven. May size and dye yarn, wind yarn on bobbins or beam and draw ends of yarn from warp beam through healds preparatory to weaving.

Weaver Power Loom; operates and tends power loom to weave cloth, checks that shuttles are in position and supplied with full weft bobbins, no wrap yarn is broken and that set-up is ready. Starts loom. Watches looms under his charge for defects in weaving. Locates broken ends of warp yarn, ties short length of yarn to broken end from warp beam, draws end through drop wire and reeds using reed hook, ties it to other end with a weaver's knot, and starts loom again. Cuts and pulls out filling of weft yarn up to point of defect, adjusts and starts loom. Replaces empty bobbin in shuttles. Cuts cloth when cloth roll becomes full.

Card Cutter; Punch Operator (Textile) operates card cutting machine for punching holes in card used for controlling pattern of cloth woven on jacquard or dobby looms. Studies designs. Spreads graph paper on table and prepares draft and plan for design, indicating places where warp is to be raised over weft. Fixes graph paper containing design on machine board. Inserts plan card into cutting machine equipped with key-board. Depresses key with fingers to punch holes into card as per diagram for controlling pattern on cloth woven. Presses lever by leg to push punched card into inner portion of machine making room for punching unpunched portion. Numbers punched cards

serially and inserts them in pegs in stand for subsequent lacing. Fixes and adjusts heald and card chain on jacquard machine. May prepare design for lattice pegging. May do lacing of cards by hand or machine to make complete design. May do lattice pegging. May fix up heald and lattice on dobby loom.

Reference NCO-2015:

(i) 2141.1500 – Weaving Master
(ii) 7318.5800 – Weaver, Handloom
(iii) 7318.5500 – Weaver Power Loom
(iv) 8152.0400 – Card Cutter

4. NSQF LEVEL COMPLIANCE

NSQF level for Weaving Technician trade under ATS: **Level 5**

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

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

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

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

The Broad Learning outcome of Weaving Technician trade under ATS mostly matches with the Level descriptor at Level- 5.

The NSQF level-5 descriptor is given below:

Level	Process required	Professional knowledge	Professional skill	Core skill	Responsibility
Level 5	Job that requires well developed skill, with clear choice of procedures in familiar context.	knowledge of facts, principles, processes and general concepts, in a field of work or study	A range of cognitive and practical skills required to accomplish tasks and solve problem by selecting and applying basic methods, tools, materials and information.	Desired mathematical skill, understanding of social, political and some skill of collecting and organizing information, communication.	Responsibility for own work and Learning and some responsibility for other's works and learning.

5. GENERAL INFORMATION

Name of the Trade	**WEAVING TECHNICIAN**
NCO - 2015	2141.1500, 7318.5800, 7318.5500, 8152.0400
NSQF Level	Level – 5
Duration of Apprenticeship Training (Basic Training + On-Job Training)	Two years (02 Blocks each of one year duration).
Duration of Basic Training	a) Block –I : 3 months b) Block – II : 3 months **Total duration of Basic Training: 6 months**
Duration of On-Job Training	a) Block–I: 9 months b) Block–II : 9 months **Total duration of Practical Training: 18 months**
Entry Qualification	Passed 10th Class with Science and Mathematics under 10+2 system of Education or its equivalent
Selection of Apprenticeship	The apprentices will be selected as per Apprenticeship Act amended time to time.
Instructors Qualification for Basic Training	As per ITI instructors qualifications as amended time to time for the specific trade.
Infrastructure of Basic Training	As per related trades of ITI
Examination	The internal examination/ assessment will be held on completion of each block. Final examination for all subjects will be held at the end of course and same will be conducted by DGT.
Rebate to Ex-ITI Trainees	01 year
CTS trades eligible for Weaving Technician Apprenticeship	1. Weaving Technician

Note:

- *Industry may impart training as per above time schedule for different block, however this is not fixed. The industry may adjust the duration of training considering the fact that all the components under the syllabus must be covered. However the flexibility should be given keeping in view that no safety aspects is compromised.*
- *For imparting Basic Training the industry to tie-up with ITIs having such specific trade and affiliated to DGT.*

6. LEARNING OUTCOME

6.1 GENERIC LEARNING OUTCOME

The following are minimum broad Common Occupational Skills/ Generic Learning Outcome after completion of the Weaving Technician course of 02 years duration under ATS.

Block I &II:-

1. Recognize & comply safe working practices, environment regulation and housekeeping.
2. Work in a team, understand and practice soft skills, technical English to communicate with required clarity.
3. Explain the concepts and principles of basic arithmetic, algebraic, trigonometric and apply knowledge of specific areas to perform practical operations which requires well developed skills
4. Understand and explain basic electrical and material sciences and apply the knowledge.
5. Read and apply engineering drawing for different application in the field of work.
6. Understand and explain the concept in productivity, quality tools, labour & welfare legislation and apply such in day to day work to improve productivity and quality.
7. Explain the general concept and process of energy conservation, global warming and pollution and contributes in day to day work by optimally using available resources.
8. Explain personnel finance management, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.
9. Apply the general concept of basic computer, basic operating system and uses of internet services to take benefit of IT developments in the industry.

6.2 SPECIFIC LEARNING OUTCOME

Block – I

1. Understand & explain basic concept of weaving, its applications & safety.
2. Analyze operation, test different textile machineries used in industries with the raw materials.
3. Perform various weaving preparatory processes using important machine settings.
4. Set up operation on different types of sizing machines, their parts, functions and their maintenance schedule.
5. Identify & apply sizing ingredients, formulation of recipe for cotton yarn, determine sizing cost and check production and efficiency of sizing machine.
6. Analyze types of reed &heald wire and their use.
7. Prepare Point Paper for basic and modified weave types with design, draft & peg plan.

8. Check Quality parameters of defective yarn samples, End break study in looms.

Block – II

9. Operate various weaving loom, their classification and Perform primary, secondary & auxiliary motion of loom using weaving machines.
10. Calculate loom constant, Production and efficiency Timing Diagram, Fabric quality parameters.
11. Perform the functions of dobby.
12. Plan & execute the operation of Jacquard loom.
13. Analyze and operate drop box loom.
14. Test various controls functions, types of Projectile loom and operate the same.
15. Detect different path and functions, types of Rapier loom and operate the same.
16. Demonstrate the operation of different process functions, types of Air-jet loom and operate the same.
17. Understand & apply QA system in textile industry.

NOTE:

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

7. LEARNING OUTCOME WITH ASSESSMENT CRITERIA

GENERIC LEARNING OUTCOME	
Learning Outcomes	**Assessment Criteria**
1. Recognize & comply safe working practices, environment regulation and housekeeping.	1.1 Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements and according to site policy.
	1.2 Recognize and report all unsafe situations according to site policy.
	1.3 Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures
	1.4 Identify, handle and store / dispose off dangerous goods and substances according to site policy and procedures following safety regulations and requirements.
	1.5 Identify and observe site policies and procedures in regard to illness or accident.
	1.6 Identify safety alarms accurately.
	1.7 Report supervisor/ Competent of authority in the event of accident or sickness of any staff and record accident details correctly according to site accident/injury procedures.
	1.8 Identify and observe site evacuation procedures according to site policy.
	1.9 Identify Personal Productive Equipment (PPE) and use the same as per related working environment.
	1.10 Identify basic first aid and use them under different circumstances.
	1.11 Identify different fire extinguisher and use the same as per requirement.
	1.12 Identify environmental pollution & contribute to the avoidance of instances of environmental pollution.
	1.13 Deploy environmental protection legislation & regulations
	1.14 Take opportunities to use energy and materials in an environmentally friendly manner
	1.15 Avoid waste and dispose waste as per procedure
	1.16 Recognize different components of 5S and apply the same in the working environment.

2. Work in a team, understand and practice soft skills, technical English to communicate with required clarity	2.1	Obtain sources of information and recognize information.
	2.2	Use and draw up technical drawings and documents.
	2.3	Use documents and technical regulations and occupationally related provisions.
	2.4	Conduct appropriate and target oriented discussions with higher authority and within the team.
	2.5	Present facts and circumstances, possible solutions &use 14 English special terminology.
	2.6	Resolve disputes within the team
	2.7	Conduct written communication.
3. Explain the concepts and principles of basic arithmetic, algebraic, trigonometric and apply knowledge of specific areas to perform practical operations which requires well developed skills	3.1	Terminal examination to test basic skills on arithmetic, algebra, trigonometry and statistics.
	3.2	Their applications will also be assessed during execution of assessable outcome and also tested during theory and practical examination.
4. Understand and explain basic electrical and material sciences and apply the knowledge.	4.1	Terminal examination to test basic skills on science in the field of study including basic electrical and hydraulics & pneumatics.
	4.2	Their applications will also be assessed during execution of assessable outcome and also tested during theory and practical examination.
5. Read and apply engineering drawing for different application in the field of work.	5.1	Terminal examination to test basic skills on engineering drawing.
	5.2	Their applications will also be assessed during execution of assessable outcome and also tested during theory and practical examination.
6. Understand and explain the concept in productivity, quality tools, labour & welfare legislation and apply such in day to day work to improve	6.1	Terminal examination to test the concept in productivity, quality tools and labour welfare legislation.
	6.2	Their applications will also be assessed during execution of assessable outcome.

productivity and quality.	
7. Explain the general concept and process of energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.	7.1 Terminal examination to test knowledge on energy conservation, global warming and pollution. 7.2 Their applications will also be assessed during execution of assessable outcome.
8. Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.	8.1 Terminal examination to test knowledge on personnel finance, entrepreneurship. 8.2 Their applications will also be assessed during execution of assessable outcome.
9. Apply the general concept of basic computer, basic operating system and uses of internet services to take benefit of IT developments in the industry.	9.1 Terminal examination to test knowledge on basic computer working, basic operating system and uses internet services. 9.2 Their applications will also be assessed during execution of assessable outcome.
SPECIFIC OUTCOME	
Block-I & II	
*Assessment Criteria i.e. the standard of performance, for each specific learning outcome mentioned under **block – I & block – II**(section: 10) must ensure that the trainee achieves well developed skill with clear choice of procedure in familiar context. Assessment criteria should broadly cover the aspect of **Planning** (Identify, ascertain, estimate etc.); **Execution** (perform, illustration, demonstration etc. by applying 1) a range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information 2) Knowledge of facts, principles, processes, and general concepts, in a field of work or study 3)Desired Mathematical Skills and some skill of collecting and organizing information, communication) and **Checking/ Testing** to ensure functionality during the assessment of each outcome. The assessments parameters must also ascertain that the candidate is responsible for own work and learning and some responsibility for other's work and learning.*	

BASIC TRAINING (Block – I)

Duration: (03) Three Months

WEEK No.	PROFESSIONAL SKILLS (TRADE PRACTICAL)	PROFESSIONAL KNOWLEDGE (TRADE THEORY)
01	Implementation of various safety measures in the shop floor. Visit to different sections of the Institute. Demonstration of elementary first aid. Artificial Respiration. Practice on use of fire extinguishers. Occupational Safety & Health. Importance of housekeeping & good shop floor practices. Health, Safety and Environment guidelines, legislations & regulations as applicable. Disposal procedure of waste materials like cotton waste, metal chips/burrs etc. Basic safety introduction, Personal protective Equipment(PPE):- Basic injury prevention, Basic first aid, Hazard identification and avoidance, safety signs for Danger, Warning, caution & personal safety message. Preventive measures for electrical accidents & steps to be taken in such accidents. Use of Fire extinguishers.	Occupational Safety & Health Basic safety introduction, Personal protection:- Basic injury prevention, Basic first aid, Hazard identification and avoidance, safety signs for Danger, Warning, caution & personal safety message. Use of Fire extinguishers. Visit & observation of sections. Various safety measures involved in the Industry. Elementary first Aid. Concept of Standard Introduction of First aid. Operation of electrical mains. Introduction of PPEs. Introduction to 5S concept & its application. Response to emergencies eg; power failure, fire, and system failure.
02-03	Visit to spinning, Weaving and Chemical Processing units. Collect various Samples of intermediate products in spinning Collect various yarn samples: Cotton Yarn, Blended Yarns, Filament Yarns, Synthetic Yarns	Orientation to Fibers: Definition of Textile Fiber. Classification of fibers with respect to Origin - natural, synthetic (man-made) and Regenerated types. Orientation to yarn manufacture: Intermediate Products in Spinning Process: Bale, Lap, Silver, Comber Lap, Roving, Ring frame Cone / Spool
04	Identify various Weaving Preparatory Machines.	Weaving Preparatory: Process Flow from yarn to fabric for

	Industrial visit to see warp winding, Warping, Sizing& Beaming, Gaiting & Pirn Winding Machine. (20 hrs)	cotton, blended synthetic yarns, types and sizes of yarn.
05	Warp Winding, Warping, Sizing& Beaming, Gaiting and Pirn Winding	Warp Winding: Objects of Warp Winding, Types & functions, Drive system,
06	Gearing arrangement, Passage of yarn, Winding &wind, wind per double traverse setting length & diameter setting.	Different types of packages (Cone/spool/cheese). Tensioning arrangement, Stop Motion, Length & Diameter adjustment motion.
07	Setting of tensioner, Slub catcher, lubrication, maintenance schedules	Winding package build up, tensioner, slub catcher,
08	Calculation of different important parameter of winding machine along with production & efficiency calculation.	Yarn Clearers, Types, Mechanical and Electronic clearers, etc. Different types of knots.
09	Calculate different important parameters of various sizing machines.	Brief study of package faults, causes and remedies. Study of Modern fully automatic sizing machines.
10	Study of Control valves (Direction control valves and gate valves) servicing.	Sizing and Beaming machine: Objects of Sizing, Parts and functions– types of machines, types of speed regulator. PIV, regulator and variator.
11	Determination of Sizing Cost, Percentage of application,	Sizing Ingredients, Formulation of size recipe for cotton yarn and its blends. Size Mixing and Cooking etc.
12	Observation of Reed/Dents, Dent spacing.	Expression of Reed/Heald Count: Methods, different popular reed count System, Irish systems.
13	Point Paper representation for basic weaves patterns. Collection of defective package sample, End breakage study on looms producing fabrics	Designing of Basic Weaves: Plain, Derivatives of Plain Weaves. Yarn Quality Requirements: Yarn defects and remedies
	Assessment/Examination 03days	

NOTE: - *More emphasis to be given on video/real-life pictures during theoretical classes. Some real-life pictures/videos of related industry operations may be shown to the trainees to give a feel of Industry and their future assignment.*

BASIC TRAINING (Block – II)

Duration: (03) Three Months

WEEK NO.	PROFESSIONAL SKILLS (TRADE PRACTICAL)	PROFESSIONAL KNOWLEDGE (TRADE THEORY)
01-02	Familiarization to Weaving machines, Industrial Visit to Handloom, Non automatic and automatic power loom, Shuttleless looms etc.	Fabric Formation: Principle, classification of looms – Handloom, Non-automatic and automatic power loom.
03	Study and analyze timing diagram of various types looms and its effect on fabric quality, productivity and efficiency, etc.	Study Loom Timing diagram.
04	Knife setting- selector pirn setting –return spring boxes –shed setting, Lubrication, schedule etc.	Dobby: Objectives, Parts and functions, Purpose and Principle, Card Cylinder, Single and double lift dobbies, paper and wooden lattice dobbies.
05-06	Card punching – Synchronizing with loom-lift. Setting of jacquard-cam throws setting-harness setting and trying lubrication.	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 board-drafts-principle parts of the jacquard machine-sizes and figuring capacities of jacquard.
07	Picking timing of drop box looms –slay dwell of box loom– box alignment with race board –synchronizing of drop box with crank shaft of the loom.	Drop Box Loom: Objectives, Parts and functions, types of drop box motion – common uses of Eccle's and cam type drop box loom – single, double and triple box lift, dobby controlled drop box.
08-09	Torsion rod setting. Guide tooth setting. Receiving unit and brake setting of Projectile Loom.	Projectile Loom : Introduction – main features-advantages -basic drive-clutch brake-weft transfer (picking mechanism)
10	Settings 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	Rapier Loom: Introduction – main features – advantages – method of weft insertion-types of weft stop- remedy for each type of weft stop.

	resetting picks/inch setting.	
11-12	Air insertion settings. Solenoid valve setting. Deciding no. of nozzles required-settings through microprocessor. Measuring air consumption.	Air-jet Loom: Introduction – main features-advantages – weft insertion cycle with profile speed – Loom timing - drives-clutch-brake-weft transfer-deciding no. of nozzles required-technique of measuring air consumption
13	Familiarization to QA Systems: Visit to Companies, which have ISO 9000 certification. Concept of fabric quality.	Quality Assurance: Concepts of quality, Control and Assurance. Introduction to ISO 9001-2000, ISO 14001-2004 & SA 8000systems,OHSAS-18001- 1999.Testing of fabric Quality.
	Assessment/Examination 03days	

NOTE: -

- *More emphasis to be given on video/real-life pictures during theoretical classes. Some real-life pictures/videos of related industry operations may be shown to the trainees to give a feel of Industry and their future assignment.*

9.1 WORKSHOP CALCULATION SCIENCE & ENGINEERING DRAWING

Block – I		
Sl. No.	**Workshop Calculation and Science (Duration: - 20 hrs.)**	**Engineering Drawing (Duration : - 30 hrs.)**
1.	**Unit:** Systems of unit- FPS, CGS, MKS/SI unit, unit of length, Mass and time, Conversion of units.	**Engineering Drawing:** Introduction and its importance - Viewing of engineering drawing sheets. Method of Folding of printed Drawing Sheet as per BIS SP:46- 2003 Drawing Instruments : their Standard and uses - Drawing board, T-Square, Drafter (Drafting M/c), Set Squares, Protractor, Drawing Instrument Box (Compass, Dividers, Scale, Diagonal Scales etc.), Pencils of different Grades, Drawing pins / Clips.
2.	**Fractions & Simplification:** Fractions, Decimal fraction, Multiplication and Division of Fractions and Decimals, conversion of Fraction to Decimal and vice versa. Simple problems Simplification using BODMAS.	**Lines :** - Definition, types and applications in Drawing as per BIS SP:46-2003 - Classification of lines (Hidden, centre, construction, Extension, Dimension, Section) - Drawing lines of given length (Straight, curved) - Drawing of parallel lines, perpendicular line - Methods of Division of line segment
3.	**Square Root:** Square and Square Root, method of finding out square roots, Simple problem using calculator	**Drawing of Geometrical Figures:** Definition, nomenclature and practice of - - Angle: Measurement and its types, method of bisecting. - Triangle -different types - Rectangle, Square, Rhombus, Parallelogram. - Circle and its elements.
4.	**Ratio &Proportion:** Simple calculation on related problems.	**Lettering and Numbering as per BIS SP46-2003:** - Single Stroke, Double Stroke, inclined, Upper case and Lower case.
5.	**Percentage:** Introduction, Simple calculation. Changing percentage to decimal and fraction and viceversa.	**Free Hand sketch:** Hand tools and measuring instruments used in electronics mechanics trades
6.	**Material Science:** properties - Physical & Mechanical, Types – Ferrous & Non-Ferrous, difference between Ferrous and	**Free hand drawing:** - Lines, polygons, ellipse, etc. - geometrical figures and blocks with dimension. - Transferring measurement from

	Non-Ferrous metals, introduction of Iron, Cast Iron, Wrought Iron, Steel, difference between Iron and Steel, Alloy steel, carbon steel, stainless steel, Non-Ferrous metals, Non-Ferrous Alloys.	the given object to the free hand sketches.
Block – II		
Sl. No.	**Workshop Calculation and Science (Duration: - 20 hrs.)**	**Engineering Drawing (Duration: - 30 hrs.)**
1.	**Mass ,Weight and Density:** Mass, Unit of Mass, Weight, difference between mass and weight, Density, unit of density, specific gravity of metals	**Symbolic Representation (as per BIS SP:46-2003) of :** - Fastener (Rivets, Bolts and Nuts) - Bars and profile sections - Weld, brazed and soldered joints. - Electrical and electronics element - Piping joints and fittings
2.	**Work, Power and Energy:** work, unit of work, power, unit of power, Horse power of engines, mechanical efficiency, energy, use of energy, potential and kinetic energy, examples of potential energy and kinetic energy	Construction of Scales and diagonal scale
3.	**Algebra:** Addition, Subtraction, Multiplication, Division, Algebraic formula, Linear equations (with two variables).	Heald wire, pulley, Drop Pin , Shuttle , Loom Drive, Auxillary shaft
4.	**Mensuration:** Area and perimeter of square, rectangle, parallelogram, triangle, circle, semi circle. Volume of solids – cube, cuboid, cylinder and Sphere. Surface area of solids – cube, cuboid, cylinder and Sphere.	Temple , Temple cutter , Slay Board , Return Spring Box , Harness Comber Board ,Tappet
5.	**Trigonometry:** Trigonometrical ratios, measurement of angles. Trigonometric tables. Finding height and distance by trigonometry.	Rapier , Weft Winder , Cutter , Beam , Tension Disc, Ballon Brake Disc, Reed

9.2 EMPLOYABILITY SKILLS

(DURATION: - 110 HRS.)

Block – I (Duration – 55 hrs.)	
1. English Literacy Duration : 20 Hrs.	Marks : 09
Pronunciation	Accentuation (mode of pronunciation) on simple words, Diction (use of word and speech)
Functional Grammar	Transformation of sentences, Voice change, Change of tense, Spellings.
Reading	Reading and understanding simple sentences about self, work and environment
Writing	Construction of simple sentences Writing simple English
Speaking / Spoken English	Speaking with preparation on self, on family, on friends/ classmates, on know, picture reading gain confidence through role-playing and discussions on current happening job description, asking about someone's job habitual actions. Cardinal (fundamental) numbers ordinal numbers. Taking messages, passing messages on and filling in message forms Greeting and introductions office hospitality, Resumes or curriculum vita essential parts, letters of application reference to previous communication.
2. I.T. Literacy Duration : 20 Hrs.	Marks : 09
Basics of Computer	Introduction, Computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down of computer.
Computer Operating System	Basics of Operating System, WINDOWS, The user interface of Windows OS, Create, Copy, Move and delete Files and Folders, Use of External memory like pen drive, CD, DVD etc, Use of Common applications.
Word processing and Worksheet	Basic operating of Word Processing, Creating, opening and closing Documents, use of shortcuts, Creating and Editing of Text, Formatting the Text, Insertion & creation of Tables. Printing document. Basics of Excel worksheet, understanding basic commands, creating simple worksheets, understanding sample worksheets, use of simple formulas and functions, Printing of simple excel sheets.
Computer Networking and Internet	Basic of computer Networks (using real life examples), Definitions of Local Area Network (LAN), Wide Area Network (WAN), Internet, Concept of Internet (Network of Networks), Meaning of World Wide Web (WWW), Web Browser, Web Site, Web page

	and Search Engines. Accessing the Internet using Web Browser, Downloading and Printing Web Pages, Opening an email account and use of email. Social media sites and its implication. Information Security and antivirus tools, Do's and Don'ts in Information Security, Awareness of IT - ACT, types of cyber crimes.
3. Communication Skills Duration : 15 Hrs. Marks : 07	
Introduction to Communication Skills	Communication and its importance Principles of Effective communication Types of communication - verbal, non verbal, written, email, talking on phone. Non verbal communication -characteristics, components-Para-language Body language Barriers to communication and dealing with barriers. Handling nervousness/ discomfort.
Listening Skills	Listening-hearing and listening, effective listening, barriers to effective listening guidelines for effective listening. Triple- A Listening - Attitude, Attention & Adjustment. Active Listening Skills.
Motivational Training	Characteristics Essential to Achieving Success. The Power of Positive Attitude. Self awareness Importance of Commitment Ethics and Values Ways to Motivate Oneself Personal Goal setting and Employability Planning.
Facing Interviews	Manners, Etiquettes, Dress code for an interview Do's & Don'ts for an interview.
Behavioral Skills	Problem Solving Confidence Building Attitude
Block – II **Duration – 55 hrs.**	
4. Entrepreneurship Skills Duration : 15 Hrs. Marks : 06	
Concept of Entrepreneurship	Entrepreneur - Entrepreneurship - Enterprises:-Conceptual issue Entrepreneurship vs. management, Entrepreneurial motivation. Performance & Record, Role & Function of entrepreneurs in relation to the enterprise & relation to the economy, Source of business ideas, Entrepreneurial opportunities, The process of setting up a business.

Project Preparation & Marketing analysis	Qualities of a good Entrepreneur, SWOT and Risk Analysis. Concept & application of PLC, Sales & distribution Management. Different Between Small Scale &Large Scale Business, Market Survey, Method of marketing, Publicity and advertisement, Marketing Mix.
Institutions Support	Preparation of Project. Role of Various Schemes and Institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non financing support agencies to familiarizes with the Policies /Programmes & procedure & the available scheme.
Investment Procurement	Project formation, Feasibility, Legal formalities i.e., Shop Act, Estimation & Costing, Investment procedure - Loan procurement - Banking Processes.
5. Productivity Duration : 10 Hrs. Marks : 05	
Benefits	Personal / Workman - Incentive, Production linked Bonus, Improvement in living standard.
Affecting Factors	Skills, Working Aids, Automation, Environment, Motivation - How improves or slows down.
Comparison with developed countries	Comparative productivity in developed countries (viz. Germany, Japan and Australia) in selected industries e.g. Manufacturing, Steel, Mining, Construction etc. Living standards of those countries, wages.
Personal Finance Management	Banking processes, Handling ATM, KYC registration, safe cash handling, Personal risk and Insurance.
6. Occupational Safety, Health and Environment Education Duration : 15 Hrs. Marks : 06	
Safety & Health	Introduction to Occupational Safety and Health importance of safety and health at workplace.
Occupational Hazards	Basic Hazards, Chemical Hazards, Vibroacoustic Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards. Occupational health, Occupational hygienic, Occupational Diseases/ Disorders & its prevention.
Accident & safety	Basic principles for protective equipment. Accident Prevention techniques - control of accidents and safety measures.
First Aid	Care of injured & Sick at the workplaces, First-Aid & Transportation of sick person.
Basic Provisions	Idea of basic provision legislation of India. safety, health, welfare under legislative of India.

Ecosystem	Introduction to Environment. Relationship between Society and Environment, Ecosystem and Factors causing imbalance.
Pollution	Pollution and pollutants including liquid, gaseous, solid and hazardous waste.
Energy Conservation	Conservation of Energy, re-use and recycle.
Global warming	Global warming, climate change and Ozone layer depletion.
Ground Water	Hydrological cycle, ground and surface water, Conservation and Harvesting of water.
Environment	Right attitude towards environment, Maintenance of in -house environment.
7. Labour Welfare Legislation Duration : 05 Hrs. Marks : 03	
Welfare Acts	Benefits guaranteed under various acts- Factories Act, Apprenticeship Act, Employees State Insurance Act (ESI), Payment Wages Act, Employees Provident Fund Act, The Workmen's compensation Act.
8. Quality Tools Duration : 10 Hrs. Marks : 05	
Quality Consciousness	Meaning of quality, Quality characteristic.
Quality Circles	Definition, Advantage of small group activity, objectives of quality Circle, Roles and function of Quality Circles in Organization, Operation of Quality circle. Approaches to starting Quality Circles, Steps for continuation Quality Circles.
Quality Management System	Idea of ISO 9000 and BIS systems and its importance in maintaining qualities.
House Keeping	Purpose of House-keeping, Practice of good Housekeeping.
Quality Tools	Basic quality tools with a few examples.

10. DETAILS OF COMPETENCIES (ON-JOBTRAINING)

BROAD LEARNING TO BE COVERED IN INDUSTRY FOR WEAVING TECHNICIAN TRADE:

1. Safety and best practices /Basic Industrial Culture (5S, KAIZEN, etc.)
2. Record keeping and documentation
3. Making components observing different metal removing procedure and perform different fitting job.
4. Assembling of different components as per requirement and check functionality.
5. Carryout maintenance of different machines including hydraulics & pneumatics system.

Note: Actual training will depend on the existing facilities available in the establishments.

The **competencies/ specific outcomes** on completion of On-Job Training are detailed below: -

Block – I

1. Understand & explain basic concept of weaving, its applications & safety.
2. Analyze operation, test different textile machineries used in industries with the raw materials.
3. Perform various weaving preparatory processes using important machine settings.
4. Set up operation on different types of sizing machines, their parts, functions and their maintenance schedule.
5. Identify & apply sizing ingredients, formulation of recipe for cotton yarn, determine sizing cost and check production and efficiency of sizing machine.
6. Analyze types of reed &heald wire and their use.
7. Prepare Point Paper for basic and modified weave types with design, draft & peg plan.
8. Check Quality parameters of defective yarn samples, End break study in looms.

Block – II

9. Operate various weaving loom, their classification and Perform primary, secondary & auxiliary motion of loom using weaving machines.
10. Calculate loom constant, Production and efficiency Timing Diagram, Fabric quality parameters.
11. Perform the functions of dobby.
12. Plan & execute the operation of Jacquard loom.
13. Analyze and operate drop box loom.
14. Test various controls functions, types of Projectile loom and operate the same.
15. Detect different path and functions, types of Rapier loom and operate the same.

16. Demonstrate the operation of different process functions, types of Air-jet loom and operate the same.
17. Understand & apply QA system in textile industry.

Note:

1. Industry must ensure that above mentioned competencies are achieved by the trainees during their on job training.

2. In addition to above competencies/ outcomes industry may impart additional training relevant to the specific industry.

ANNEXURE – I

INFRASTRUCTURE FOR PROFESSIONAL SKILL & PROFESSIONAL KNOWLEDGE

WEAVING TECHNICIAN			
LIST OF TOOLS AND EQUIPMENT for Basic Training (For 20 Apprentices)			
A. TRAINEES TOOL KIT (For each additional unit trainees tool kit Sl. 1-18 is required additionally)			
Sl. no.	**Name of the Tool &Equipments**	**Specification**	**Quantity**
1	Combination Plier	200 mm insulated	21 Nos.
2	Screw Driver	200 mm	21 Nos.
3	Screw Driver	100 mm	21 Nos.
4	Terminal Screw Driver		21 Nos.
5	Hammer Ball Pein	0.25 kg	21 Nos.
6	Try Square	200 mm	21 Nos.
7	Neon Tester		21 Nos.
8	Steel Rule	300mm to read Metric	21 Nos.
B : INSTRUMENTS & GENERAL SHOP OUTFIT			
19.	Pliers side cutting	200 mm	03 Nos.
20.	Pliers flat nose	150 mm	03 Nos.
21.	Pliers round nose		03 Nos.
22.	Pliers long nose		03 Nos.
23.	Screw driver heavy duty	250 mm	03 Nos.
24.	Screw driver	7 mm x 300 mm square blade	03 Nos.
25.	Hammer Ball Pein	0.5 kg	03 Nos.
26.	Hammer Ball Pein	0.75 kg	03 Nos.
27.	Hammer Ball Pein	1 Kg	03 Nos.
28.	Hammer Cross Pein	0.5 kg	03 Nos.
29.	Spanner double ended set of 6		02 SET
30.	Adjustable Spanner	350 mm	03 Nos.
31.	Allen keys Metric & Inches		02 SET EACH
32.	Steel Measuring Tape	2 mtr	03 Nos.
33.	Steel Measuring Tape	20mtr	03 Nos.
34.	Hacksaw frame Adjustable	200 mm to 300 mm	05 Nos.

35.	Bench vice	150 mm	04 Nos.
36.	Pipe Wrench	300 mm	02 Nos.
37.	Spanner up to	32 mm	02 SET
38.	Ring spanner		02 SET
39.	Nylon hammer		03 Nos.
40.	Puller	2 arm, 3 arm	02 EACH
41.	Machine leveling gauge (Spirit level)		01 No.
42.	Greasing pump		01 No.
43.	Spindle oil lubricating machine		01 No.
44.	Roll trueing machine		01 No.
45.	Pressure gauge		01 No.
46.	Tachometer		01 No.
47.	Tensionometer		01 No.
48.	Work bench		02 Nos.
49.	Locker with 10 drawers (standard size)		02 Nos.
50.	Steel almirah / cupboard		01 No.
51.	Instructor's table& chair		01 set
C : GENERAL MACHINERY INSTALLATIONS			
52.	Warp Winding Machine		01 No.
53.	Pirn Winder		01 No.
54.	Plain loom with Dobby		01 No.
55.	Handloom with jack & loom arrangement		01 No.
56.	Drum Type/ sectional warping & Beaming machine		01No.
57.	Handloom with Jacquard		01No.
58.	Semiautomatic Power Loom		01 No.
59.	Hand Knotter, Splicer etc		01 No.
60.	Shuttleless Repair loom		01 No.

INFRASTRUCTURE FOR WORKSHOP CALCULATION & SCIENCE AND ENGINEERING DRAWING

TRADE: WEAVING TECHNICIAN
LIST OF TOOLS& EQUIPMENTS FOR -20APPRENTICES

1) Space Norms : 45 Sq. m.(For Engineering Drawing)

2) Infrastructure:

A : TRAINEES TOOL KIT:-			
Sl. No.	**Name of the items**	**Specification**	**Quantity**
1.	Draughtsman drawing instrument box		20+1 set
2.	Set square celluloid 45^o (250 X 1.5 mm)		20+1 set
3.	Set square celluloid 30^o-60^o (250 X 1.5 mm)		20+1 set
4.	Mini drafter		20+1 set
5.	Drawing board (700mm x500 mm) IS: 1444		20+1 set
B : Furniture Required			
Sl. No.	**Name of the items**	**Specification**	**Quantity**
1	Drawing Board		20
2	Models : Solid & cut section		as required
3	Drawing Table for trainees		as required
4	Stool for trainees		as required
5	Cupboard (big)		01
6	White Board	8ft. x 4ft	01
7	Trainer's Table		01
8	Trainer's Chair		01

Tools & Equipments for Employability Skills		
Sl. No.	**Name of the Equipment**	**Quantity**
1.	**Computer (PC) with latest configurations and Internet connection with standard operating system and standard word processor and worksheet software**	**10 Nos.**
2.	**UPS - 500VA**	**10 Nos.**
3.	**Scanner cum Printer**	**1 No.**
4.	**Computer Tables**	**10 Nos.**
5.	**Computer Chairs**	**20 Nos.**
6.	**LCD Projector**	**1 No.**
7.	**White Board 1200mm x 900mm**	**1 No.**
Note: - Above Tools & Equipments not required, if Computer LAB is available in the institute.		

ANNEXURE-II

FORMAT FOR INTERNAL ASSESSMENT

Name & Address of the Assessor :	**Year of Enrollment :**
Name & Address of ITI (Govt./Pvt.) :	**Date of Assessment :**
Name & Address of the Industry :	**Assessment location: Industry / ITI**
Trade Name : **Semester:**	**Duration of the Trade/course:**
Learning Outcome:	

Sl. No	**Candidate Name**	**Father's/Mother's Name**	Safety consciousness	Workplace hygiene	Attendance/ Punctuality	Ability to follow Manuals/ Written instructions	Application of Knowledge	Skills to handle tools & equipment	Economical use of materials	Speed in doing work	Quality in workmanship	VIVA	**Total internal assessment Marks**	**Result (Y/N)**
Maximum Marks (Total 100 Marks)			**15**	**5**	**10**	**5**	**10**	**10**	**5**	**10**	**15**	**15**		
1														
2														