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

COMPETENCY BASED CURRICULUM

METAL CUTTING ATTENDANT
(FOR VISUALLY IMPAIRED)

(Duration: Two Years)

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 4

SECTOR–CAPITAL GOODS AND MANUFACTURING

Directorate General of Training

METAL CUTTING ATTENDANT
(FOR VISUALLY IMPAIRED)

(Engineering Trade)

(Revised in March 2023)

Version: 2.0

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL – 4

Developed By

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE

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

Kolkata – 700 091

www.cstaricalcutta.gov.in

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1. COURSE INFORMATION

In the two-year duration, the visually impaired candidate is trained on subjects: professional skill, professional knowledge as well as employability skills related to job role. In addition, the visually impaired (either partial or full blind) candidate is entrusted project work with proper supervision. Extracurricular activities are used to build up his confidence. Following the Basic Skills development practice, his Practical Skills are gradually developed up to level 3 (i.e. in NSQ notification from unskilled to semiskilled). Simultaneously, Theory Subjects are taught in the same hands on manner, to have him apply his growing knowledge base to executing his practical tasks.

The Broad components covered during the course are given below:

FIRST YEAR: In this year the contents covered are the safety aspects related to the trade and basic skills. Arm movement, finger movement, gross and fine manipulation, finger dexterity, memory of location as well as memory of shape, and reaction time are developed. Also, in focus are the development of the concept of shapes – square, triangle, rectangle, hexagon, etc – together with the basic fitting operations, viz. filling, sawing, drilling, tapping, checking by Go – No Go gauge, along with handling jigs and fixtures, sheet metal work, and riveting joints with pop-rivet gun. The candidate learns to identify and mount different job holding devices with standard operations practice in the lathe machine, with specified accuracy through 1alipers; dissimilar material fit as per required tolerance. Further skills are developed in different turning operations, parallel and taper turning by from tool and swiveling compound rest.

SECOND YEAR: In this year, the candidate learns to use external and internal thread (BSF) to produce male /female components with turning long shaft in the lathe. He prepares different components in capstan lathe which is more suitable for the visual impaired. Further, cutting materials in power saw machine and shearing operations are learnt, with assistance. In this year different operations are learnt on the shaping machine and milling machine which also include setting simple operations and maintenance work, with assistance. Practice on the skills learnt in the previous six months is stressed.

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.

Metal Cutting Attendant (For Visually Impaired) trade under CTS is one of the popular courses delivered nationwide through a network of ITIs. The course is of two years duration. It mainly consists of Domain area and Core area. The Domain area (Trade Theory & Practical) impart professional skills and knowledge, while Core area (Employability Skills) impart requisite core skill, knowledge and life skills. After passing out the training program, the trainee is awarded National Trade Certificate (NTC) by DGT which is recognized worldwide.

Candidates broadly need to demonstrate that they are able to:

- Read & interpret technical parameters/documentation, identify necessary materials and tools.
- Perform task with due consideration to safety rules, accident prevention regulations.
- Apply professional knowledge, core skills & employability skills while performing the job and machining work.
- Check the job/components as per drawing/ sample for functioning.

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.
- Self-Employment
- Work in the industry as a supporting staff in Metal Cutting operation or any other related areas.

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
3	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
5	Optional Courses (10th/ 12th class certificate along with ITI certification or add on short term courses)	240	240

Trainees of one-year or two-year trade can also opt for optional courses ofup 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 have to maintain 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 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 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

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 assessment. Due consideration should be given while assessing for teamwork, 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 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 examination 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 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 • 60-70% 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)Marks 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% 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) Marks 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% 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

The Metal-cutting Attendant (for V.I.) operates various types of power driven metal cutting machines with ease. He does so by measuring out the sample, with measuring instruments, to note its different dimensions and the sequence of operations needed for the job, with assistance. He identifies the metal piece, mounting on chuck, or jig, or fixtures, and cutter on appropriate machine (lathe, shaper, drill, milling, power saw and shearing), with assistance. He undertakes all repetitive work on lathe, Capstan lathe, drill and other machines and puts them to good use.

Note: The Job Role is modified from that of a fully able person. A visually impaired person is unable to grind any tool, measure according to the drawing, cut the internal or external thread on lathe and adjust tool-travel.

May be designated as **Metal Cutting Attendant (For Visually Impaired)** according to nature of work done

Reference NCO-2015:

a) 7223.0500 - Mechanist, General/Machinist

Reference NOS:

a) CSC/N0110
b) CSC/N0304
c) CSC/N0301
d) CSC/N0308
e) CSC/N9402
f) CSC/N0108
g) ISC/N9451

4. GENERAL INFORMATION

Name of the Trade	**METAL CUTTING ATTENDANT (FOR VISUALLY IMPAIRED)**
Trade Code	DGT/1115
Ref. NCO - 2015	7223.0500
NOS Covered	CSC/N0110, CSC/N0304, CSC/N0301, CSC/N0308, CSC/N9402, CSC/N0108, ISC/N9451
NSQF Level	Level-4
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. (Candidate should be visually impaired).
Minimum Age	14 years as on first day of academic session.
Eligibility for PwD	Visually Impaired
Unit Strength (No. Of Students)	12 (There is no separate provision of supernumerary seats)
Space Norms	100 Sq. m
Power Norms	18 KW
Instructors Qualification for	
1. Metal Cutting Attendant (For Visually Impaired) Trade	B.Voc/Degree in Mechanical Engineering from AICTE/UGC recognized Engineering College/ university with one-year experience in the relevant field. **OR** 03 years Diploma in Mechanical 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 passed in the trade of "Machinist" with three years' experience in the relevant field. **Essential Qualification:** Relevant Regular / RPL variants of National Craft Instructor Certificate (NCIC) under DGT. ***NOTE: - Out of two Instructors required for the unit of 2(1+1), one***

	must have Degree/Diploma and other must have NTC/NAC qualifications. However, both of them must possess NCIC in any of its variants.
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. **<u>Essential Qualification:</u>** Regular / RPL variants of National Craft Instructor Certificate (NCIC) in relevant trade **OR** Regular / RPL variants NCIC in RoDA or any of its variants under DGT
3. 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.
4. 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 OUTCOME

FIRST YEAR:

1. Perform basic task involving motor skill and develop dexterity to build confidence in doing day to day activity following safety precautions. (NOS: ISC/N9451)
2. Make simple components by different basic fitting and develop proper real time testing through motor skills programme. [Basic fitting operations: Fitting, Hack sawing, Dieing, Tapping etc.] (NOS: CSC/N0304)
3. Produce components by different operations and check accuracy using specific gauges and measuring instruments. [Different operations: drilling, reaming, tapping, etc. in

bench, pillar and radial drill machine; specific gauges and instruments; go/ no-go gauge; Braille micrometer] (NOS: CSC/N0304)

4. Produce components of sheet metal and riveting joints using stakes, mallet, and pop-rivet gun. (NOS: CSC/N0301)
5. Make simple components by different operations and setting different shaped jobs, with assistance. [Different chucks, with different shaped jobs: round, square, hexagonal.] (NOS: CSC/N0308)
6. Set different cutting tools, with assistance, to produce jobs by performing different turning operations. [Different cutting tool – V-tool, side cutting tool (R.H. and L.H.) with accuracy ±1/64" through callipers. Different turning operations: Plain, facing, drilling, grooving, parallel and step turning, parting, chamfering] (NOS: CSC/N0110)
7. Make dissimilar material fit as per required tolerance ±.0625" or ±1/64" by drilling and boring in lathe (Plain and Stepped) [Dissimilar materials: H.S.S. in Brass, Aluminium in cast iron etc.] (NOS: CSC/N0304, CSC/N0110)
8. Set cylindrical/hexagonal job on lathe and make simple components performing different taper turning operations. (Different turning operations parallel and taper turning (external only) by form tool, swivelling compound rest. (NOS: CSC/N0110)
9. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS: CSC/N9402)

SECOND YEAR:

10. Set non-ferrous metal components for dieing & taping over male and female threaded components, by using die & tap. (Different external and internal thread. (BSF) (NOS: CSC/N0304)
11. Prepare job by turning long shaft using steadies and setting different machining parameters and cutting tools, with assistance. (NOS: CSC/N0110)
12. Prepare job by performing operations in Capstan Lathe using three jaw chuck and collect chuck with assistance. (NOS: CSC/N0110)
13. Cut out components of various shape and size in Power Saw Machine, by setting different parameters. (NOS: CSC/N0301)
14. Set the different machining parameters to prepare job by performing shearing operations with assistance. (NOS: CSC/N0301)

15. External - Set the different machining parameters to produce plain surface, square and Vee-Slot, internal - Key way as well as square shape on round head using shaper with assistance. (NOS: CSC/N0110)
16. Set the different components of machine and parameters to prepare job by performing different milling operation with assistance. [Different machining parameters – feed, speed and depth of cut, Different milling operations: plain, face, step milling] (NOS: CSC/N0108)
17. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (*NOS: CSC/N9402)*

6. ASSESSMENT CRITERIA

LEARNING OUTCOMES	ASSESSMENT CRITERIA
FIRST YEAR	
1. Perform basic task involving motor skill and develop dexterity to build confidence in doing day to day activity following safety precautions.	Recognize cylindrical Block – its placing, positioning by properly counting.
	Carryout exercise on Minnesota Rate of Manipulation Test - (i) Displacing (ii) Turning
	Recognize bolts and nuts and perform both-hand coordination and finger dexterity.

(NOS: ISC/N9451)	Carryout exercise on Pennsylvania Bi-manual work sample – (i) Assembly (ii) Disassembly
	Recognize small size pin (peg), washer and collar for development of fine manipulation, both-hand coordination and memory of shape.
	Carryout exercise on Purdue pegboard : (i) Right hand (ii) Left hand (iii) both hand (iv) Assembly
	Recognize small size pin as well as collar, use of tweezers for development of fine manipulation and both hand coordination.
	Carryout exercise on Crawford small parts dexterity Test : (i) Pin & Collar (ii) Screw
	Recognize screw and screw driver and use screw driver for development of finger dexterity with reaction time.
	Recognize different kind of shape design according to tactile map for development of finger movement fine manipulation, memory of location and shape with reaction time.
	Carryout exercise on Stanford – Khos Block design Test.
2. Make simple components by different basic fitting and develop proper real time testing through motor skills programme. [Basic fitting operations: Fitting, Hack sawing, Dieing, Tapping, etc.] (NOS: CSC/N0304)	Plan and identify wooden block, bolts and nuts, peg and pegboard, pin and collar, screws and screws driver. Use in timely manner.
	Develop basic skills – arm movement, finger movement, gross manipulation, fine manipulation, both-hand coordination, finger dexterity, reaction time.
	Develop conception over different kinds of shapes: square, triangle, rectangle, oval etc.
	Identify hand tools: Different kinds of hammer and punch, screw driver, wrench, vice-types and uses, vice block, etc.
	Identify cutting tools: different kinds of files, hack-saw – types and different blades, die and tap
	Identify measuring instruments: odd-leg caliper, steel rule, Braille micro meter
	Prepare the job for hack-sawing, filling, drilling, tapping to close tolerance as per specification.
	Check dimensional accuracy over flat surface with help of a try square and filler gauge (0.0025”), check by inserting between the gap (for VI) of try square blade and surface

	Clear out metal chips, unused materials and components for disposal, store in appropriate manner and prepare for disposal.
3. Produce components by different operations and check accuracy using specific gauges and measuring instruments. [Different operations: drilling, reaming, tapping, etc. in bench, pillar and radial drill machine; specific gauges and instruments; go/ no-go gauge; Braille micrometer] (NOS: CSC/N0304)	Plan and organize to produce different components
	Select raw material, jigs and fixtures, tools and equipment, as per sample.
	Perform different drilling operations with the help of jigs and fixtures only
	Execute other operations such as rearing, tapping, etc., by hand only
	Check the work/ job using gauges, Braille micrometer and rectify, if necessary.
4. Produce components of sheet metal and riveting joints using stakes, mallet, and pop-rivet gun. (NOS: CSC/N0301)	Plan and organize for sheet metal components.
	Select raw material (aluminium sheet preferable), tolls and equipment.
	Make the work pieces (cylindrical job) by folding, bending, etc. operations using stakes, mallet and “C” clamps.
	Perform riveting joints with help of tools, like pop rivet gun.
	Check dimensions and joints properly.
	Work properly under supervision.
5. Make simple components by different operations and setting different shaped jobs, with assistance. [Different chucks, with different shaped jobs: round, square, hexagonal.] (NOS: CSC/N0308)	Identify lathe machine with its operations and component.
	Identify different job holding device and acquaint with functional application of each device.
	Mount the job holding devices, check functional usage to perform turning operations.
	Set the job on chuck as per shape and size, with assistance.
	Set the lathe on appropriate speed and feed, with assistance.
	Make the components by different lathe operations, like facing, turning etc. and observe Standard Operating Practice.
	Check the dimensions using limit gauges.
	Observe safety procedure during operations as per standard

	norm and guideline.
6. Set different cutting tools, with assistance, to produce jobs by performing different turning operations. [Different cutting tool – V-tool, side cutting tool (R.H. and L.H.) with accuracy ±1/64" through calipers. Different turning operations : Plain, facing, drilling, grooving, parallel and step turning, parting, chamfering] (NOS:CSC/N0110)	Identify different work and tool holding devices with functional application of each device.
	Mount the job and tool holding devices with required alignments to perform facing and drilling operations.
	Observe safety procedure during mounting as per standard norm.
	Select appropriate tools &equipment and operating machine, with assistance.
	Avoid waste and dispose waste as per procedure.
	Measure all dimensions to check for accuracy, using measuring instruments.
7. Make dissimilar material fit as per required tolerance ±.0625" or ±1/64" by drilling and boring in lathe (Plain and Stepped) [Dissimilar materials: H.S.S. in Brass, Aluminium in cast iron etc.] (NOS: CSC/N0304, CSC/N0110)	Select raw material, tools & equipment.
	Perform drilling and boring operations according to standard operating practice.
	Perform the work pieces for fitting according to tolerances and interchange ability.
	Check all dimensions and interchange ability in accordance with samples and rectify if required.
8. Set cylindrical/hexagonal job on lathe and make simple components performing different taper turning operations. (Different turning operations parallel and taper turning (external only) by form tool, swivelling compound rest.	Identify cutting tool materials on lathe machine.
	Measure tool angles with gauge.
	Mount job and set machine parameter.
	Perform different kinds of Taper turning according to setting tools for their functional requirement.
	Check accuracy of job using appropriate gauge and measuring instruments.

(NOS: CSC/N0110)	
9. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS: CSC/N9402)	Solve different mathematical problems
	Explain concept of basic science related to the field of study
SECOND YEAR	
10. Set non-ferrous metal components for dieing & taping over male and female threaded components, by using die & tap. (Different external and internal thread BSF) (NOS: CSC/N0304)	Select non-ferrous metal components for arranging external thread (BSF).
	Produce internal threaded component over the material.
	Assemble male-female components to ascertain function-ability.
11. Prepare job by turning long shaft using steadies and setting different machining parameters and cutting tools, with assistance. (NOS: CSC/N0110)	Setting job in between lathe centres, with assistance.
	Identify steady and follower rest.
	Select appropriate tools and equipment and operate machine to produce components as per required dimensions.
	Measure all dimensions to check accuracy.
	Dispose waste as per procedure.
12. Prepare job by performing operations in Capstan Lathe using three jaw chuck and collect chuck, with assistance. (NOS: CSC/N0110)	Identify different work and tool holding devices with functional application of each device.
	Mount the work and tool holding devices with required alignment to perform operations.
	Select appropriate tools and equipment and operate the machine to produce components.
	Observe production as well as Safety procedure during operations with proper cooling system.
	Avoid waste and dispose waste.
	Measure dimensions to check accuracy.

13. Cut out components of various shape and size in Power Saw Machine, by setting different parameters. (NOS: CSC/N0301)	Identify various size, teeth of blade and its adjustment.
	Identify Quick return mechanism.
	Mount the work with required alignment with cooling system.
	Observe safety procedure during mounting.
	Operate the machine to produce components.
	Avoid waste and dispose waste.
14. Set the different machining parameters to prepare job by performing shearing operations, with assistance. (NOS: CSC/N0301)	Identify stopper adjustment.
	Mount the work with required alignment.
	Observe the safety procedure during mounting.
	Operate the machine to produce components.
15. External - Set the different machining parameters to produce plain surface, square and Vee-Slot. Internal - Key way as well as square shape on round head using shaper, with assistance. (NOS: CSC/N0110)	Identify Automatic feed mechanism and Quick return mechanism of machine.
	Mount the work with required alignment.
	Adjust stroke length according to work piece, with assistance.
	Select appropriate tools, equipment and machine by following standard operating practice, with assistance.
	Observe safety precautions during operation of machine.
	Check for desired performance.
16. Set the different components of machine and parameters to prepare job by performing different milling operation, with assistance. [Different machining parameters – feed, speed and depth of cut. Different milling operations : plain, face, step milling] (NOS: CSC/N0108)	Identify different work and tool holding devices with functional application of each device.
	Mount the work through job holding device and tool on Arbor with spacer.
	Check for both of their functional usage to perform milling operations.
	Observe safety procedure during mounting as per standard norms.
	Measure with instruments/gauges and check functionality of components.

17. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study.(NOS: CSC/N9402)	Solve different mathematical problems
	Explain concept of basic science related to the field of study

7. TRADE SYLLABUS

SYLLABUS FOR METAL CUTTING ATTENDANT (FOR VISUALLY IMPAIRED) TRADE			
FIRST YEAR			
Duration	**Reference Learning Outcome**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
Professional Skill 200Hrs.; Professional Knowledge 50Hrs.	Perform basic task involving motor skill and develop dexterity to build confidence in doing day to day activity following safety precautions.	1. Introduction Training Familiarization with the Institute. 2. Importance of trade training. 3. Machinery used in the trade. 4. Types of work done by trainees in the trade. 5. Introduction of safety rules in the shop floor and to the fire fighting equipment etc. 6. Introduction of First Aid.	Importance of Safety and Precautions to be oversexed in the section as well as in the Institute causes of accident and its remedies. Importance of the trade in the Industrial development of the country. Subjects to be taught and standard of proficiency to be attained. Awareness of recreational, medical leave and other facilities necessary guidance to be provide to become familiar with the working of the Institute including stores procedures.
		7. Exercise on Minnesota Rate of Manipulation Test (i) Displacing. (ii) Turning.	Recognition of Dots, Counting. Direction & position of dots.
		8. Exercise on Pennsylvania Bi-Manual Work sample (i) Assembly. (ii) Disassembly.	Recognition of writing frame and cell (L & R). Preparing the margin of the sheet, setting of paper write letters.
		9. Exercise on Purdue pegboard (i) Right Hand (ii) Left Hand Purdue Pegboard. (iii) Both Hand.	Word writing (Dictation from Text Books) Simple punctuation, Number writing 1-10. Text Book Reading.

		(iv) Purdue Pegboard (v) Assembly.	
		10. Exercise on Crawford small parts dexterity Test Pin & Collar.	G.K. India & Indians, World & UNO, Solar System, Artificial Satellite & outer space. Common diseases, their treatment, First-Aid, Common Eye diseases & prevention.
		11. Exercise on Crawford small parts dexterity Test of Screws.	Democracy & Election, Modern Science Recognition of Taylor Frame. Recognition of numbers. Number reading and writing.
		12. Exercise on Stanford-khos Block Design Test.	Concept of addition, Subtraction, Multiplication & Division I.M.C. (Indian Mathematics Code) Application of I.M.C. Addition, Subtraction, Multiplication and division of fraction and decimal. Conversion of inches to millimeters and vice versa.
Professional Skill 140Hrs.; Professional Knowledge 36Hrs.	Make simple components by different basic fitting and develop proper real time testing through motor skills programme. [Basic fitting operations: Fitting, Hack sawing, Dieing, Tapping etc.]	13. Various types of measuring tools & instruments orientation.	Different kinds of gauges, its usage.
		14. Micrometer, its usage.	Structure & its usage of Braille Micrometer.
		15. Angle Protector (Braille), Depth Gauge: its demonstration.	Construction & working Principle of Angle Protractor & depth gauge.
		16. Demonstration of marking tools.	Odd-leg caliper, Scriber, Divider (Spring-joint), different kinds of hammer, surface plate, divider - kinds & uses.
		17. Use different kinds of Hammer and Punch.	Measurement - steel rule - different types Theory of Hardware and punch - type

			uses.
		18. Filling Practice on Plain surfaces, Draw filling use of callipers and scale measurement.	Vice - types and uses. Files - different types of uses, cut, grade, shape materials etc. Try square - different types, parts, material used etc. callipers - types and uses.
		19. Filling at right angle, hack sawing.	Vee-block, scribing block, and its uses. Hacksaw - Their types & uses, different blades (06hrs.)
Professional Skill 40Hrs.; Professional Knowledge 10Hrs.	Produce components by different operations and check accuracy using specific gauges and measuring instruments. [Different operations: drilling, reaming, tapping, etc. in bench, pillar and radial drill machine; specific gauges and instruments; go/ no-go gauge; Braille micrometer]	20. Drilling operations under bench and Pillar Drill.	Drill machine: different kinds, different parts and function. Nomenclature of drill bit.
		21. Drilling with the help of Jigs and fixtures under Radial Drill machine. 22. Threading with the help of taps and dies Sheet Metal working - folding, bending, forming of cylindrical job, using stakes, mallet & 'C' clamps.	Different kinds of jigs and fixtures and their uses. Tap & Die - their different types and uses. Calculation involved finding out drill size. Sheet Metal Terms such as folding, bending, forming of cylindrical job, different kinds of stakes.
Professional Skill 40Hrs.; Professional Knowledge 10Hrs.	Produce components of sheet metal and riveting joints using stakes, mallet, and pop-rivet gun.	23. Sheet Metal working - folding, bending, forming of cylindrical job, using stakes, mallet & 'C' clamps.	Sheet Metal Terms such as folding, bending, forming of cylindrical job, different kinds of stakes.
		24. Riveting Joints (Manual Practice).	Rivets & its parts, types & usage. Riveting tools like Pop Rivet Gun use on aluminum sheet.

Professional Skill 60Hrs.; Professional Knowledge 15Hrs.	Make simple components by different operations and setting different shaped jobs, with assistance. [Different chucks, with different shaped jobs: round, square, hexagonal.]	25. Getting to know the lathe with its main components, lever position and various lubrication points as well.	Definition of machine & machine tool and its classification. History and gradual development of lathe.
		26. Mounting of chuck on machine spindle and unloading various systems.	Classification of lathe in function. Construction of different parts of lathe & its safety precautions.
		27. Use of 3-jaw self centering chuck.	Types of lathe drivers, merit and demerit, Description in details -headstock - cone pulley type - all geared type construction & function.
Professional Skill 170Hrs.; Professional Knowledge 40Hrs.	Set different cutting tools, with assistance, to produce jobs by performing different turning operations. [Different cutting tool – V-tool, side cutting tool (R.H. and L.H.) with accuracy ±1/64” through calipers. Different turning operations : Plain, facing, drilling, grooving, parallel and step turning, parting, chamfering]	28. Use of Driving plate, lathe dog, centre to centre job setting.	Reducing Speed-necessary & uses of speed calculation.
		29. R.H. and L.H. cutting tools checking of angles with tools angle gauge.	Theory of Driving plate, lathe dog, kinds of centre - their use functions of Tail Stock.
		30. Setting of lathe tools in different types of tool post following correct procedure.	Lathe cutting tool - different types, shapes and different angles (clearances and rakes) Specification of lathe tools.
		31. Facing operation to correct length, centre drilling operation.	Different types of lathe tool posts, Function of quick change gear box feed shaft, lead screw etc.
		32. Parallel turning practice - measurement with scale and calliper, then 'GO' - 'NO GO' Limit Gauge.	Combination drill - Drill chuck - its uses, Cutting speed, depth of cut, calculation involved - speed, feed, R.P.M. etc. recommended for different materials.
		33. Step turning with scale and calliper ±1/64". 34. Parallel turning Practice measurement with Braille micrometer ± 0.001"	Vernier calliper - its construction, principle but measure with scale and spring calliper Outside micrometer - different

		accuracy.	parts, principle, graduation, reading construction.
		35. Step turning practice with in ± 0.001" with SQ. Shoulder, Under cut, feel of micrometer, Sources of error with micrometer.	Different types of micrometer, sources of error with micrometer and how to avoid them.
		36. Drilling on lathe -step drilling.	Lathe accessories; chuck self centering, collets, its function, construction and uses.
Professional Skill 130Hrs.; Professional Knowledge 30Hrs.	Make dissimilar material fit as per required tolerance ±.0625" or ±1/64" by drilling and boring in lathe (Plain and Stepped) [Dissimilar materials: H.S.S. in Brass, Aluminium in cast iron etc.]	37. Boring Practice - plain. Use of inside calliper. 38. Bore plain, measurement with transfer caliper ±0.0625"or ± 1/64 ".	Drills: Different parts, types, sizes etc. different cutting angles cutting speed for different material, Boring tool -core drill. Letter and number drill, core drill etc. transfer callipers: construction on uses.
		39. Boring plain & step checked by bore gauge.	Driving plate, Face plate & fixed & travelling steadies. Construction and uses.
		40. Checking alignment of Lathe Centers. Reaming by setting job in vice using solid reamer.	Lathe Centers - types and their uses lathe carrier-function, types & uses. Reamers - types and uses, lubricant and coolant - types, necessity system of distribution, selection of coolant for different material, handling and care.
		41. Knurling Practice in lathe.	Knurling measuring, necessity, types, grade, cutting speed for knurling.
		42. Turning Practice between centers on mandrel.	Lathe mandrel - different types and their uses.
		43. Fitting of Dissimilar materials - H.S.S in brass, aluminium in cast Iron etc.	Concept of interchange ability, Limit, Fit and tolerances, Fits- different types, hole basis &

			shaft basis etc.
Professional Skill 60Hrs.; Professional Knowledge 15Hrs.	Set cylindrical/hexagonal job on lathe and make simple components performing different taper turning operations. (Different turning operations parallel and taper turning (external only) by form tool, swivelling compound rest	44. Taper turning by swivelling compound rest.	Taper turning by swivelling compound slide, its calculation, advantages & disadvantages.
		45. Taper turning by taper turning attachment, practice (External only). 46. Taper turning by form tool (External).	Taper turning: Principle setting, advantages & disadvantages. Different types of form tool & uses.
		47. Buffing & polishing practice on MS, stainless steel, non-ferrous metal & Lacquering.	Buffing machine & wheels, its uses, lacquering material. Dies: different types, Die Stock. Electro-plated materials, brass, bronze &aluminium for polishing work.
WORKSHOP CALCULATION & SCIENCE: (34 Hrs)			
Professional Knowledge WCS-34 Hrs.	Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study.	**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 Fractions - Addition, substraction, 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 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 Introduction of iron and cast iron Difference between iron & steel, alloy steel Properties and uses of insulating materials **Mass, Weight, Volume and Density** Mass, volume, density, weight and specific gravity Numerical related to L,C, O sections **Speed and Velocity, Work, Power and Energy** Work, power, energy, HP, IHP, BHP and efficiency **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- Concept of pressure - Units of pressure **Basic Electricity** Introduction and uses of electricity **Mensuration** Area and perimeter of square, rectangle and parallelogram Area and perimeter of Triangles Area and perimeter of circle, semi-circle, circular ring, sector of circle, hexagon and ellipse Surface area and volume of solids - cube, cuboid, cylinder, sphere and hollow cylinder Finding the lateral surface area, total surface area and capacity in litres of hexagonal, conical and cylindrical shaped vessels **Levers and Simple machines** Lever & Simple machines - Lever and its types **Trigonometry** Measurement of angles Trigonometrical ratios Trigonometrical tables
Psychomotor skill practice		

SYLLABUS FOR METAL CUTTING ATTENDANT (FOR VISUALLY IMPAIRED) TRADE			
SECOND YEAR			
Duration	**Reference Learning Outcome**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
Professional Skill 150Hrs.; Professional Knowledge 45Hrs.	Set non-ferrous metal components for dieing & taping over male and female threaded components, by using die & tap. (Different external and internal thread. (BSF)	48. Use Die, Practice on thread (External) non-Ferrous metal, BSF thread.	Dies: different types, Die stock (BSF thread).
		49. Use Taps Practice on thread (Internal), Non-Ferrous metal (BSF thread).	Taps: different types, Tap wrenches (BSF thread).
		50. Fitting of male and female threaded components.	Calculation involved depth, core dia., pitch proportion.
		51. Square and round groove cutting in lathe.	Groove tool and their uses, calculation & speed of job held in between centers.
		52. Taper turning by Taper turning attachment (External).	Template - Purpose & use. Checking taper by gauge.
		53. Introduction to various components produced on lathe.	Review of lathe machine, its classification for productivity.
		54. Turning & boring practice on C.I. block. 55. Periodical lubrication procedure on lathe, testing of accuracy of alignment. 56. Preventive maintenance of lathe.	Method of brazing solder, flux used for tip tools. Preventive maintenance, its necessity, frequently of lubrication, TPM (Total Productive Maintenance). E.H.S. (Environment, Heats, Safety).
Professional Skill 60Hrs.; Professional Knowledge	Prepare job by turning long shaft using steadies and setting different machining	57. Turning of long shaft (using steadies).	Steady and follower rest
		58. Use of attachments on lathe for different operations.	Different types of attachment used in lathe.

20Hrs.	parameters and cutting tools, with assistance.	59. Setting and operation involving face and Angle plate.	Accessories used on face plate - their uses. Angle plate - its construction & use.
Professional Skill 60Hrs.; Professional Knowledge 20Hrs.	Prepare job by performing operations in Capstan Lathe using three jaw chuck and collect chuck with assistance.	60. Operation in capstan lathe with three-jaw chuck.	Capstan lathe - construction & working principle with safety precaution.
		61. Operation in Capstan lathe with collet chuck. (20hrs.)	Difference between center and capstan lathe. (4hrs.)
		62. Producing (3/8") nut in capstan lathe (without thread).	Principle of cutting Nut: drilling, chamfering and parting.
Professional Skill 140Hrs.; Professional Knowledge 37Hrs.	Cut out components of various shape and size in Power Saw Machine, by setting different parameters.	63. Power saw machine Blade Setting.	Power saw: Construction, Construction different kinds of blade use in it.
		64. Job setting on vice and coolant supply.	Working principle of power saw with its safety precaution
		65. Round Rod cutting in various sizes.	Size, Teeth of blade and its adjustment.
		66. Practice cutting of MS bar as well as sheet.	Quick return mechanism
		67. Ball Press Practice.	Description of Fly Press/Ball Press, Operating Principle of power press with safety precaution.
		68. Conveyer Belt - its demonstration. 69. Working Practice on conveyer belt.	Necessity of conveyer belt & its construction. Different types of conveyer belt use in industry due to production purpose.
Professional Skill 40Hrs.; Professional Knowledge 10Hrs.	Set the different machining parameters to prepare job by performing shearing operations with assistance.	70. Shearing Machine Demonstration.	Construction & working principle of shearing.
		71. Stopper adjustment and shearing practice on sheets.	Principle of using the blade & safety.
Professional	External - Set the	72. Setting machine vice on	Shaper: Construction, its parts,

Skill 200Hrs.; Professional Knowledge 70Hrs.	different machining parameters to produce plain surface, square and Vee-Slot, internal - Key way as well as square shape on round head using shaper with assistance.	the table of shaper.	accessories & safety precaution.
		73. Checking stroke length of shaper.	Shaper: Working Principle.
		74. Different tool setting according to stroke length.	Kinds of shaper tools, their uses.
		75. Plain surface on C.I. block in shaper.	Automatic feed mechanism. Quick return mechanism of shaper
		76. Plain surface on MS Plate.	--do-
		77. Square Slot Practice on MS Plate.	Kinds of tools use for slot cutting.
		78. Vee-slot practice on C.I. Block.	Tool adjusts on RAM, job setting & stroke length adjustment.
		79. Key way Practice on a shaft end -demonstration only.	Kinds of key ways formed on shaft end & coupling fitting. Related Theory.
		80. Square Shape practice on round head bolt.	Job sequence of bolt forming, stroke length adjustment & square shaped formed.
		81. Maintenance of Shaper.	Theory of maintenance of Shaper.
Professional Skill 190Hrs.; Professional Knowledge 60Hrs.	Set the different components of machine and parameters to prepare job by performing different milling operation with assistance. [Different machining parameters – feed, speed and depth of cut, Different	82. Milling Operations and vice setting on table.	Basic parts & safety precautions of Milling.
		83. Setting different types of tools on Arbor with spacer. 84. Practice plain surface on MS Plate by up milling. 85. Step Milling using side and face cutter.	Milling: Working principle & adjustment of work in Vice. Different kinds of milling cutters and their uses. Up milling.
		86. Plain surface on CI Block by down Milling - only demonstration.	Down milling - Necessity & limitation.
		87. Square slot practice on MS plate with side and	Difference between up milling & down milling.

	milling operations: plain, face, step milling]	face cutter.	
		88. V-shape slot practice on CI block.	V-shape slot formed by side and face cutter, job adjusting with the help of V-block & vice. (8hrs.)
		89. Maintenance of Milling Machine.	Theory on Milling Machine maintenance.
WORKSHOP CALCULATION & SCIENCE: (38 Hrs)			
Professional Knowledge WCS-38 Hrs.	Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study.	**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 **Centre of Gravity** Centre of gravity - Centre of gravity and its practical application **Area of cut out regular surfaces and area of irregular surfaces** Area of cut out regular surfaces - circle, segment and sector of circle Related problems of area of cut out regular surfaces - circle, segment and sector of circle Area of irregular surfaces and application related to shop problems **Elasticity** Elasticity - Elastic, plastic materials, stress, strain and their units and young's modulus Elasticity - Ultimate stress and working stress **Heat Treatment** Heat treatment and advantages **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	
Psychomotor skill practice			

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 inwww.bharatskills.gov.in/ dgt.gov.in

ANNEXURE-I

LIST OF TOOLS AND EQUIPMENT			
METAL CUTTING ATTENDANT (FOR VISUALLY IMPAIRED) (For batch of 12 candidates)			
Sl. No.	**Name of the Tools& Equipment**	**Specification**	**Quantity**
A. TRAINEES TOOL KIT			
1.	Caliper outside firm and spring-joint	150mm.	12+1 Nos.
2.	Caliper inside firm and spring-joint	150 mm.	12+1 Nos.
3.	Caliper odd-leg firm-joint	150 mm.	12+1 Nos.
4.	Divider spring-joint	150 mm.	12+1 Nos.
5.	Scriber	150 mm. X 3 mm.	12+1 Nos.
6.	Center punch	100 mm.	12+1 Nos.
7.	Dot Or Prick Punch	100 mm.	12+1 Nos.
8.	Hammer (Ball pein, Cross pein and straight pein)	250 GM.	12+1 Nos.
9.	Steel Rule	150 mm. (Braille type 6inch size with 160 inch division)	12+1 Nos.
B. TOOLS AND EQUIPMENT			
10.	Surface plate	60 X 60cm.	01 No.
11.	Marking Table	120cm. X 90cm. X 30cm.	01 No.
12.	Vee-block	75 and 125mm. with clamp.	01 No. each
13.	Hand punch	30, 60, 90	2 Set.
14.	Hack saw fixed	250mm.	4 Nos.
15.	File Flat	300mm. rough	4 Nos.
16.	File Flat	250mm. 2nd cut	6 Nos.
17.	File Flat	150mm. smooth	4 Nos.
18.	File Flat	250mm. smooth	2 Nos.
19.	File Half round	250mm. 2nd cut	4Nos.
20.	File half round	150mm. smooth	4Nos.
21.	File round	250mm. smooth	2Nos.
22.	File Knife	250mm. smooth	2Nos.
23.	Screw driver	150mm and 200mm. shank	2 set
24.	Spanner double ended	6mm. to 21mm.	2 set
25.	Spanner adjustable	200mm.	2Nos.
26.	Pliers flat nose	150mm.	2 Nos.
27.	Calliper Transfer outside	150mm.	1 No.

28.	Micro meter outside	0 to 1 inch (Braille System 0.001 inch)	1 No.
29.	Depth gauge (Braille System)		1 No.
30.	Angle Protractor reading	5 degree multipliers upto 180 degree	1 No.
31.	"Go-No Go" Gauge	(1/4 inch to *V2*inch)	1 each
32.	Try square	150mm. blade	6 No.
33.	Feeler gauge	0.002 inch thick	6Nos.
34.	Fitter bench vice	5” Jaw Opening	13 Nos.
35.	Machine vice	100 mm.-jaw (for drill machine)	2Nos.
36.	Twist drill straight shank	7/64 inch to 3/8 inch	1 set
37.	Twist drill taper shank	7/16 inch	2 No.
38.	Tap and die Metric set	up to 12 mm	2 set
39.	Morse Taper Sleeves	NO. 0-1, 1-2, 2-3, 3-4	1 set
40.	Drill Chuck	12mm. capacity with key	2 Set
41.	Drill Chuck	25 mm capacity with key	2 set
42.	Reamer straight flute	6 to 12mm.(3/16 inch to 7/16 inch)	2 sets
43.	Reamer adjustable	7/16 inch	1 No.
44.	Tool holder RH and straight for square tool bit	Standard	1No.
45.	Parting tool holder with HSS blade	Standard	4 Nos.
46.	Oil can	½ pint (Pressure feed system)	4 Nos.
47.	Boring tool Holder	6mm. square tool bit	2 Nos.
48.	Angle plate with slots	200mm.	2 Nos.
49.	Oil stone	12mm. square 100mm long	2 Nos.
50.	Tap wrench (adjustable)	Standard	6 Nos.
51.	Box wrench (spanner)	Standard	1 set
52.	Die handle (stroke)		3 Nos.
53.	Grinding wheel	150mm. dia	2 Nos.
54.	Almirah	1980 x 910 x 480 mm.	2 Nos.
55.	Steel Locker with drawer	5x2x 1 ½‘	1 No.
56.	Angle gauge for tool grinding	Standard	2 Nos.
57.	Revolving center	2 suit Lathe tail stock	2 Nos.
58.	Bore Gauge (plane and stepped)	Standard	2 sets.
59.	Wheel Dresser diamond	inserted 0.75 or 1 carat	2 Nos.
60.	Gauge drill grinding	Standard	1 No.
61.	Tool Holder for shaper with bit	Standard	2 Nos.
62.	Cylindrical cutter (shell)	3 inchdia X3 inch length	2 Nos.
63.	Side and face cutter for milling	½ inch X 2.5 inch and ¾ inch X2.5 inch	1+1 Nos.
64.	Slitting saw cutter	4 inchdia X 1/32 inch + 4 inchdia X 1/16 inch	1 set.

65.	Shearing Machine Blade	75cm.	1 No.
66.	Hacksaw blades	(18 TPI) 250mm.	13 Nos.
67.	Center gauge	60 degree, 55 degree and 29 degree	2 Nos.
68.	Screw pitch gauge wit worth and Metric each	Standard	2 Nos.
69.	Dial test Indicator	0.01mm. with Magnetic base	2 Nos.
70.	Spirit Level	0.05 meter	2 Nos.
71.	Buffing wheels with material		2 Nos.
72.	Snips Straight	250 mm.	4 Nos.
73.	'C' clamp	150 mm.	2 Nos.
74.	Lazy Tong		2 Nos.
75.	Rivet sets snap & dolly combined	3 mm.	4 Nos.
76.	Fire Extinguisher	Operate and test clinical equipment/ instruments used in hospital.	2 Nos.
C. GENERAL MACHINERIES			
77.	Lathe (all geared head stock)	18cm center height to admit 90cm between centers. Machine to be motorized to H.P. and supplied with coolant installation, 4-jaw independent chuck 250mm 3-jaw self-centering chuck 160mm. fixed steady rest, face plate driving plate follower rest 4-way tool post live and dead centers with taper turning attachments or higher specification.	1 No.
78.	Lathe (step pulley type)	16cm. center height 120cm. between centers gapped machine to be motorized 4-jaw independent chuck 300mm. 3-jaw self centering chuck 200mm. 4-way tool post live and dead center with taper attachments.	2 Nos.
79.	Lathe (step pulley bench type)	7cm. center height 40cm. between centers motorized 3-jaw self centering chuck, fixed steady and follower rest, face plate, driving plate, single tool post, live and dead center with tapper attachments.	2 Nos.
80.	Pedestal Grinding machine power driven	180mm. dia wheel guard and vision guard.	1 No.
81.	Drill machine pillar type motorized	upto 30mm. capacity.	1 No.

82.	Radial drill machine motorized (1H.P.)	upto 25mm. capacity.	1 No.
83.	Universal Milling machine head Motor	1.5H.P. dividing head 150mm. 250mm. rotary table, 150 mm. Milling Vice with cutters and spacers.	1 No.
84.	Capstans Lathe	Motorized (3H.P.) 160mm. 3-jaw chuck and collets 40mm. capacity.	1 No.
85.	Capstan Lathe - motorized (1H.P.)	collets 12mm. capacity.	1 No.
86.	Conveyer belt	(1 8 inch width) with brake drum (15inchdia * 18 inch L) and motor 3H.P.	1 No.
87.	Power saw machine	Hydraulic feed system 400mm. blade size.	1 No.
88.	A shaper Motorized	30cm. stroke length 2 H.P. motor.	2 No.
89.	Shearing machine	75cm. capacity motorized 3H.P.	1 No.
90.	Buffing & Polishing machine	$^1/_2$ H.P. motor and 6" dia wheels	1 No.
91.	Pop rivet gun (Manual)	Standard	1 No.
92.	Ball Press	Standard	1 No.
93.	Desktop Computer	CPU: 32/64 Bit i3/i5/i7 or latest processer, speed: 3 GHz or Higher, RAM: 4GB 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 or higher specification	2 Nos.
94.	UPS		2 Nos.
95.	Chair		2 Nos.
96.	Computer Table		2 Nos.

NOTE: -

1. *As trainees are visually challenged persons, additional item may be required according to their necessity.*
2. *Inch scale is provided for them as suitable because they can measure with their nail as a least count 1/16 inch which may be considered 1.5 mm.*
3. *Drawing and marking are impossible for them.*
4. *For drilling purpose jigs and fixtures are suitable for them.*
5. *Internet facility is desired to be provided in the class room.*

ANNEXURE - II

The DGT sincerely acknowledges contributions of the Industries, State Directorates, Trade Experts, Domain Experts, trainers of ITIs, NSTIs, faculties from universities and all other swho contributed in revising the curriculum.

Special acknowledgement is extended by DGT to the following expert members who had contributed immensely in this curriculum.

S No.	Name & Designation Sh/Mr/Ms	Organization	Mentor Council Designation
Members of Sector Mentor council			
1	A. D. Shahane, Vice-President, (Corporate Trg.)	Larsen &Toubro Ltd., Mumbai-400001	Chairman
2	Dr. P.K. Jain, Professor	IIT, Roorkee, Roorkee-247667, Uttarakhand	Member
3	N. Ramakrishnan, Professor	IIT Gandhinagar, Gujarat-382424	Member
4	Dr. P.V.Rao, Professor	IIT Delhi, New Delhi-110016	Member
5	Dr. Debdas Roy, Asstt. Professor	NIFFT, Hatia, Ranchi-834003, Jharkhand	Member
6	Dr. Anil Kumar Singh, Professor	NIFFT, Hatia, Ranchi-834003, Jharkhand	Member
7	Dr. P.P. Bandyopadhyay, Professor	IIT Kharagpur, Kharagpur-721302, West Bengal	Member
8	Dr. P.K. Ray, Professor	IIT Kharagpur, Kharagpur-721302, West Bengal	Member
9	S. S. Maity, MD	Central Tool Room & Training Centre (CTTC), Bhubaneswar	Member
10	Dr. Ramesh Babu N, Professor	IIT Madras, Chennai	Member
11	R.K. Sridharan, Manager/HRDC	Bharat Heavy Electricals Ltd, Ranipet, Tamil Nadu	Member
12	N. Krishna Murthy, Principal Scientific Officer	CQA(Heavy Vehicles), DGQA, Chennai, Tamil Nadu	Member
13	Sunil Khodke, Training Manager	Bobst India Pvt. Ltd., Pune	Member
14	Ajay Dhuri, Div. Manager - Training	TATA Motors, Pune	Member
15	UdayJ. Apte,	TATA Motors, Pune	Member

	Div. Manager - Training		
16	H B Jagadeesh, Sr. Manager	HMT, Bengaluru	Member
17	K Venugopal, Director & COO	NTTF, Peenya, Bengaluru	Member
18	B.A.Damahe, Principal, L&T Institute of Technology	L&T Institute of Technology, Mumbai	Member
19	Lakshmanan. R Senior Manager	BOSCH Ltd., Bengaluru	Member
20	R C Agnihotri, Principal	Indo- Swiss Training Centre Chandigarh, 160030	Member
Mentor			
21	Sunil Kumar Gupta (Director)	DGT HQ, New Delhi	Mentor
Members of Core Group			
22	N. Nath (ADT)	CSTARI, Kolkata	Co-ordinator
23	H.Charles (TO)	NIMI, Chennai	Member
24	Sukhdev Singh (JDT)	ATI Kanpur	Team Leader
25	Ravi Pandey (V.I)	ATI Kanpur	Member
26	A.K. Nasakar (T.O)	ATI Kolkata	Member
27	Samir Sarkar (T.O)	ATI Kolkata	Member
28	J. Ram EswaraRao (T.O)	RDAT Hyderabad	Member
29	T.G. Kadam (T.O)	ATI Mumbai	Member
30	K. Mahendar (DDT)	ATI Chennai	Member
31	Shrikant S Sonnavane (T.O)	ATI Mumbai	Member
32	K. Nagasrinivas (DDT)	ATI Hyderabad	Member
33	G.N. Eswarappa (DDT)	FTI Bangalore	Member
34	G. Govindan, Sr. Draughtsman	ATI Chennai	Member
35	M.N. Renukaradhya, Dy. Director/Principal Grade I.	Govt. ITI, Tumkur Road, Bangalore, Karnataka	Member
36	B.V. Venkatesh Reddy., JTO	Govt. ITI, Tumkur Road, Bangalore, Karnataka	Member
37	N.M. Kajale, Principal,	Govt. ITI Velhe, Distt- Pune, Maharashtra	Member
38	Subrata Polley, Instructor	ITI Howrah Homes, West Bengal	Member
39	Vinod Kumar R, Sr.Instructor	Govt. ITI Dhanuvachapuram Trivandrum, Dist., Kerala	Member
40	M. Anbalagan, B.E., Assistant	Govt. ITI Coimbatore, Tamil Nadu	Member

	Training Officer		
41	K. Lakshmi Narayanan, T.O.	DET, Tamil Nadu	Member
42	Venugopal Parvatikar	Skill Sonics, Bangalore	Member
43	Venkata Dasari	Skill Sonics, Bangalore	Member
44	Srihari D	CADEM Tech. Pvt. Ltd., Bengaluru	Member
45	Dasarathi. G.V.	CADEM Tech. Pvt. Ltd., Bengaluru	Member
46	L.R.S.Mani	Ohm Shakti Industries, Bengaluru	Member

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