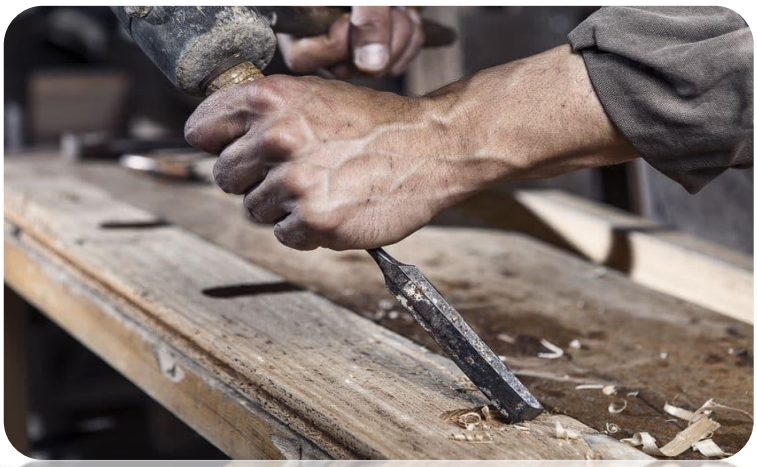
WOOD WORK TECHNICIAN

NSQF LEVEL- 3.5



SECTOR- WOOD & CARPENTRY

COMPETENCY BASED CURRICULUM
CRAFT INSTRUCTOR TRAINING SCHEME (CITS)

GOVERNMENT OF INDIA
Ministry of Skill Development & Entrepreneurship
Directorate General of Training
CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE
EN-81, Sector-V, Salt Lake City, Kolkata – 700091

WOOD WORK TECHNICIAN

(Engineering Trade)

SECTOR – WOOD & CARPENTRY

(Revised in 2024)

Version 2.1

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Developed By

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CONTENTS

1. COURSEOVERVIEW

The Craft Instructor Training Scheme is operational since inception of the Craftsmen Training Scheme. The first Craft Instructor Training Institute was established in 1948. Subsequently, 6 more institutes namely, Central Training Institute for Instructors (now called as National Skill Training Institute (NSTI)), NSTI at Ludhiana, Kanpur, Howrah, Mumbai, Chennai and Hyderabad were established in 1960's by DGT. Since then the CITS course is successfully running in all the NSTIs across India as well as in DGT affiliated private institutes viz. Institutes for Training of Trainers (ITOT). This is a competency based course for instructors of one year duration. "Wood Work Technician" CITS trade is applicable for Instructors of "Wood Work Technician" Trade only.

The main objective of Craft Instructor training programme is to enable Instructors explore different aspects of the techniques in pedagogy and transferring of hands-on skills so as to develop a pool of skilled manpower for industries, also leading to their career growth & benefiting society at large. Thus promoting a holistic learning experience where trainee acquires specialized knowledge, skills & develops attitude towards learning & contributing in vocational training ecosystem.

This course also enables the instructors to develop instructional skills for mentoring the trainees, engaging all trainees in learning process and managing effective utilization of resources. It emphasizes on the importance of collaborative learning & innovative ways of doing things. All trainees will be able to understand and interpret the course content in right perspective, so that they are engaged in & empowered by their learning experiences and above all, ensure quality delivery.

2. TRAINING SYSTEM

2.1 GENERAL

CITS courses are delivered in National Skill Training Institutes (NSTIs) & DGT affiliated institutes viz., Institutes for Training of Trainers (IToT). For detailed guidelines regarding admission on CITS, instructions issued by DGT from time to time are to be observed. Further complete admission details are made available on NIMI web portal http://www.nimionlineadmission.in.The course is of one-year duration. It consists of Trade Technology (Professional skills and Professional knowledge), Training Methodology and Engineering Technology/ Soft skills. After successful completion of the training programme, the trainees appear in All India Trade Test for Craft Instructor. The successful trainee is awarded NCIC certificate by DGT.

2.2 COURSE STRUCTURE

Table below depicts the distribution of training hours across various course elements during a period of one year:

S No.	Course Element	Notional Training Hours
1.	**Trade Technology**	
	Professional Skill (Trade Practical)	480
	Professional Knowledge (Trade Theory)	270
2.	**Training Methodology**	
	TM Practical	270
	TM Theory	180
	Total	**1200**

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

3	On the Job Training (OJT)/ Group Project	150
4	Optional Courses	240

CITS Trainees of optional courses of up to 240 hours in each year short term courses.

2.3 PROGRESSION PATHWAYS

- Can join asan Instructor in a Vocational Training Institute/ technical Institute.
- Can join as a supervisor in Industries.

2.4 ASSESSMENT & CERTIFICATION

The CITS trainee will be assessed for his/her Instructional skills, knowledge and attitude towards learning throughout the course span and also at the end of the training program.

a) The Continuous Assessment (Internal) during the period of training will be done by **Formative Assessment Method** to test competency of instructor with respect to assessment criteria set against each learning outcomes. The training institute has to maintain an individual trainee portfolio in line with assessment guidelines. The marks of internal assessment will be as per the formative assessment template provided on www.bharatskills.gov.in

b) The **Final Assessment** will be in the form of **Summative Assessment Method**. The All India Trade Test for awarding National Craft Instructor Certificate will be conducted by DGT at the end of the yearas per the guidelines of DGT. The learning outcome and assessment criteria will be the basis for setting question papers for final assessment**.** The external examiner during final examination will also check the individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.

2.4.1 PASS CRITERIA

Allotment of Marks among the subjects for Examination:

The minimum pass percent for Trade Practical, TM Practical, Soft Skill Practical Examinations and Formative assessment is 60% & for all other subjects is 40%. There will be no Grace marks.

2.4.2 ASSESSMENT GUIDELINE

Appropriate arrangements should be made to ensure that there will be no artificial barriers to assessment. The nature of special needs should be taken into account while undertaking the assessment. While assessing, the major factors to be considered are approaches to generate solutions to specific problems by involving standard/non-standard practices.

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

Assessment will be evidence based comprising of the following:

- Demonstration of Instructional Skills (Lesson Plan, Demonstration Plan)
- Record book/daily diary

- Assessment Sheet
- Progress chart
- Video Recording
- Attendance and punctuality
- Viva-voce
- Practical work done/Models
- Assignments
- Project work

Evidences and records of internal (Formative) assessments are to be preserved until forthcoming yearly examination for audit and verification by examining 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 should be well versed with instructional design, implement learning programme and assess learners which demonstrates attainment of an ***acceptable standard*** of crafts instructorship with ***occasional*** **guidance** and engage students by demonstrating good attributes of a trainer.	• Demonstration of ***fairly good*** skill to establish a rapport with audience, presentation in orderly manner and establish as an expert in the field. • Average engagement of students for learning and achievement of goals while undertaking the training on specific topic. • A fairly good level of competency in expressing each concept in terms the student can relate, draw analogy and summarize the entire lesson.. • Occasional support in imparting effective training.
(b) Weightage in the range of 75%-90% to be allotted during assessment	
For performance in this grade, the candidate should be well versed with instructional design, implement learning programme and assess learners which demonstrates attainment of a***re asonable standard*** of crafts instructorship with ***little*** **guidance** and engage students by demonstrating good attributes of a trainer.	• Demonstration of ***good*** skill to establish a rapport with audience, presentation in orderly manner and establish as an expert in the field. • Above average engagement of students for learning and achievement of goals while undertaking the training on specific topic. • A good level of competency in expressing each concept in terms the student can relate, draw analogy and summarize the entire lesson. • Little support in imparting effective training.
(c) Weightage in the range of more than 90% to be allotted during assessment	
For performance in this grade, the candidate should be well versed with instructional	• Demonstration of ***high*** skill level to establish a rapport with audience,

design, implement learning programme and assess learners which demonstrates attainment of a ***high standard*** of crafts instructorship with ***minimal or no support*** and engage students by demonstrating good attributes of a trainer.	presentation in orderly manner and establish as an expert in the field. • Good engagement of students for learning and achievement of goals while undertaking the training on specific topic. • A high level of competency in expressing each concept in terms the student can relate, draw analogy and summarize the entire lesson. • Minimal or no support in imparting effective training.

3. GENERAL INFORMATION

Name of the Trade	**WOOD WORK TECHNICIAN-CITS**
Trade code	**DGT/4020**
Reference NCO – 2015	2356.0100,7115.0100, 7115.0500
NOS Covered	FFS/N9412, FFS/N9413, FFS/N9414, FFS/N9415, FFS/N9416, FFS/N9417, FFS/N9418, FFS/N9419, FFS/N9420, FFS/N9421, FFS/N9422, FFS/N9423, FFS/N9424, FFS/N9425, FFS/N9426, FFS/N9427, ASC/N9410, ASC/N9411
NSQF Level	Level-5
Duration of Craft Instructor Training	One year
Unit Strength (No. Of Student)	25
Entry Qualification	Degree in Mechanical/Production/Industrial Engineering/ Civil from AICTE/ UGC recognized Engineering College/ University OR 03 years Diploma in Mechanical/Production/ Industrial Engineering/ Civil after class 10th from AICTE/ recognized board of technical education. OR Ex-serviceman from Indian Armed forces with 15 years of service in related field as per equivalency through DGR OR 01 year NTC / NAC passed in the trade of 'Wood Work Technician' (Candidate must have passed 10th Class)
Minimum Age	16 years as on first day of academic session.
Space Norms	120 Sq. m
Power Norms	10 KW
Instructor's Qualification for	
1. Wood Work Technician -CITS Trade	B.Voc./Degree in Mechanical/ Production/ Industrial Engineering/ Civil from AICTE/UGC recognized University with two years experience in relevant field. OR 03 years Diploma in Mechanical / Production/Industrial Engineering/ Civil from AICTE/ recognized Board/ University with five years experience in relevant field. OR Ex-serviceman from Indian Armed forces with 15 years of service in related filed as per equivalency through DGR. Candidate should have undergone methods of instruction course or minimum 02 years of experience in technical training institute of Indian armed forces OR NTC/ NAC passed in Wood Work Technician trade with seven years experience in relevant field. **<u>Essential Qualification:</u>**

	Relevant National Craft Instructor Certificate (NCIC) in Wood Work Technician trade, in any of the variants under DGT.
2. Workshop Calculation & Science	B.Voc/Degree in any Engineering from AICTE/ UGC recognized Engineering College/ university with two years experience in relevant field. OR 3 years Diploma in Engineering from AICTE /recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with five years experience in relevant field. OR NTC/ NAC in any Engineering trade with seven years experience in relevant field. **Essential Qualification:** National Craft Instructor Certificate (NCIC) in relevant trade. OR NCIC inRoDA or any of its variants under DGT.
3. Engineering Drawing	B.Voc/Degree in Engineering from AICTE/ UGC recognized Engineering College/ university with two years experience in relevant field. OR 03 years Diploma in Engineering from AICTE /recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with five years' experience in the relevant field. OR NTC/ NAC in any one of the 'Mechanical group (Gr-I) trades categorized under Engg. Drawing'/ D'man Mechanical / D'man Civil' with seven years experience. **Essential Qualification:** National Craft Instructor Certificate (NCIC) in relevant trade. OR NCIC in RoDA / D'man (Mech /civil) or any of its variants under DGT.
4. Training Methodology	B.Voc./Degree in any discipline from AICTE/ UGC recognized College/ university with two years experience in training/ teaching field. OR Diploma in any discipline from recognized board / University with five years experience in training/teaching field. OR NTC/ NAC passed in anytrade with seven years experience in training/ teaching field. **EssentialQualification:** National Craft Instructor Certificate (NCIC) in any of the variants under DGT / B.Ed /ToT from NITTTR or equivalent.
5. Minimum Age for Instructor	21 years

4. JOB ROLE

Brief description of job roles:

Manual Training Teacher/Craft Instructor Instructs students in ITIs/Vocational Training Institutes in respective trades. Imparts theoretical instructions for the use of tools, mechanical drawings, blueprint reading and related subjects. Demonstrates processes and operations in the workshop; supervises, assesses and evaluates students in their practical work. Ensures availability & proper functioning of equipment & tools in stores.

Carpenter, General makes, assembles, alters and repairs wooden structures and articles according to sample or drawing using hand or power tools or both. Studies drawing on sample to understand type of structure or article to be made and calculates quantity of timber required. Selects timber to suit requirements. Marks them to size using square, scriber etc. Saws, chisels and planes wooden pieces to required sizes and makes necessary joints such as half lap, Tenon mortice, dove-tail etc. using saws, planes, mortising, chisels, drills and other carpentry hand or power tools as required. Checks parts frequently with square, foot rule, measuring tape etc. to ensure correctness. Assembles parts and secures them in position by screwing, nailing or doweling. Checks assembled structure with drawing or sample; rectifies defects if any, and finishes it to required specifications. Alters, repairs or replaces components in case of old structures or articles in similar manner. May glue parts together. May smoothen and finish surface with sand paper and polish. May fix metal fittings to structure and polish. May fix metal fittings to structure or article made. May calculate cost of furniture. May sharpen his own tools.

Joiner, Wood joins and assembles prefabricated wooden-plank boards, building-fixtures, etc. using hand or power tools or both. Collects prefabricated planks of required sizes. Joins required number of planks with double ended nails to form sides of structure. Assembles framework step by step by nailing or screwing. Sharpens his own tools. May fit strengthening band or mild steel hoop by nailing or screwing for strengthening boxes and cases, if necessary. May make crate for packing. May be designated as WOODEN BOX MAKER; CARPENTER, PACKING CASES if engaged in making wooden boxes or packing cases of specified dimensions.

Reference NCO 2015 Code:

2356.0100- Manual Training Teacher/Craft Instructor
7115.0100 - Carpenter, General
7115.0500 - Joiner, Wood

Reference NOS:

a) FFS/N9412
b) FFS/N9413
c) FFS/N9414
d) FFS/N9415
e) FFS/N9416
f) FFS/N9417
g) FFS/N9418
h) FFS/N9419
i) FFS/N9420
j) FFS/N9421
k) FFS/N9422
l) FFS/N9423
m) FFS/N9424
n) FFS/N9425
o) FFS/N9426
p) ASC/N9410
q) ASC/N9411

5. LEARNING OUTCOMES

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

5.1 TRADE TECHNOLOGY

1. Evaluate, plan and demonstrate the use of Wood Work Technician hand tools used for ripping, cross cutting, curve cutting, oblique sawing etc. of woods using saws, portable power tools, shaving tools or portable power planning machine etc.(NOS: FFS/N9412)
2. Explain chiselling with better finish and operate along or across the grains etc. by using Firmer, bevel edged, mortise chisel etc. (NOS: FFS/N9413)
3. Demonstrate drilling and boring on wood. (NOS: FFS/N9414)
4. Assess joining of wood with accurate dimension, related to strength & appearance and check for correctness, strength and finishing. (NOS: FFS/N9415)
5. Plan & produce utility items as per drawing with schedule sizes of timber or alternatives of timber, block boards, sunmica etc. using resources economically. (NOS: FFS/N9416)
6. Administer effective solution during assembling of the components/ sub-assemblies to make a complete utility item from OST sheet. (NOS: FFS/N9416)
7. Interpret the need of the various carving tools and demonstrate use of various carving tools and steps to convert a wooden block/ piece into a decorative article. (NOS: FFS/N9417)
8. Explain the need for preservation of wooden items and demonstrate surface finishing with various processes such as painting, polishing, varnishing etc. (NOS: FFS/N9418)
9. Interpret the need of pattern making and demonstrate various types of patterns, needs of layout, core box, core print, allowances, various colour applications etc. (NOS: FFS/N9419)
10. Evaluate planning& set up of wood working machines to produce wood components. (NOS: FFS/N9420)
11. Assess construction of different designs of furniture by assembling & fitting components/sub assemblies ensuring their functionality. (NOS: FFS/N9421)
12. Evaluate designs and construction of different patterns of doors& windows and frames & shutters by optimum use of raw materials. (NOS: FFS/N9422)
13. Assess accuracy in finishing of wooden construction works, assembling & fixing. [Various wooden constructions works Viz. various roof truss, doors& windows and frames& shutters.] (NOS: FFS/N9423)
14. Evaluate different operations (i.e. cutting, boring, drilling and nesting) of Wood working on CNC router machine. (NOS: FFS/N9424)
15. Test basic & advance programming on CNC Router and its application. (NOS: FFS/N9424)
16. Monitor operations on Laser cutting machine.(NOS: FFS/N9425)
17. Evaluate operations on lathe to construct wooden components and assemble them.(NOS: FFS/N9426)
18. Read and apply engineering drawing for different application in the field of work. (NOS: ASC/N9410)
19. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS: ASC/N9411)

6. COURSE CONTENT

SYLLABUS FOR WOOD WORK TECHNICIAN-CITSTRADE			
TRADE TECHNOLOGY			
Duration	**Reference Learning Outcome**	**Professional Skill (Trade Practical)**	**Professional Knowledge (Trade Theory)**
Practical 60 Hrs. Theory 15 Hrs.	Evaluate, plan and demonstrate the use of Wood Work Technician hand tools used for ripping, cross cutting, curve cutting, oblique sawing etc. of woods using saws, portable power tools, shaving tools or portable power planning machine etc.	**Introduction to Craft Instructor Training &Familiarization with the workshop:** 1. Introduction to Craft Instructors Training Course and importance of Craft Instructors Training Course in India 2. Familiarization with the institute. Importance of Trade Training, machinery used in the trade as well as industries. 3. Demonstrate use of fire fighting & equipments in shop floor and safety precaution in wood working sections and wood working machines. 4. Demonstrate safety rules in shop floor on wood working and sections to be made in wood.	**Safety precautions:** Introduction to the wood working trade, workshop activities and general discipline. General safety - Personal safety habit, workshop safety habit, hand tools safety, machine, etc BIS for Wood Work Technician Metal used for tools. Classification of hand tools in carpentry shop. Workshop appliances - Work benches, bench stop, bench hook, mitre board, mitre box, shooting board, hold fast, etc. Marking, measuring & testing tools- description, types, sizes, uses etc.
		Demonstrate Sawing practice: 5. Using saws and special saws - hand saw, bow saw, key hole saw etc., (Ripping, cross cutting, curve cutting, oblique sawing etc.) 6. Demonstrate Sharpening and setting of different types of saws. **Hand Tools and portable power tools - curve cutting saws** : 7. Compass saw, coping saw, bow saw, fret saw etc. Explain description, types, size, use, care and maintenance. Sharpening	**Saws and the Planes** : Bench saws & curve cutting saws -description, types,sizes, uses etc. Saw sharpening for Cross cutting saws & Rip saws **Different plane:** Bench planes- description, types, sizes, uses etc. Curve cutting planes- descriptions, types, sizes, uses. Purpose planes -description, types, sizes, uses etc. Sharpening of planecutters. Botanical classification of

		and setting of saws. 8. Portable circular saw and its uses. **Demonstrate Planning practice** 9. Using planes and special planes - jackplane, block plane, rebate plane, plough plane, compass plane etc. (planning face side, face edge, face end, rebate, groove, concave, convex etc.) 10. Demonstrate Grinding and sharpening of cutters- plane cutter, cutter for rebate planes, molding planes, plough plane, etc. 11. Examine the finished components after sawing and planning. 12. Test the sharpened cutters.	timber tree, growth of timber, The parts of timber tree seen from cross section Timber identification. Properties of timber - physical & mechanical.
Practical 20 Hrs. Theory 10 Hrs.	Explain chiseling with better finish and operate along or across the grains etc. by using Firmer, bevel edged, mortise chisel etc.	**Chiseling Practice and multiple Chiseling practice:** 13. Chiseling along the grains, across the grains, vertical, horizontal, mortise etc. by using Firmer, bevel edged, paring, mortise chisel etc. 14. Demonstrate Curve chiseling (convex and concave) by using firmer gouge and scribing gouge (concave, inner diameter circle). 15. Demonstrate Grinding of chisel and gouge. 16. Sharpening and honing of chisel and gouge. 17. Examine the finished components after chiseling.	**Growth of timber trees :** Description of timber- Hard wood varieties like-teak, sal, haldu etc. Soft wood varieties like-deodar, chir, kair etc. Physical and mechanical properties of timber. Shrinkage of timber & its effect on timber. **Paring tools :** Chisels- Description, types, sizes, uses etc. Gouges- Description, types, sizes, uses etc. Grinding tools- Description, types, sizes, uses etc. Honing tools/sharpening tools- Description, types, sizes, uses etc.
Practical 10 Hrs. Theory 05 Hrs.	Demonstrate drilling and boring on wood.	**Demonstrate application of boring tools:** 18. Using boring tools- Hand drilling machine, Drill bit, counter sink bit, expansion bit etc.(making hole in wood and thin wood,	**Seasoning of timber-** Seasoning of timber- Natural seasoning, artificial seasoning - description, types etc. Advantages & disadvantages of seasoning Conversion of

		counter boring, countersink boring etc.). 19. Examine the components after drilling and boring with the given drawing.	timber & conversion method Drill bits, handled anger, gimlet, bradawl- description, sizes, uses etc. Hand drill machine, breast drill machine, ratchet brace- description, sizes, uses etc. Files and rasps-used in carpentry section- Description, types, sizes, uses etc. Defects in timber- Growth defects, grain defects, seasoning defects, other defects like decay, insect etc.
Practical 80 Hrs. Theory 40 Hrs.	Assess joining of wood with accurate dimension, related to strength & appearance and check for correctness, strength and finishing.	**Demonstrate joining of wood :-** **Demonstrate framing joints :-** 20. Making framing joints: Half lap, mortise & tennon, bridle joints etc. 21. Making angle joints: Housing, simple butt, shoulder butt joints dovetail joints, etc. 22. Making wooden dowel for joints. 23. Test wooden joints.	**Wood working joints :** Technical terms used in joints Classification of joints used in carpentry. Framing joint-half lap joint, mortise and tenon joints, bridle joint- Description, types, uses etc. Angle joints- Description, types, uses etc. Types of dowels. Trade sizes and market forms of timber. Manufacturing terms.
		Demonstrate making Widening joints: 24. Making widening joints: Butt, dowelled, tongue and groove, rebate joints etc. **Demonstrate lengthening joints :** 25. Making lengthening joints: Table scarf, bevel scarf joints etc. 26. Method of timber stacking for seasoning. 27. Show preparation of bill of material for different jobs, estimation and costing. 28. Assess bill of material, estimation and costing.	**Widening joints-** Widening joint- Simple butt, dowelled butt, rebated, tongued, pocket screwed, tongued and grooved, slot screwed- description, uses etc **Lengthening joints-** Lengthening joints- description, types, uses etc. Calculation of timber- Log form, plank form (in cubic feet, cubic centimeter and cubic meter). Measuring sheet materials
		Demonstrate Fixing of Metal Fittings in jobs : 29. Fitting of hinges, locks, handles, fasteners, tower	**Striking tools-** Striking tools-hammers, mallets used in carpentry- Description, types, sizes, uses

		bolts, casters, hasp and staple, door rings, all drops etc. 30. Using screws, making holes using hand drilling machine, screwing with screwdriver set. 31. Examine fixing of metal fittings for proper working.	etc. **Impelling tools-** Impelling tools-Punches, screw drivers used in carpentry-description, types, sizes, uses etc. **Miscellaneous tools** – Miscellaneous tools like-pincer, cutting pliers, crowbar etc.-description, sizes, uses etc. Nails- Description, types, sizes, uses etc. Wood screws- Description, types, sizes, uses etc. Wood adhesives- Description, types, uses etc. **Conversion of timber.** Definition, types, applications
		Demonstrate application of laminated sheet- 32. Application of laminated sheet- tool box, tray, etc. **Demonstrate application of block boards** - 33. Application of block boards -Small racks etc. **Demonstrate application of sun mica sheets-** 34. Application of sun mica sheets- Kitchen tool box, step tool etc. 35. Glues, nails and screws.	**Fiber board-** Solid core stock board-Description, types, sizes, uses etc. Manufacturing of solid core stock board Fiber board- (1) Hard board, (2) Medium density fiber board (MDF), (3)insulated board-Description, sizes, uses etc. Manufacture of fiber board. Decorated laminated plastics-Description, types, sizes, etc. Manufacturing of decorated laminated plastics
Practical 20 Hrs. Theory 10 Hrs.	Plan & produce utility items as per drawing with schedule sizes of timber or alternatives of timber, block boards, sunmica etc. using resources economically.	**Demonstrate application of plywood and veneers** : 36. Application of plywood and veneer ply over table shelves etc. 37. Assess proper application of laminated sheets, block boards, sunmica sheets, plywood and veneers.	**Veneers and Ply Wood** Veneers- Advantages of veneered construction, types of veneers, Manufacturing of veneers. Plywood- description, types, sizes, uses of plywood, Manufacturing of plywood. Classification and grading of plywood, Properties of plywood i.e. advantages over solid wood
Practical 20 Hrs. Theory 10 Hrs.	Administer effective solution during assembling of the components/sub-assemblies to make a	**Demonstrate us of Other surface Treated (OST) sheet** : 38. Application of plywood and OST sheet-making book	**Wood particle board-** Wood particle boards-Description, types, uses etc. Manufacturing of particle board

	complete utility item from OST sheet.	cases, show cases etc.	Selection of timber for various work i.e.- (1)for building constructions like door, window, (2)for body building work like, bus, railway (3)for hammer handles, sport goods etc.
Practical 10 Hrs. Theory 05 Hrs.	Interpret the need of the various carving tools and demonstrate use of various carving tools and steps to convert a wooden block/ piece into a decorative article.	**Demonstrate use of carving hand tools:** 39. Using carving hand tools. Carving of simple figures (leaves, flowers etc.). 40. Carving simple figures in different woods. 41. Assess carved figure with the design and its finishing.	**Carving Hand Tools :** Carving hand tools- Description, types, sizes, uses etc.
Practical 10 Hrs. Theory 05 Hrs.	Explain the need for preservation of wooden items and demonstrate surface finishing with various processes such as painting, polishing, varnishing etc.	42. Perform surface polishing for preservation of wood like painting, polishing, varnishing etc.	**Preservation of timber-** Preservation system of timber, Preservatives used in process. Strength data of various form of timber such as-beam, plank, Batten etc.
Practical 20 Hrs. Theory 10 Hrs.	Interpret the need of pattern making and demonstrate various types of patterns, needs of layout, core box, core print, allowances, various colour applications etc.	43. Solid pattern, split pattern, layout board and allowances application, core box, core print, colour application.	Definition types, material, application, allowances, core box, core print, colour application etc.
Practical 20 Hrs. Theory 10 Hrs.	Evaluate planning & set up of wood working machines to produce wood components. (Mapped NOS:FFS/N9402)	**Demonstrate different types of** - 44. Framing joints, Angle joints, Broadening joints and lengthening joints. 45. Demonstrate making of stool / Armless chair / Armed chair - Using wood working machines:- Circular saw, Surface planner, Thickness planner. 46. Examine the wooden product with the drawing for its design, dimension, accuracy and strength.	**Selection of timber for different kinds of joints, considering their strength and utility** Designing of furniture (indoor and outdoor) Timber selection for different furniture. Chair type sizes etc. Portable power circular saw- description uses etc. Circular saw machine- Uses, construction and parts, safety, operations etc. Surface planner- Uses, construction and parts, safety, operations, etc.

			Thickness planner - Uses, construction and parts, safety and operations, etc.
		Demonstrate making of book shelf / rack etc.- 47. Using wood working machines:- ▪ Band saw machine, ▪ Hollow chisel mortising machine, ▪ Chain mortising machine ▪ Tenoning machine.	**Size and specification of furniture used in different places.** Band saw- Description, uses, construction and parts, safety and operations, etc.
Practical 20 Hrs. Theory 10 Hrs.	Assess construction of different designs of furniture by assembling & fitting components/sub assemblies ensuring their functionality.	**Demonstrate making of table with drawer and cupboard.** 48. Making table with drawer and cupboard. 49. Fitting of drawer lock, hinges, cupboard lock, etc. 50. Using wood working machines:- a) Disc sander b) Portable planner c) Portable disc sander etc.	**Table - types, size, uses etc. And Metal Fittings used.** Table - types, size, uses etc. Hinges- types, size, uses etc. Locks and catches - types, size, uses etc. Other fitting- description, size, uses etc. Portable power planes- Description, uses etc. Disk sanding machines- Description, size, parts and uses etc. Portable power dick sanders- Description, size, parts, uses care.
Practical 50 Hrs. Theory 10 Hrs.	Evaluate designs and construction of different patterns of doors& windows and frames & shutters by optimum use of raw materials.	**Demonstrate making of Door frame and Door shutters (Model):** 51. Making door frame (model). 52. Making door shutters (model)- paneled and flush. 53. Using wood working machines, Portable power router etc. 54. Assess the product for dimension, finishing etc. with the drawing.	**Door frame and Door shutters :** Door frames- types, sizes etc. used in building constructions Door shutters- types, sizes etc. used in building constructions Portable power router- Description, uses care etc.
		Demonstrate making of window frame and window shutters (Model) : 55. Making window frame (model). 56. Making window shutters	**Window frame and window shutters :** Window frames-- types, sizes etc. used in building constructions Window shutters-- types, sizes etc. used

		(model) with solid timber and glass panel. 57. Using hand tools, Glass cutter, etc.	in building constructions.
		Demonstrate Lay out and making of partition: 58. Explain Lay out and making of partition, using jig saw, rotary hammer. 59. Hand drilling etc. 60. Assess layout prepared and partition made.	**Wooden partition-types, sizes, purposes :** Wooden partition-types, sizes, purposes etc. Jig saw machine- Uses, construction and parts, Jig saw operations Jig saw safety precautions, etc. Drilling machine and Portable power drill- Description, size, parts, uses, etc. Portable power rotary hammer- Description, size, parts, uses etc.
Practical 60 Hrs. Theory 15 Hrs.	Assess accuracy in finishing of wooden construction works, assembling & fixing. [Various wooden construction works Viz. various roof truss, doors& windows and frames& shutters.]	**Demonstrate Making Model of framed roofs:** 61. Making framed roofs (model) constructions. 62. Making tusk tenon and mortising joint. 63. Making wooden floor (model). 64. Examine constructed roof/ floor with the drawing.	**Roofs, Roof trusses and Wooden floors:** Roofs / ceiling - Technical terms used in roofing and ceiling construction. Roofs - types, sizes, purpose Pitched roof structure - Single and double pitched roof structure, description etc. Roof trusses - King post roof truss & queen post roof truss. Wooden floors Construction details; types, uses etc.
		Demonstrate Wood Finishing: 65. Wood finishing- a. By using Sand papering, filling materials i.e. putty, wax, saw dust, colour powders etc. for preparation of surface b. By using different methods of application of- French polish, varnishes, etc. 66. Assess surface finish.	**Wood finishes** Types of abrasive papers - Sand paper, Garnet paper, Silicon carbide papers - Grade, uses etc. Wood/Timber finishes- Purpose, classification of finishes, Basic stages in finishing preparation of wood - (a)Surface, b) Surface treatment - Bleaching. Staining, types of stains, filling, types of wood grain fillers. Types of clear finishes- description, uses & their application method.

		Wood finishing continue : 67. Wood finishing- By using Sand papering, filling materials i.e. putty, wax, saw dust, color powders, plaster of parish etc. for preparation of surface by using different methods of application of - (a)Wood primer. (b)Paints etc. Pattern Prepared and related practical.	**Wood finishes continue :** Types of opaque or pigmented finishes- description, uses, and their application method used in carpentry etc. Wood primer- description, uses and their application method used in carpentry. description and uses of finishes Shellac polish, varnish, wax polishes etc. and their application. Pattern Making- Types, Uses and related theory.
Practical 10 Hrs. Theory 05 Hrs.	Evaluate different operations (i.e. cutting, boring, drilling and nesting) of Wood working on CNC router machine.	68. Wood working Router machine Fundamental of wood working CNC Router-Introduction &demonstration, operational techniques of CNC Router machines.	Wood working CNC Router-Description, types, sizes, parts, functions, operations. Safety precautions, care and maintenance. And its applications.
Practical 50 Hrs. Theory 10 Hrs.	Test basic & advance programming on CNC Router and its application.	69. Basic Programming &Operation on CNC Router.	How to write the basic program, according to the operation. What are the languages of programming.
		70. Advance Programming & Operation on CNC Router	How to write the basic program, according to the operation. What are the languages of programming.
Practical 10 Hrs. Theory 05 Hrs.	Monitor operations on Laser cutting machine.	71. Introduction & demonstration, design developing and operational techniques of laser cutting machines	Laser cutting machines description, types, sizes, parts, functions, operations. Safety precautions, care & maintenance and its applications.
Practical 10 Hrs. Theory 05 Hrs.	Evaluate operations on lathe to construct components and assemble them.	**Making tea poi :** 72. Making tea poi with plywood and decorative laminated plastics i.e. sun mica, etc. 73. Using special wood working machines:-wood turning lathe, jig saw, angle grinder.	**Tea poi :** Tea poi- types, size, uses etc. Wood turning lathe machine-construction, parts and its appliance, Wood turning tools • wood turning operations, lathe safety precautions, Sanding and finishing lathe work • Angle grinder- Description, types, size, uses etc.
Engineering Drawing: 45 Hrs.			

Professional Knowledge ED- 45 Hrs.	Read and apply engineering drawing for different application in the field of work.	**CIRCLES, TANGENTS AND ELLIPSE:** Practical applications procedure for constructing tangent to given circle-lines- loop pattern-- tangential circles- external tangents- internal tangents ellipse **PARABOLIC CURVES, HYPERBOLA:** Involutes - Properties and their application. Procedure for constructing parabolic curve-hyperbolic curve-in volute curve. epicycloids, hypocycloid, Involutes, spiral & Archimedes spiral **TECHNICAL DRAWING/ SKETCHING OF COMPONENTS' PARTS:** Views of object Importance of technical sketching-types of sketches-Isometric drawing sketching- Oblique drawing sketching. **PROJECTIONS**: Theory of projections (Elaborate theoretical instructions), Reference planes, orthographic projections concept 1st Angle and 3rd Angle, Projections of points, Projections of Lines–determination of true lengths & inclinations. Projections of plane, determination of true shape. Exercises on missing surfaces and views. Orthographic drawing or interpretation of views. Introduction to first angle projections of solids. **ISOMETRIC VIEWS**: Fundamentals of isometric projections (Theoretical Projections) Isometric views from 2 to 3 given orthographic views. Preparation of simple working drawing of Furniture items like table, stool and any job prepared in the workshop. **SECTIONAL VIEWS:** Importance and salient features, Methods of representing sections, conventional sections of various materials, classification of sections, conventional in sectioning. Drawing of full section, half section, partial or broken out sections, offset sections, revolved sections and removed sections. Drawing of different conventions for materials in section, conventional breaks for shafts, pipes, Rectangular, square angle, channel, rolled sections. Exercises on sectional views of different objects. - **DEVELOPMENT AND INTERSECTIONS:** Development of surfaces-Types of surface- Methods of development-Intersection- Methods of drawing intersection lines-critical point or key point. **FASTENERS**: Sketches of elements of screw threads, Sketches of studs, cap screws machine screws, set screws, Locking devices, bolts, Hexagonal & square nuts & nut bolt & washer assembly. Sketches of plain spring lock, toothed lock, washers, cap nut, check nut, slotted nut, cassel nut, sawn nut, wing nut, eye blot, tee bolt & foundation bolt. Sketches of various types of rivet heads (snap–pan–conical– countersunk) Sketches of keys (sunk, flat, saddle, gib head, woodruff) Sketches of hole & shaft assembly. **DETAIL DRAWING AND ASSEMBLY DRAWING:** Details of machine drawing- Assembly drawing- surface quality-surface

		finish standard- Method of indicating surface roughness for general engineering drawing-symbols used for indication of surface roughness-symbols for direction of lay. Geometrical tolerance. Detail drawing of the following with complete dimensioning, tolerances, material and Surface finish specifications 1. Universal couplings 2. Ball bearing and roller bearing. 3. Fast and loose pulley. 4. Stepped and V belt pulley. 5. Flanged Pipe joints, right angle bend. 6. Tool Post of Lathe Machine. 7. Tail Stock of Lathe Machine 8. Stepped and V belt pulley. 9. Flanged Pipe joints, right angle bend. 10. Tool Post of Lathe Machine. 11. Tail Stock of Lathe Machine Practice of blue print reading on limit, size, fits, tolerance, machining symbols, and reading out of assembly drawing etc., ISO Standards. **READING OF ENGINEERING DRAWING:** Blue print and machine drawing reading exercises. **GRAPHS & CHARTS**: Types (Bar, Pie, Percentage bar, Logarithmic), Preparation & interpretation of the graphs and charts. **AUTO CAD:** Familiarization with AutoCAD application in engineering drawing. Practice on AutoCAD using Draw & Modify commands. Practice on AutoCAD with Rectangular snap using Draw, Modify, Inquiry commands. Practice on AutoCAD using text dimensioning& dimensioning styles Practice on AutoCAD to draw nuts, bolts & washers. Isometric views-isometric views with square, taper and radial surface-simple & complex views. Perspective views. Practice on AutoCAD using isometric snap to make isometric drawings Practice on AutoCAD using Hatch command and application. Practice on AutoCAD using 3D primitives with UCS (User Co-ordinate system).
WORKSHOP CALCULATION & SCIENCE: 45 Hrs.		
Professional Knowledge WCS- 45 Hrs.	Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study.	**<u>WORKSHOP CALCULATION:</u>** **Fraction:** Concept of Fraction, Numbers, Variable, Constant, **Ratio & Proportion**: - Trade related problems **Percentage:** Definition, changing percentage to decimal and fraction and vice versa. Applied problems related to trade. Estimation and cost of product. **Algebra:** Fundamental Algebraic formulae for multiplication and factorization. Algebraic equations, simple & simultaneous equations, quadratic equations and their applications. **Mensuration 2D:** Concept on basic geometrical definitions,

		basic geometrical theorems. Determination of areas, perimeters of triangles, quadrilaterals, polygons, circle, sector etc. **Mensuration 3D:** Determination of volumes, surface areas of cube, cuboids cylinders, hollow cylinder, sphere prisms, pyramids cone spheres, frustums etc. Mass, Weight, Volume, Density, Viscosity, Specific gravity and related problems. **Trigonometry:** Concept of angles, measurement of angles in degrees, grades and radians and their conversions. Trigonometrical ratios and their relations. Review of ratios of some standard angles (0, 30,45,60,90 degrees), Height & Distances, Simple problems. **Graphs:** basic concept, importance. Plotting of graphs of simple linear equation. Related problems on ohm's law, series-parallel combination. **Statistics:** Frequency tables, normal distribution, measure of central tendency – Mean, Median & Mode. Concept of probability. Charts like pie chart, bar chart, line diagram, Histogram and frequency polygon. **WORKSHOP SCIENCE:** **Units and Dimensions:** Conversions between British & Metric system of Units. Fundamental and derived units in SI System, Dimensions of Physical Quantities (MLT)-Fundamental & Derived. **Engineering Materials:** Classification properties and uses of ferrous metals, non-ferrous metals, alloys etc. Properties and uses of non-metals such as wood, plastic, rubber, ceramics industrial adhesives. **Heat & Temperature:** Concepts, differences, effects of heat, different units, relation, specific heat, thermal capacity, latent heat, water equivalent, mechanical equivalent of heat. Different Temperature measuring scales and their relation. Transference of heat, conduction, convection and radiation. Thermal Expansion related calculations. **Force and Motion**: Newton's laws of motion, displacement, velocity, acceleration, retardation, rest & motion such as linear, angular. Force – units, different laws for composition and resolution of forces. Concept on centre of gravity and equilibrium of forces in plane. Concept of moment of inertia and torque. **Work, power & energy**: Definitions, units, calculation & application. Concept of HP, IHP, BHP and FHP – related calculations with

		mechanical efficiency. S.I. unit of power and their relations. **Friction:** Concept of friction, laws of friction, limiting friction, coefficient of friction and angle of friction. Rolling friction & sliding friction with examples. Friction on inclined surfaces **Stress & Strain:** Concepts of stress, strain, modulus of elasticity. Stress- strain curve. Hook's law, different module of elasticity like Young's modulus, modulus of rigidity, bulk modulus and their relations. Poisson's ratio. **Simple machines:** Concept of Mechanical Advantage, Velocity Ratio, Efficiency and their relations. Working principles of inclined plane, lever, screw jack, wheel and axle, differential wheel and axle, worm and worm wheel, rack and pinion. Gear train. **Electricity:** Basic definitions like emf, current, resistance, potential difference, etc. Uses of electricity. Difference between ac and dc. Safety devices. Difference between conductors and semiconductors and resistors, Materials used for conductors, semiconductors and resistors. Ohm's Law. Series, parallel and series-parallel combination of resistances. Concept, definitions and units of electrical work, power and energy with related problems. **Fluid Mechanics:** Properties of fluid (density, viscosity, specific weight, specific volume, specific gravity) with their units. Concept of atmospheric pressure, gauge pressure, absolute pressure, vacuum and differential pressure.

SYLLABUS FORCORE SKILLS
1. Training Methodology (Common for all CITS trades) (270Hrs + 180Hrs)

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

7. ASSESSMENT CRITERIA

LEARNING OUTCOME	ASSESSMENT CRITERIA
TRADE TECHNOLOGY (TT)	
1. Evaluate, plan and demonstrate the use of Wood Work Technician hand tools used for ripping, cross cutting, curve cutting, oblique sawing etc. of woods using saws, portable power tools, shaving tools or portable power planning machine etc. (NOS: FFS/N9412)	Demonstrate workshop safety & discipline.
	Identify different types of wood/ timber and measuring, marking and testing instrument.
	Evaluate marks made as per drawing and measure dimensions for checking.
	Evaluate use of testing instrument and other useable hand tools.
	Evaluate Ripping/cross, cutting/curve, sawing/ cutting operations according to the marking following safety norms.
	Monitor marking of an angle with the aid of bevel square and mitre square for oblique sawing.
	Demonstrate to set planner with sharpened cutting edge and perform required planning operation to obtain required size and finish.
	Check the size, flatness, squareness and finish of the job as per drawing. Check for dimensional accuracy.
	Instruct to avoid waste and plan for reuse/ dispose of the unused items.
2. Explain chiselling with better finish and operate along or across the grains etc. by using Firmer, bevel edged, mortise chisel etc. (NOS: FFS/N9413)	Explain identification of woods with vertical/ horizontal grains and required type of chisel for performing operation (chiselling across the grain) as per drawing.
	Check for Markings done as per drawing.
	Demonstrate chiselling as per drawing and ensure better finish.
	Assess the finished job as per drawing.
3. Demonstrate drilling and boring on wood. (NOS: FFS/N9414)	Demonstrate to mark hole position on the work/ job.
	Demonstrate drilling, counter boring, counter sinking, enlarging the hole on wood as per standard operating procedure.
	Demonstrate checking of the finished job as per drawing.
4. Assess joining of wood with accurate dimension, related to strength & appearance and check for correctness, strength and finishing. (NOS: FFS/N9415)	Assess identification of exact type of joint to employ and arrange materials, tools and equipments to perform the operation.
	Evaluate framing of joint (Sawing and chiseling) as required maintaining dimensions.
	Assess different parts and check for correctness, strength and finishing.
5. Plan & produce utility items as per drawing with schedule	Demonstrate Identification of required material, tools etc. to make the job as per drawing.

sizes of timber or alternatives of timber, block boards, sunmica etc. using resources economically. (NOS: FFS/N9416)	Evaluate markings done as per drawing.
	Demonstrate sawing, chiselling of different parts, prepare all the parts as per marking layout and check dimension.
	Demonstrate assembling of different parts to make a complete job.
	Evaluate overall finish and check dimensions as per drawing.
	Assess proper application of laminated sheets, block boards, sunmica sheets etc.
	Instruct waste avoidance and plan for reuse/ dispose of the unused materials.
6. Administer effective solution during assembling of the components/ sub-assemblies to make a complete utility item from OST sheet. (NOS: FFS/N9416)	Administer identification of required plywood and OST materials, tools etc. to make the job as per drawing.
	Evaluate markings done as per drawing.
	Demonstrate checking of dimension of assembled components as per drawing.
	Demonstrate waste avoidance and plan for reuse/ dispose of the unused materials.
7. Interpret the need of the various carving tools and demonstrate use of various carving tools and steps to convert a wooden block/ piece into a decorative article. (NOS: FFS/N9417)	Interpret planning for wood carving as per drawing and arranging for material and tools for the purpose.
	Demonstrate wood carving operation to make a piece of wood as per drawing.
	Illustrate corrections as per drawing.
	Monitor finishing made on the wood product by smoothing.
8. Explain the need for preservation of wooden items and demonstrate surface finishing with various processes such as painting, polishing, varnishing etc. (NOS: FFS/N9418)	Explain planning for finishing works done on the surface of wooden product as per requirement and identify required items and tools.
	Instruct Cleaning/ preparation of surface for the purpose.
	Evaluate smoothening of surface applying proper procedure.
	Illustrate application of varnish/ polish on the surface to get required finish.
	Evaluate the quality of finish.
9. Interpret the need of pattern making and demonstrate various types of patterns, needs of layout, core box, core print, allowances, various colour applications etc. (NOS: FFS/N9419)	Interpret planning for pattern works to be done on the surface of wooden product as per requirement and identify required items and tools.
	Illustrate the core print area for colour application.
	Evaluate quality of finished pattern.
	Instruct waste avoidance and plan for reuse/ dispose of the unused materials.
10. Evaluate planning& set up of wood working machines to produce wood components.	Evaluate operational readiness of Band saw machine /Hollow chisel mortising machine/Chain mortising machine/Tenoning machine including tools, following best safety practices.

(NOS: FFS/N9420)	Check selection of tools & cleaning devices, align and clamp work piece.
	Assess construction of stool/Armed chair using Circular saw, Surface planner, Thickness planner.
	Evaluate components made as per drawing/sample & assess its specifications.
	Evaluate framing/Angle/Broadening/Lengthening Joints.
11. Assess construction of different designs of furniture by assembling & fitting components/sub assemblies ensuring their functionality. (NOS: FFS/N9421)	Assess technical drawings / documents.
	Evaluate draw up & use of assembly plans.
	Explain standard specifications & procedure.
	Evaluate making of table with drawer & cupboards and fit drawer lock/ hinges/cupboard lock.
	Evaluate making of table with drawer using Disc Sander/Portable Planner/Portable Disc Sander etc.
	Assess assembling different parts to make a complete job.
	Evaluate overall finish and dimensions as per drawing.
	Instruct waste avoidance and plan for reuse/ dispose of the unused items.
	Suggest possible optimization & compare their cost effectiveness.
	Monitor, evaluate & document work result.
12. Evaluate designs and construction of different patterns of doors& windows and frames & shutters by making optimum use of raw materials. (NOS: FFS/N9422)	Assess technical drawing as per requirement.
	Evaluate door frame, shutters (Panelled/flush) using wood working machines.
	Evaluate construction of window frame/shutter with solid timber/glass panel using different tools.
	Monitor planning layout and making partition using jig saw/rotary hammer/drilling machine following best safety practices.
	Contribute to continuous improvement of work process in the related area.
	Instruct waste management & optimum utilization of resources.
13. Assess accuracy in finishing of various wooden construction works, assembling & fixing. [Various wooden constructions works Viz. various roof truss, doors& windows and frames& shutters.] (NOS: FFS/N9423)	Monitor Construction of different types of framed roofs /tusk tenon /mortising joint/wooden floor as per the given dimensions.
	Assess wood finishing by using sand papering/filing materials (Putty/wax/saw dust etc.) for preparing surfaces.
	Evaluate different methods of application of French polish, varnishes and maintain accuracy in finishing.
	Demonstrate different learning techniques of surface treatment like Bleaching/Staining, use of Wood Primer/Paints etc.
14. Evaluate different operations (i.e. cutting, boring, drilling and nesting) of Wood	Ensure the operational readiness of the CNC router machine including tools.
	Identify tools & cleaning devices, align & clamp work piece with

working on CNC router machine. (NOS: FFS/N9424)	accuracy for required outcome.
	Plan &execute work processes and such tasks with due consideration to scheduling stipulation.
	Record and evaluate relevant data.
	Monitor, evaluate and document work result.
	Check & present possible solutions & compare their cost effectiveness.
	Demonstrate functions of different parts & apply best safety precautions ensuring its care & maintenance.
15. Test basic & advance programming on CNC Router and its application. (NOS: FFS/N9424)	Develop & test functionality of basic/ advance programming on CNC router for effective outcome.
	Demonstrate various applications of the basic/advance programming in operating CNC router.
16. Monitor operations on Laser Cutting machine. (NOS: FSS/N9425)	Identify the woodwork and relevant tools required for laser cutting.
	Monitor various operational techniques of Laser Cutting machines.
	Evaluate functions of different parts & application of best safety precautions ensuring its care & maintenance.
	Instruct waste management & optimum utilization of resources.
17. Evaluate operations on lathe to construct wooden components and assemble them. (NOS: FFS/N9426)	Evaluate operations on wood turning lathe/jig saw/angle grinder swiftly & effectively applying best safety methods.
	Check for Markings done as per drawing.
	Check for corrections as per drawing.
	Assess production of Tea Poi with plywood & decorative laminated plastics like sunmica etc.
	Finish the product by smoothing, sanding on lathe.
	Check the quality of finish.
18. Read and apply engineering drawing for different application in the field of work. (NOS: ASC/N9410)	Read & interpret the information on drawings and apply in executing practical work
	Read &analyze the specification to ascertain the material requirement, tools and assembly/maintenance parameters.
	Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work.
19. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS: ASC/N9411	Solve different mathematical problems
	Explain concept of basic science related to the field of study

8. INFRASTRUCTURE

LIST OF TOOLS AND EQUIPMENT FOR WOOD WORK TECHNICIAN (CITS)			
(For batch of 25 candidates)			
A. TRAINEES TOOL KIT			
S No.	**Name of the Tool & Equipment**	**Specification**	**Quantity**
1.	Foot rule/steel tape	Two ft. Four fold/6 mtrs.	26 nos.
2.	Steel Measuring Scale	Twelve inch	26nos.
3.	Marking Knife	200 mm length	26 nos.
4.	Try Square	200mm	26 nos.
5.	Bevel Square	50 mm	26 nos.
6.	Carpenter marking gauge		26 nos.
7.	Carpenter mortise gauge		26 nos.
8.	Hand Saw	450mm	26 nos.
9.	Tenon saw	300mm	26 nos.
10.	Metal Jack plane	335mmX 50mm cutter	26 nos.
11.	Metal smoothing plane	200mm X 50mm cutter	26 nos.
12.	Firmer/Bevel edge Chisel	Bevel edge 6mm. 10, 15, 20 and 25mm width (5 nos.)	26 nos. each
13.	Mortise chisel	06, 10, 15mm (3 nos.)	26 nos. each
14.	Screw driver	300mm	26 nos.
15.	Mallet	medium size	26 nos.
16.	Claw hammer	500 gms	26 nos.
17.	Oil stone (consumable)	Carborundum universal silicon carbide combination rough and fine.	26 nos.
18.	Contraction measuring scale	as per standard size	26 nos.
19.	Hand brush for cleaning	450mm	26 nos.
B. GENERAL SHOP OUTFIT			
20.	Measuring tape	3 meter	02nos.
21.	Construction scale	1 meter	04 nos.
22.	Spring caliper (inside)	150 mm	04 nos.
23.	Spring caliper (outside)	150 mm	04 nos.
24.	Wing compass	300 mm	04 nos.
25.	Trammel	300 mm	02 pair
26.	Sprit level	300 mm	02 nos.
27.	Rip saw	600 mm	04 nos.
28.	Cross cut saw	250 mm	02 nos.
29.	Key hole saw	250 mm	02 nos.
30.	Fret saw frame	150 mm	02 nos.
31.	Compass saw	350 mm	04 nos.
32.	Adze	15 kg	04 nos.
33.	Trying plane metal	450 mm X 60 mm Cutter	02 nos.
34.	Plane rivet adjustable	250 mm X meters x 9 mm Cutters	04 nos.
35.	Plough plane	with set of 8 cutter up to 12 mm Width	04 nos.
36.	Spoke shaves	50 mm Cutter	08 nos.

37.	Plane adjustable circular	250 mm	04 nos.
38.	Router plane	197 X 42 mm	04 nos.
39.	Moulding plane set		04 nos.
40.	Cabinet scraper	100 mm	04 nos.
41.	Gauge chisel, firmer	6,10,12,16,20mm	08 sets
42.	Gauge chisel, scribing	6,10,12,16,20mm	08 sets
43.	Ball pein hammer	600 grs	04 nos.
44.	Cross pein hammer	600 grs	04 nos.
45.	Screw driver	450 mm	04 nos.
46.	Screw driver	250 mm	04 nos.
47.	Screw driver	150 mm	04 nos.
48.	Pincer	50 mm	13 nos.
49.	File half round	2nd cut 250 mm	08 nos.
50.	File half round	Wood rasp bastard250mm	08 nos.
51.	File slim taper	100 mm	12 nos.
52.	File slim taper	150 mm	12 nos.
53.	Card file (steel) wire brush for file	200 mm	04 nos.
54.	Hands drill	6 mm Capacities	08 nos.
55.	Country drill with bow (ball bearing type)	620 X 726 mm	04 nos.
56.	Ratchet brace	250 mm Swap	04 nos.
57.	Hand auger	10,12,14,16,18,20,22,25 mm	02 sets
58.	Centre bits	6,8,10,12	02 sets
59.	Expansion bit sets	218 X 171 mm	02 sets.
60.	Twist drill bits	6,8,10,12 mm	02 sets
61.	Counter sink bit rose type	12 mm	04 nos.
62.	Breast drill	6 mm. capacity	02 nos.
63.	Centre punch	5mm	04 nos.
64.	Snip straight	200 mm	04 nos.
65.	Oil cans	225 X 225 mm	02 nos.
66.	Combination side cutting pliers	250 X 250 mm	02 nos.
67.	Plunger saw set/ pistol grip type.	300 X 300 mm	02 nos.
68.	Number punch	12 mm.	02 sets
69.	Slip stone	100 mm	08 nos.
70.	Round crow bar	with chisel and claw end 1070 x 25mm	02 nos.
71.	'G' clamp	100 mm	08 nos.
72.	'G' clamp	150 mm	08 nos.
73.	'G' clamp	250 mm	04 nos.
74.	'T' bar cramp	0.6 meter	08 nos.
75.	'T' bar cramp	1.25 meter	04 nos.
76.	'T' bar cramp	1.75 meter	02 nos.
77.	Carpenter vice	250 mm jaws	26nos.
78.	Saw sharpening vice	250 jaws	02 nos.
79.	Carving tools set		04 sets
80.	Goggles pair		26 nos.

81.	Leather Cloves	Standard	26 nos.
82.	Digital Vernier caliper	300mm least count 0.01 mm	02 nos.
83.	Glass cutter		02 nos.
84.	Nail punch		04 nos.
85.	Surface plate	600x 600 mm	01 no.
86.	Carpenter's work bench	2400x920x800 mm Height	10 nos.
87.	Blower		04 Nos.
88.	Grease gun		01 no.
89.	Spanner double ended	set of 14	01 no. of set
90.	Fire extinguisher		01 no.
91.	Fire buckets		04 nos.
92.	Steel lockers, 8 Compartments, with Individual locks	1980 x 910 x 480 mm depth	02 nos.
93.	Steel Almirah with shelves	1980 x 910 x 480 mm depth	02 nos.
94.	Instructor table (half secretariat)		01 no.
95.	Instructor chair		02 nos.
96.	Stool		01 no.
97.	Chalk board with easel		01 no.
98.	Material rack		01 no.
99.	Wood working CNC Router machine, with electric spindle, boring and drilling head, voltage stabilizer, compressor and dust collector.	Table size 4ft x 8ft	01 no.
C. GENERAL SHOPOUTFIT			
100.	Portable circular saw machine	Dia 184 mm wt 3.6 kg no load speed 4200rpm	02 nos.
101.	Portable planning machine	No load speed 16500 rpm, 650 w, wt 2.8 kg, chip thickness 2.6 mm	02 nos.
102.	Power drill machine	500 watt, capacity ¼”	02 nos.
103.	Portable sander machine	670 watt 2 positions side handle, 100 mm dia, no load speed 11000 rpm	01 no.
104.	Portable jig saw machine	Wt 2.27 kg, 400 watt, max 45deg angle., zigsaw cutter	02 nos.
105.	Portable router machine	500 watt, 33000 rpm,	01 no.
106.	Power Screw driver basic duty (cordless)	Torque 30 nm and 13th nm, no load speed 1300 rpm, 12 volt, keyless chuck 10 mm	02 nos.
107.	Wood working mitre saw machine	2400 watt 3800 rpm wt 18kg	02 nos.
108.	Combined surface planner and thicknesses machine	440 volt, 2/3 blade no.,	01 no.
109.	Angle Grinder	2000 watt motor, light and compact,discdia 180 mm, no load speed 8500 rpm	01 no.
110.	Trimmer		01 no.

111.	Rotary Hammer	Light duty	02 nos.
112.	Circular saw machine	150 mmdia.	01 no.
113.	Lathe, wood turning	1.25 mm bed length, motorised complete with a set of turning tools	01 no.
114.	Lathe, wood turning	150 mm height of centres 1.75-meter bed, motorised complete with a set of turning tools	02 nos.
115.	Tenoning machine (single ended)	3400 rpm max, saw blade dia 12", 5 Hp	01 no.
116.	Mortising machine (combine hollow chisel and chain)		01 no.
117.	Bench grinder	200 mm. whole D.E. pedestal	01 no.
118.	Drill machine	12 mm. Capacity	01 no.
119.	Portable electric drill	6 mm. Capacity (wolf type)	01 no.
120.	Drills chuck	12 mm capacities.	01 no.
121.	Portable disc sander	200 mm. Dia	01 no.
122.	Adjustable saw sharpener		01 no.
123.	Electric heater	1000/1500 w 1 nos.102. Electric blower (portable)	01 no.
124.	Moisture meter		01 no.
125.	Universal wood working circular saw machine	Blade dia 300 mm.	01 no.
126.	Electrical drying oven (small type)		01 no.
127.	Band saw machine (vertical)		01 no.
128.	Band saw sharpening machine (Automatic)	Wheel dia 600mm, minimum blade length 3900mm, maximum blade length 4275 mm, depth of cut 425 mm, 5 HP, 750 rpm.	01 no.
129.	Band saw blade Brazing Machine	900 watt power input	01 no.
130.	Wood working CNC Router Machine	HSD/ HSK electro spindle, 9kwatt, servo motor (double), boring head 5, spindle speed 20000 rpm(min.) Axis speed x/y/z 22/22/15 m / min minimum. Table size 8'by 4'. ATC (tool changing system) 6 nos. min., z-axis stroke 100mm min., alongwith voltage stabilizer, compressor and dust collector as required	01 no.
131.	Laser cutting machine	Laser Power- 25W, Drive- AC servo control, Z axis moving – automatic, Computer interface- USB/ Ethernet, Memory Buffer- 265 MB, Power Consumption- 1100W.	01 no.
132.	External Hard disk	1 tb	02 nos.
133.	Carpentry Software	Latest configuration	02 nos.
134.	Fire buckets		04 nos.

135.	Fire Extinguisher		04 nos.
136.	Laptop, Internet facilities with excellent strength	Latest configuration	02 nos.
137.	Air conditioner split		As required


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