AERONAUTICAL STRUCTURE AND EQUIPMENT FITTER

NSQF LEVEL- 4.5

SECTOR- CAPITAL GOODS AND MANUFACTURING

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

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(Engineering Trade)

SECTOR –CAPITAL GOODS AND MANUFACTURING

(Revised in 2024)

Version 2.1

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Developed By
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EN-81, Sector-V, Salt Lake City,
Kolkata – 700 091
www.cstaricalcuta.gov.in

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1. COURSE OVERVIEW

The Craft Instructor Training Scheme has been operational since inception of the Craftsmen Training Scheme. The first Craft Instructors' Training Institute was established in 1948. Subsequently, 6 more institutes namely, Central Training Institute for Instructors (now called 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 institutes viz. Institutes for Training of Trainers (ItoT). This is a competency based course of one year duration. "Aeronautical Structure and Equipment Fitter" CITS trade is applicable for Instructors of "Aeronautical Structure and Equipment Fitter" trade.

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 trainees acquire specialized knowledge, skills & develop an attitude towards learning & contributing to the 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 the importance of collaborative learning & innovative ways of doing things. All trainees will be able to understand and interpret the course content in the 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 a NCIC certificate by DGT. With effect from the session starting August 2019, the validity of National Craft Instructor Certificate (NCIC) issued under Craft Instructor Training Scheme (CITS) shall be 5 years. During the fifth year after attaining NCIC certificate, the certificate holder shall be required to attend a refresher course of duration not less than 10 days. These refresher courses would be offered by NSTIs / short-listed partners.

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 Course	240

Trainees can also opt for optional courses of 240 hours duration.

2.3 PROGRESSION PATHWAYS

- Can join as an 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 outcome. 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 a Summative **Assessment Method**. The All India Trade Test for awarding National Craft Instructor Certificate will be conducted by DGT at the end of the year as 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 the final examination will also check the individual trainee's profile as detailed in assessment guidelines 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 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 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 some 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

Evidence and records of internal (Formative) assessments are to be preserved until forthcoming yearly examination for audit and verification by the examining body. The following marking pattern to be adopted for formative assessment:

Performance Level	Evidence
(a) Marks in the range of 60%-75% to be allotted during assessment	
For performance in this grade, the candidate should be well versed with instructional design, implement a 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 topics. • 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) Marks 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 a learning programme and assess learners which demonstrates attainment of a *reasonable 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 the 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 topics. • 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) Marks 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 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.	● Demonstration of *high* skill level to establish a rapport with audience, 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	**AERONAUTICAL STRUCTURE AND EQUIPMENT FITTER -CITS**
Trade Code	DGT/4058
NCO – 2015	2356.0100, 3115.1000
NOS Covered	AAS/N9422, AAS/N9423, AAS/N9424, AAS/N9425, AAS/N9426, AAS/N9427, AAS/N9428, AAS/N9429, AAS/N9430, AAS/N9431, AAS/N9432, AAS/N9433, AAS/N9433, AAS/N9434, AAS/N9435, AAS/N9436, AAS/N9437, ASC/N9410, ASC/N9411
NSQF Level	Level - 4.5
Duration of Craft Instructor Training	One Year
Unit Strength (No. Of Student)	25
Entry Qualification	Degree in Aeronautical/ Mechanical Engineering from AICTE/ UGC recognized Engineering College/ University OR B.Voc in Aeronautical/ Mechanical Engineering from AICTE/ UGC recognized Engineering College/ University OR 03 years Diploma in Aeronautical/ Mechanical Engineering after class 10th from AICTE/ recognized board of technical education. OR Ex-service man from Indian Air Force with 15 years of service in related fields. OR 10th Class 02-year NTC passed in the trade of "Aeronautical Structure and Equipment Fitter".
Minimum Age	16 years as on first day of academic session.
Space Norms	400 Sq. mt
Power Norms	25 KW
Instructors Qualification for	
1. Aeronautical Structure and Equipment Fitter - CITS	B.Voc/Degree in Aeronautical/ Mechanical Engineering from AICTE/UGC recognized Engineering College/ university with one-year experience in the relevant field. **OR** 03 years Diploma in Aeronautical/Mechanical Engineering from AICTE/ recognized board of technical education with two years' experience in the relevant field. **OR** Ex-service man from Indian Air Force with 20 years of service in

	related fields. Candidate should have undergone methods of instruction course or minimum two years of experience in technical training institute of Indian Air Force. **OR** NTC/NAC passed in the trade of "Aeronautical Structure and Equipment Fitter" with three years' experience in the relevant field. **Essential Qualification:** Relevant Regular/RPL variant of National Craft Instructor Certificate (NCIC) 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** 03 years Diploma in any 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:** Regular/RPL variants of National Craft Instructor Certificate (NCIC) in relevant trade **OR** NCIC in RoDA or any of its variants under DGT.
3. Engineering Drawing	B.Voc./Degree in Engineering from AICTE/ UGC recognized Engineering College/ university with 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 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:** Regular/RPL variants of National Craft Instructor Certificate (NCIC) in relevant trade **OR** NCIC in RoDA / D'man (Mech /civil) or any of its variants under DGT.

3. **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 any trade with seven years experience in training/ teaching field. **Essential Qualification:** National Craft Instructor Certificate (NCIC) in any of the variants under DGT / B.Ed /ToT from NITTTR or equivalent.
4. **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 as per defined job role. Imparts theoretical instructions for the use of tools & equipment of related trades and related subjects. Demonstrate process and operations related to the trade in the workshop; supervises, assesses and evaluates students in their practical work. Ensures availability & proper functioning of equipment and tools in stores.

Aeronautical Structure Fitter:

- Plans, demonstrates and Assembles aircraft structure parts made of different materials with different thickness and geometric constraints as per drawing and required tolerance.
- Controls the quality of an assembly.
- Interprets and applies safety rules and quality standards.
- Supervises selection of material as per application and its visual inspection for rusting, scaling, corrosion etc.
- Reads and interprets aircraft drawings, specification of different parts, fittings or assembles to be made and their functions.
- Plans, demonstrates and makes components of different fit for assembling as per required tolerance observing principle of interchangeability and checks for functionality.
- Plans, demonstrates and assembles components by different fitting operations and checking accuracy using appropriate measuring instruments.
- Supervises and manufactures straight and curved interchangeable metal components of sheet metal, rivets and checks accuracy using appropriate measuring instruments according to required tolerances.
- Supervises and manufactures open and closed riveted box with two different thicknesses, bended sheets, anchor nuts and electrical bonding
- Demonstrates and produces composite riveted components using different thicknesses of Carbon Fibre and different types of rivets.

Aeronautical Equipment Fitter for Fluid Aircraft Systems:

- Plans and demonstrates Aircraft systems assembly phases and mechanical assembly by exhibiting the operation of all fluid systems: hydraulic, pneumatic, cooling, fuel, oxygen.
- Reads and interprets the technical documentation of an aircraft
- Plans and assemble different fluid pipes and equipment, perform pipe routing inspections and simple leak tests, check the malfunctioning if any, diagnose the same and rectifies errors.
- Supervises and Performs surface treatment, corrosion treatment and touch-ups on manufactured metal parts.
- Demonstrates and Performs Non-Destructive Test by observing standard procedure.

- Demonstrates detailed records.

Aeronautical Equipment Fitter for Electrical Aircraft Systems:

- Plans, fits and installs supports, wires, harness and other components of the different aircraft electrical systems (power chain, command and information chain, fly by wire chain, etc.) on different types of panels and structure elements.
- Demonstrates and performs basic electrical tests relative to connections and check compliance of harness building
- Supervises and selects cables and associated parts as per the wiring diagram and technical documentation; Assembles supports and wiring attaching parts;
- Plans, Prepares and positions electrical equipment, wires, harness on a support;
- Demonstrates and checks the electrical continuity of the wiring and makes the settings prior to powering on by using electrical measuring devices;
- Exhibits Stripping, crimping and connecting techniques;
- Applies electrical safety standards and respects wiring arrangement rules;
- Demonstrates inspection of wiring installations.

In addition, "Aeronautical Structure and Equipment Fitter" have the following abilities:

- Planning and organizing the assigned work;
- Plan and organize assigned work, detecting and resolving issues during work execution with confident feedback to the managing team;
- Demonstrating possible solutions and agree tasks within the team;
- Communicate with required clarity and understand technical English;
- Sensitive to environment, self-learning, productivity and team spirit.
- Analyze, evaluate and apply information gathered from observation, experience, reasoning or communication to act efficiently.

Reference NCO-2015:

a) 2356.0100-Manual Training Teacher/ Craft Instructor
b) 3115.1000- Aeronautical Engineering Technician.

Reference NOS:

a) AAS/N9422
b) AAS/N9423
c) AAS/N9424
d) AAS/N9425
e) AAS/N9426
f) AAS/N9427
g) AAS/N9428
h) AAS/N9429
i) AAS/N9430
j) AAS/N9431
k) AAS/N9432
l) AAS/N9433
m) AAS/N9433
n) AAS/N9434
o) AAS/N9435
p) AAS/N9436
q) AAS/N9437
r) ASC/N9410
s) ASC/N9411

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 TRADE TECHNOLOGY

1. Implement safe working practices, environment regulation, housekeeping and Aircraft Safety Practices to be observed in the industry/shop floor. (NOS: AAS/N9422)
2. Plan and Demonstrate assembly of parts made of different materials (Aluminium and Stainless steel, etc.) and of different thicknesses, with geometric constraints as per drawing and required tolerance and check for dimensional accuracy. (NOS: AAS/N9423)
3. Exhibit bending of metal, squeeze riveting or "C" squeeze and angle profile as per drawing and check dimensional accuracy. (NOS: AAS/N9424)
4. Plan and Demonstrate structure part manufacturing, assemble them, check dimensional accuracy and Evaluate functionality of the assembly. (Example: little bended aircraft). (NOS: AAS/N9425)
5. Realize PR sealant application on structure panels and check for correct bonding of PR sealant. (NOS: AAS/N9426)
6. Demonstrate riveted profile manufacturing (open and closed), assembly of equipment, electrical bonding, sealant application/ removal and leak test. (NOS: AAS/N9427)
7. Exhibit fabrication of multi material composite sandwich panel with riveted installation, Inspection for desired quality, detection of non-conformities and Problem solving. (NOS: AAS/N9428)
8. Illustrate aircraft assembly fluid systems (Hydraulic, Pneumatic, Cooling, Fuel and Oxygen) and demonstrate installation of metallic pipes and equipment, screwing, torqueing, locking and checking the assembly. (NOS: AAS/N9429)
9. Demonstrate installation of Composite duct and flexible hose for aircraft fluid systems, installation of overheat protection as per installation plans. (NOS: AAS/N9430)
10. Illustrate assembly and fitting of different mechanical sub-assemblies (hooks, locking means, flight controls, mechanical link rod and wires) and check for proper functioning. (NOS: AAS/N9431)
11. Exhibit and supervise surface treatment and Non-Destructive Testing. (NOS: AAS/N9432)
12. Plan and Demonstrate assembly on the Hydraulic system, inspect assembly compliance of the system and exhibit leak tests. (NOS: AAS/N9433)
13. Exhibit assembly on the Pneumatic system, inspect assembly compliance and demonstrate leak tests of the system. (NOS: AAS/N9433)

14. Perform fitting and assembly of Oxygen components inspect assembly compliance and exhibit leak tests of the system. (NOS: AAS/N9434)
15. Plan and Demonstrate Shielding by end, window and stop implementation and exhibit test. (NOS: AAS/N9435)
16. Plan and execute Stripping, crimping of different terminal components, Insertion and extraction of various contacts on different types of connector and quality and functional electrical tests. (NOS: AAS/N9436)
17. Demonstrate planning and execution of Shaping and tying wires/cables to build a harness, assembly of harness components, fitting and installation harness in accordance with the drawing and check errors. (NOS: AAS/N9437)
18. Read and apply engineering drawings for different applications in the field of work. (NOS: ASC/N9410)
19. Demonstrate basic mathematical concepts and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS: ASC/N9411)

6. COURSE CONTENT

AERONAUTICAL STRUCTURE AND EQUIPMENT FITTER –CITS TRADE			
TRADE TECHNOLOGY			
Duration	**Reference Learning Outcome**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
Professional Skill 09 Hrs. Professional Knowledge 06 Hrs.	Implement safe working practices, environment regulation, housekeeping and Aircraft Safety Practices to be observed in the industry/shop floor.	1. Explain Importance of Instructor training. 2. Exhibit use of Personal Protective Equipment (PPE). 3. Demonstrate First Aid Method. 4. Demonstrate Safe disposal of waste materials, Hazard identification and avoidance. 5. Explain Safety signs for Danger, Warning, caution & personal safety message. 6. Demonstrate Preventive measures for electrical accidents & steps to be taken in such accidents. 7. Demonstrate practical use of Fire extinguishers. 8. Demonstration of housekeeping & good shop floor practices. 9. Aircraft Safety Practices: Foreign Object Damage, Inventory of tools before and after intervention, Traceability of specific tools used.	Explain Institute system including stores procedures. Importance of safety and general precautions observed in the industry/shop floor. Demonstration on application of First aid. Operation of electrical mains. Use of PPEs. Aspects of safe working practices including precautions to take when working with electricity, gases especially oxygen, oils and chemicals. Instruction in the remedial action to be taken in the event of a fire including knowledge on extinguishing agents. Response to emergencies e.g.; power failure, fire, and system failure. Introduction to 5S concept & its application. Demonstration of Occupational Safety & Health: Health, Safety and Environment guidelines, legislations & regulations as applicable. Basic understanding on hot work, confined space work

			and material handling equipment
Professional Skill 35 Hrs. Professional Knowledge 10 Hrs.	Plan and Demonstrate assembly of parts made of different materials (Aluminium and Stainless steel, etc.) and of different thicknesses, with geometric constraints as per drawing and required tolerance and check for dimensional accuracy.	10. Demonstration of tools & equipment as per desired specifications for marking & sawing. 11. Identification and Visual inspection Selection of counterfeit /material as per specification 12. Marking out lines and hacksawing to given dimensions on different types of metals of different sections. (pipes and angles)	Marking tools –Steel rule, dividers, calipers, hermaphrodite, center punch, dot punch, their description and uses of different types of hammers. Description, use and care of 'V' Blocks, marking off table. Angle plate and Engineers square
		13. Demonstrate filing and drilling operations on Aluminum 2024, stainless steel 316L and titanium TA6V (size 400 mm x 200 mm for each) by: - Tracing, Cutting with Hacksaw, fitting process (using files) on each sheet - Tracing for rivet pitch and edge distance calculation and drilling - Debiting - Deburring - Adjustment of the parts with geometric tolerances: perpendicularity, parallelism, flatness, rounded, angle - Making flanged holes - Drilling - Counter boring - Countersinking - thread cutting - Temporary fitting (clamping pin) - Check dimensional accuracy and deviation.	File – elements, cuts, shapes, grades and cleaning of files. Vernier caliper and vernier height gauge, micrometer, Care of tools, Calibration of tools and equipment, calibration standards. Drill- material, types, parts and sizes for metallic materials. Drill angle-cutting angle for different materials, cutting speed feed. R.P.M. for different materials. Vertical drill machine-handling and maintenance." *GO - no GO" gauge* Deburring and chamfering of holes Counter boring, countersinking and spot facing. Taps and Thread Standards. Tap drill Size.

		- Perform correcting errors	Hydraulic press for Flanges holes.
		14. Demonstrate assembly (size 100 mm x 50 mm) with Aluminum (Al 7075) and Stainless-steel parts of different thicknesses, with geometric constraints by: - Drilling - Fitting process (using files) - Countersinking - Reaming - Perform thread cutting - Filling with liquid shim (Aluminum filler) - Clearance measurement. - Check dimensional accuracy - Perform correcting errors.	Non-Ferrous metals: Aluminum Non-Ferrous Alloys: Aluminum series. Screw threads: terminology, parts, types and their uses. Screw pitch gauge. Clearance and tolerances, liquid shim handling and maintenance. Angular measurements: unit, subdivision, types, bevel protractor, vernier bevel protractor, combination squares Gauges: wire gauge, radius gauge, plug gauge, screw pitch gauge
Professional Skill 22 Hrs. Professional Knowledge 08 Hrs.	Exhibit bending of metal, squeeze riveting or "C" squeeze and angle profile as per drawing and Check dimensional accuracy.	15. Demonstrate manual bending operations on Aluminum 5086 (size 100 mm x 80 mm) by: - Tracing, cutting process with Hacksaw, fitting process (using files) - Bending of metal as per drawing - Check dimensional accuracy - Perform correcting errors	Non-Ferrous metals: magnesium, titanium, copper, nickel. Counter sink, counterbore and spot facing-tools and nomenclature, Reamer-material, types (Hand and machine reamer). Pneumatic drills, types of drill bits, holding devices. Bending handling and maintenance. Designation of steel - AISI/SAE numerical system and European standard Necessity of interchangeability, limits, fits and tolerances.
		16. Exhibit squeeze riveting or "C" squeeze on thickness 2 mm and angle profile (countersunk head and round	Sheet holders pins: material, construction, types, accuracy and uses. Sheet metal forming

		head rivet with different dash diameters) by: - *countersinking* - squeeze riveting or "C" squeeze - Self-check by using rivet gauge - Check dimensional accuracy - Perform correcting errors	terminology, bending calculation, bend allowance, total developed width calculation. holding and clamping devices Basic riveting operations with squeeze etc. riveting tools, care, maintenance, Solid Rivet definition, types, sizes, materials, length calculation. Calculation of pitch and edge distance, importance of the pitch and the edge distance.
Professional Skill 35 Hrs. Professional Knowledge 10 Hrs.	Plan and Demonstrate structure part manufacturing, assemble them, check dimensional accuracy and Evaluate functionality of the assembly. *(Example: little bended aircraft)*	17. Demonstrate Part manufacturing *(example: little bended aircraft):* Exhibit adjustment operations on Aluminum sheet (Al 5086), size 200 mm x 100 mm, thickness of 1.5 mm by: - Tracing with template, cutting process with belt saw, Fitting process (using files) - Drilling, Counter drilling - Deburring - Temporary fitting (clamp) - Rivet pitch and edge distance calculation - Bending - Temporary fitting (clamping pin) Riveting (squeeze riveting, "C" squeeze) - Manual and micrometric countersinking - Self-check by using rivet gauge - Riveting using rivet gun (different diameters, different thicknesses, angle profile, countersunk head and round	Drill angle holding devices- material, construction and their uses. Assembling techniques such as aligning, bending, fixing, mechanical jointing, threaded jointing, sealing and torquing. Riveting operations with Rivet gun tools, care, maintenance, specification, description, types and their uses, handling and maintenance. Removal operations of rivets and other fasteners. Fasteners symbolisation – NAS 523 standard Stress, strain, ultimate strength, factor of safety. Physical properties of engineering metal: colour, weight, structure, and conductivity, magnetic, fusibility, specific gravity.

		head rivets) - Check dimensional accuracy - Perform correcting errors	Basic study of stress-strain curve for MS.
		18. Demonstrate Structure parts manufacturing **:***(Example: frames, stringers, splices)* Using Aluminum 2024, sheet size 2000 mm x1000 mm thickness of 1.5 mm or 2 mm, bending radius 4, 5, Exhibit manufacture of primary parts with geometric constraints (angle, rounded, flatness) - Tracing - Cutting process with saw with geometric constraints - Bending - Debiting - Deburring - Clearances measurement - Drilling with hand drill machine - Flanged holes	Sheet metal working techniques such as growing, shrinking. Shrinking machine handling and maintenance. Temperature measuring instruments. Specific heats of solids & liquids. Thermal Conductivity, Heat loss and heat gain. Average Velocity, Acceleration & Retardation. Related problems.
		19. Demonstrate Assembly of structure parts: Using the previous manufactured parts, with Aluminum 2024, sheet size 2000 mm x 1000 mm, exhibit operations of: - Drilling with hand drill machine - Riveting using rivet gun, drilling grid, countersunk head and round head rivets, different diameters of rivets - Self-check by using rivet gauge - Perform correcting errors - Evaluate functionality of the assembly	Circular Motion: Relation between circular motion and Linear motion, Centrifugal force, centripetal force. Aircraft Safety Practices: Means of protection of the aircraft working area. Brief History of Aviation, General aircraft description, Aerodynamic notions, how does an aircraft fly. Aircraft main parts (fuselage, wing and empennage, engine and pylons, Landing gear, equipment's)

Professional Skill 09 Hrs. Professional Knowledge 06 Hrs.	Realize PR sealant application on structure panels and check for correct bonding of PR sealant.	20. Demonstrate PR sealant application: Using Aluminum 2024, sheet size 400 mm x 200 mm, exhibit operations of: - Tracing, cutting process with belt saw with geometric constraints - Drilling with hand drill machine - Counter drilling, - Pickling, cleaning - PR mixing - Temporary fitting - rivets and fasteners covering - PR sealant application - Check for perfection - Perform correcting errors	Aircraft Safety Practices: Identification of ingredients with limited shelf life, how to store them and discard them. PR sealant types, uses, curing, pot life, storage, care and maintenance. PR physical properties, surfaces treatment associated.
Professional Skill 20 Hrs. Professional Knowledge 10 Hrs.	Demonstrate riveted profile manufacturing (open and closed), assembly of equipment, electrical bonding, sealant application/ removal and leak test.	21. Demonstrate Open riveted box manufacturing: Using Aluminum 2024, different thicknesses sheet, size 400 mm x 400 mm, exhibit operations of: - Bending - Drilling, counter drilling - Countersinking - Riveting - Flanged hole (2 spars with thickness *1*.5mm, 2 spars with thickness 2.5mm) on dedicated support, - Assemblies of anchor nuts - Assemblies of equipment and electrical harness supports - Electrical Bonding using electrical bonding brush.	Human Factors: Human Performance and Limitations, Social Psychology, Factors Affecting Performance, Physical Environment, Physical work; Repetitive tasks; Visual inspection; Complex systems, Communication within and between teams; Human Error, Hazards in the Workplace. Bonding definition, uses, protection. Bonding brush handling and maintenance
		22. Demonstrate Riveted closed profile manufacturing**: Using** Aluminum 2024, Titanium TA6V, sheet size 400 mm x 300 mm, exhibit operations	Manufacturing processes for metallic materials: molding, welding, forging, forging die, sheet metal work (bending, cutting, stamping, rolling),

		of: - Rolling, - Shaping, - Bending, - Drilling (with angle drill machine), counter drilling - Countersinking - Riveting on sheets of different thicknesses, - Pickling, cleaning, rivets and fasteners covering - PR mixing,PR sealant application, - Making flanged holes - Making movable access door - Exhibit leak test of the closed wing profile by using a Schrader plug and compressed air.	additive manufacturing.
		23. Demonstrate Removal of PR sealant by performing: - Rivets and fasteners removal - Mastic removal by scraping - Surface cleaning.	PR sealant removal operations and cleaning.
Professional Skill 40 Hrs. Professional Knowledge 20 Hrs.	Exhibit fabrication of multi material composite sandwich panel with riveted installation, Inspection for desired quality, detection of non-conformities and Problem solving.	24. Exhibit Composite panel manufacturing: Using GFRP (Glass Fibre Reinforced Polymer) and unidirectional CFRP (Carbon Fibre Reinforced Polymer), sheet size 500 mm x 500 mm demonstrate operations of: - Marking plies - Making Fibre orientation choice - Calculating resin ratio - Composite wet lay-up - Making a curved panel by wet lay-up - Vacuum bag installation - Resin curing.	Composite Fibre: types, conductivity, specific gravity, mechanical properties and uses. Resins types, conductivity, specific gravity, mechanical properties and uses. Composite Fibre orientation, different waves types, resin ratio calculation. Composite manufacturing processes. Composite Material Science: properties -Physical & Mechanical, difference between CFRP, GFRP, AFRP, QFRP, different weaving types,

			manufacturing methods, resin ratio, curing, sandwich materials, different core materials, composite technical textile.
		25. Demonstrate Composite drilling: Using previous GFRP & CFRP, sheets size 500 mm x 500 mm, Exhibit operations of: - Drilling, counter drilling - Countersinking - Temporary fitting 26. Exhibit Composite sandwich manufacturing: Using previous CFRP, sheets size 500 mm x 500 mm, fabricate a sandwich panel by: - Tracing - Fibre orientation, resin ratio calculation, composite lay-up, honeycomb cutting, vacuum bag, polymerization.	Drill- material, types, parts and sizes for composite materials. Drill angle-cutting angle for different materials, cutting speed feed. R.P.M. for composite materials. Drilling composite materials handling and maintenance. Composite core, types, mechanical properties and uses. Sandwiches composites manufacturing processes, curing.
		27. Demonstrate Composite riveted installation: Using different thicknesses of multi-materials (Aluminum, Titanium, CFRP, GRFP...) and different types of rivets and fasteners (LGP, Hi-lite, Cherry-max, Composite-lock, etc.) exhibit operations of: - Drilling, counter drilling, countersinking - Deburring - Reaming - Temporary fitting - Rivets and fasteners fitting (LGP, Hi-lite, Cherry-max, etc.)	Riveting operations on composite structure, Rivet pull machine, care, maintenance, specification, description, types and their uses, method of using. Composite metallic assembly specification. Blind rivet and specific fasteners specifications for composite and metallic installation, definition, types, sizes, materials, length calculation. Blind Rivet and other fasteners removal operations. Aviation Legislation:

		28. Demonstrate Rivets and other fasteners removal: Using Metallic and composite assembly exhibit rivets and other fasteners removals on the composite component by manual drilling and use of punch tool and pin drift.	International Aviation legislation: Chicago Convention and the role of the International Civil Aviation Organization. Directorate General of Civil Aviation: India safety policy, Structure of the aviation regulatory framework, relationship between CAR-21, CAR-M, CAR-145, CAR-147. General description of CAR 21 and the importance of applying Airworthiness requirements.
		29. Demonstrate Composite riveted closed box manufacturing: Using CFRP, size 500 mm x 500 mm, fabricate a metal-composite assembly by: - Bending - Riveting - Drilling - Countersinking - Pinning - Rivets and fasteners installation - PR sealant application. - Testing and Inspection for desired quality. - defects and non-conformities detection - Problem solving and correcting errors.	PR sealant, care & maintenance on composite materials. Aircraft description: ATA standard and ATA list, General description of the main Aircraft systems and related parts. Aircraft Maintenance Programmes: Reliability programme, AMP, on condition maintenance, TBO revision programme, Maintenance of fuel and oil consumption records, Fixing routine maintenance periods and component TBO, initial and revision.
Professional Skill 56 Hrs. Professional Knowledge 19 Hrs.	Illustrate aircraft assembly fluid systems (Hydraulic, Pneumatic, Cooling, Fuel and Oxygen) and demonstrate installation of	30. Exhibit aircraft systems assembly phases on structure panels and mock-up, explain for each system (Hydraulic, Pneumatic, Fuel, Cooling and Oxygen): - Identify different elements	Brief description of Hydraulic, Pneumatic, Fuel, Cooling and Oxygen systems. Operation, function and use of avionic general test equipment.

	metallic pipes and equipment, screwing, torqueing, locking and check the assembly.	and explain their role. - Brief presentation of the operating system. - Identification of the hazards. - Association of each element of the panel its symbol on the corresponding diagram. - Identifying in the work card the order of assembly of each element. - Assembly on the mock-up all the different elements. - Checking and correcting errors according to the technical documentation.	Unpacking and storage conditions. Different common damage. Different types of plugs. Standard practices procedures on the technical documentation.
		31. Exhibit operations before mounting piping (ATA 26,28,29,30,35,36,38...): - Check protections and lack of impact on the pipes, - Handling of all types of pipes and different lengths (trolleys, protective foam, bubble wrap, transport case) - Identify pipe's plugs shutter and Installation of corresponding plugs - Check elements to be mounted have not been damaged - Check part or equipment number corresponds to the requisition sheet - Check expiry date.	
		32. Demonstrate Pipe routing on a diagram: On mock-up with technical documentation, exhibit operations of: - Explain each pipe	Routing diagram. Definition of the appropriate marking according to the type of pipe.

		mentioned in the work card and its belonging system - Identify fluid flow direction - Identify tools and equipments to achieve the pipe routing - Check condition of the connection ends - Prepare structure panel and mark - Mark path of the different elements 33. Demonstrate Screwing and torquing operations: On structure panels exhibit operations of Screwing and Tightening different types of screws using appropriate torque wrench 34. Demonstrate Locking techniques: on different subassemblies and structure panel, exhibit operations of: - Locking with nut lock washer, pin and castle nut, self-locking nut - Wire locking of nut retainer, screw, nut and piping and safety wire - Checking of Locking fault and correction of errors.	Technical vocabulary related to the systems. Select a torque wrench and read the Aluminium of torquing on an abacus. Locking techniques.
		35. Demonstrate Metallic pipe installation by performing operations of: - Combs, pipe support collars and clamps installation and torque tightening. - Connect pipes in accordance with the work card.	Different pipe joining techniques / grounding / bounding. Identify pipes constraints and gaps between pipes and the surrounding environment.

		- Dismantling, assembly valves and fitting with pipes. - Ensure electrical continuity and grounding with bonding leads. - Assemble metal pipes on different structural panels with respect to the gaps between pipes and the surrounding environment. - Checking installation and correcting errors.	
Professional Skill 20 Hrs. Professional Knowledge 10 Hrs.	Demonstrate installation of Composite duct and flexible hose for aircraft fluid systems, installation of overheat protection as per installation plans.	36. Exhibit Composite duct installation by: - Composite duct support collars, brackets installation and torque tightening. - Connect the duct in accordance with the work card. - Dismantling, assembly of sleeves and bellows. - Assembly of composite ducts on different structural panels with respect to the gaps between ducts and the surrounding environment. - Checking installation and correcting errors. 37. Demonstrate Flexible hose installation by: - Connect flexible hose in accordance with the work card. - Dismantling, assembly of fittings. - Fitting assembly of fittings with torque wrench.	Different duct joining techniques/ grounding/ bounding. Identify ducts constraints and gaps between ducts and the surrounding environment. Different flexible hose joining techniques. Flexible hose constraints, bending radius, kinking and gaps between flexible hoses and the surrounding environment. Common damage. Different thermal insulation sleeving assembly techniques.

		- Assembly of flexible hoses on different structural panels with respect to the gaps between ducts and the surrounding environment. - Checking the mounting constraints, bending radius and lack of kinking. - Checking installation and correcting errors. 38. On different subassemblies exhibit operations of: - Check insulation sleeves comply with installation plans, standards and technical specifications. - Put the sleeve in place and fix it to the pipe work.	
		39. Demonstrate assembly/ disassembly of Over Heat Detection System by: - Muff installation on duct coupling - Connect Graviner and wire locking in accordance with work card - Assemble OHDS on different ducts with respect to the functional installation rules - Check tolerances for waviness, bends in wire and two detection loops - Check duct coupling - Check correct adjustment between the muff position and the Graviner. - Check for proper function and correct errors.	Different types of GRAVINER systems. Common damage / mistakes.

Professional Skill 41 Hrs. Professional Knowledge 19 Hrs.	Illustrate assembly and fitting of different mechanical sub-assemblies (hooks, locking means, flight controls, mechanical link rod and wires) and check for proper functioning.	40. Demonstrate assembly / disassembly of different mechanical sub-assemblies by: - Applying the task according to technical documentation - Disassembly the mechanical sub-assembly: classification, verification, identification and storage of the parts - Assembly of mechanical sub-assembly: clearance gaps, torque tightening, lockage - Check the correct assembly. Check for proper functioning of all the assembled parts: bonding, leaks.	Drawing Of Typical Aircraft Parts: Study of drawing and drawings, drawing types and diagrams, their symbols, Wiring diagrams and schematic diagrams. Different types of locking techniques. Common damage / mistakes. Bearings: Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings.
		41. Exhibit assembly of flight controls and settings by: - Assembly the components of flight control chain: control rod, cable, pulley, shaft, etc. - Tightening according to the standard torque mentioned in work card - Bonding/grounding: screw the ground termination, apply varnish on different pipes - Checking flight controls functionality. - Constraint checking / tension of a cable. - Functionality test of assembly.	Technical documentation, tolerance criteria. Flight controls chain and setting process. Common damage / mistakes. Specific hazards regarding the test procedure.
Professional Skill 30 Hrs.	Exhibit and super vise surface treatment and Non-Destructive	42. Demonstrate Treating and preventing Surface corrosion: - Demonstrate surface and	Corrosion definition: different types of corrosion (galvanic, pitting, filiform,

Professional Knowledge 15 Hrs.	Testing	corrosion treatments on the manufactured parts by: - Sanding - Pickling - Reworking - Alodine process application - Zinc chromate touch-ups - Painting touch-ups - Checking quality and correcting errors	crevice, stress, fatigue, intergranular) Methods of corrosion protection. Corrosion treatment. prevention of corrosion, Physical properties of materials. Surfaces treatment knowledge, grinding, scouring. Surface protection, definition: types, uses, properties, paint. 90°angle sander handling, care and maintenance Corrosion reworking and corrosion removal processes. Special coating, chemical films, special paints like Abrasive Resistant Paint, Heat and corrosion resistant paints
		43. Demonstrate Non-Destructive Testing: - Crack detection by various method such as visual/ optical inspection, - Hot oil and chalk method. - Dye penetrant method. - Magnetic particle inspection, - Eddy current inspection, - Ultrasonic testing - Fluro particle inspection test. - NDT of composite materials.	Heat treatment and advantages. Heat treatment Terms - Critical range, Annealing, Normalizing, Heat treatment, Hardening Quenching, Tempering carburizing, case hardening. Physical properties of Aluminum metal: phase diagram of Al-Cu, AL-Zn and Al-Mg, Heat treatment associated. NDT definition, types, uses, care, maintenance for metallic and composite materials.
Professional Skill 20 Hrs.	Plan and Demonstrate	44. Demonstrate assembly on the Hydraulic system by:	**Aircraft Hydraulic System** - System layout, fundamental

Professional Knowledge 10 Hrs.	assembly on the Hydraulic system, inspect assembly compliance of the system and exhibit leak tests.	- Assemble Hydraulic system components: valve, pump, actuators. - Position parts relative to each other - Tighten according to the standard torque mentioned in work card - Bonding/grounding: screw the ground termination, apply varnish on different pipes - Check Functionality according to the technical documentation and correct errors.	of hydraulic systems and terminology, advantages and disadvantages of hydraulic system. - Hydraulic fluids. - Hydraulic rubber seals and packing washers. - Hydraulic system component: Reservoir, hand pumps, power driven pumps, filters, pressure regulator valve, accumulator, selector valves, pressure relief valves, actuating cylinders, check valves, orifice check valve, restrictor valves, hydraulic fuse, fine disconnect or quick disconnect valve, Emergency pressure generation - Flexible hydraulic hoses. How hydraulic system works in aircraft. Benefit of aviation hydraulics. - Inspection and pressure testing. - Indication & warning system.
		45. Exhibit inspection on a mock up with defaults on the hydraulic system: - Routing according to the diagram - Cleanliness - Grounding, bounding standards - Marking and lockage - Marking of systems - Check tightening torques - Check the assembly compliance of the system according to the	Technical documentation and operation of the hydraulic system. Tolerance criteria. Specific hazards regarding test procedure. standards inspection procedure according to the system. Common faults / mistakes.

		requirements defined in the documentation. 46. Using compressed air, demonstrate Hydraulic system leak tests.	
Professional Skill 20 Hrs. Professional Knowledge 10 Hrs.	Exhibit assembly on the Pneumatic system, inspect assembly compliance and demonstrate leak tests of the system.	47. Exhibit assembly on the Pneumatic system by: - Assemble pneumatic system components: compressor, pressure gauge, filter, regulator... - Position parts relative to each other - Tighten according to the standard torque Aluminum mentioned in work card - Bonding/grounding: screw the ground termination, apply varnish on different pipes - Check functionality according to the technical documentation and correct errors - Check leakages.	Aircraft Pneumatic System :- - Introduction, System Layout advantages and disadvantages of pneumatic system. - High pressure, medium pressure and low pressure system. - Pneumatic system components, engine driven compressor, relief valves, control valve, filters, oil separators, air bottle, pressure reducing valves, check valves, restrictors, air compressors, oil and water trap regulator, storage bottles and air pump. - Indication & warning system Technical documentation and operation of the pneumatic system. Common faults / mistakes.
		48. Exhibit inspection on a mock up with defaults on the Pneumatic system: - Routing according to the diagram - Cleanliness - Grounding, bounding standards - Marking and lockage - Marking of systems - Check tightening torques	Technical documentation, standards inspection procedure according to the system. Common faults / mistakes.

		- Check assembly compliance of the system according to the requirements defined in the documentation. 49. Using compressed air, demonstrate Pneumatic system leak tests.	
Professional Skill 20 Hrs. Professional Knowledge 10 Hrs.	Perform fitting and assembly of Oxygen components, inspect assembly compliance and exhibit leak tests of the system.	50. Exhibit assembly and fitting of Oxygen components by: - Fit and assemble oxygen system components - Position parts relative to each other - Tighten according to the standard torque Aluminum mentioned in work card - Bonding/grounding: screw the ground termination, apply varnish on different pipes - Checking leakage and functionality according to the technical documentation and correction of errors.	Aircraft Oxygen Systems: - Introduction, systems layout cockpit, cabin sources supply regulation. - Charging and purging of oxygen system, oxygen system servicing. - General precautions for oxygen system, Indications & warning. Technical documentation, tolerance criteria. Specific hazards regarding test procedure.
		51. Demonstrate inspection on a mock up with defaults on the Oxygen system: - Routing according to the diagram - Cleanliness - Grounding, bounding according to CDCCL standards - Marking of systems - Check tightening torques - Check the assembly compliance of the system according to the requirements defined in	Technical documentation, standards inspection procedure according to the system. Common faults /mistakes. Technical documentation, tolerance criteria. Specific hazards regarding test procedure.

		the documentation. 52. Using compressed air, demonstrate Oxygen system leak tests.	
Professional Skill 20 Hrs. Professional Knowledge 10 Hrs.	Plan and Demonstrate Shielding by end, window and stop implementation and exhibit test.	53. Demonstrate operations of infra-red gun or hot air gun: - Shielding by end implementation (special measurements, insulation stripping, shield cutting, wire lead and solder sleeve installation, infra-red gun heating, checking) - Shielding by window implementation (special measurements, insulation stripping, shield cutting, wire lead and solder sleeve installation, infra-red gun heating, checking) - Shield stop implementation (special measurements, insulation stripping, shield cutting, shrinkable sleeve heating with hot airgun).	Aeronautic shielded cables. Stripping techniques and associated inspections. Solder sleeves and shrinkable sleeves. Wiring tools: Scalpel or cutter, cutting pliers, scissors, ruler, infra-red gun, hot air gun. Quality requirements.
Professional Skill 38 Hrs. Professional Knowledge 22 Hrs.	Plan and execute Stripping, crimping of different terminal components, Insertion and extraction of various contacts on different types of connector and quality and functional electrical tests.	54. Exhibit Stripping of different types of wires/cables (insulation removal) by: - Stripping small gauge wires using the stripping pliers - Removal insulation on shielded cables using the scalpel - Stripping and disassembling large section cables using the specific tooling. - Checking for non-	Stripping techniques using appropriate tools according to wires/cables types and gauges, and in compliance with technical documentation. Stripping defects/ nonconformities. Safety rules with cutting tools. Wiring tools: Scalpel or cutter, stripping pliers, ruler. Terminal types: contents, splices, lugs, spare wire end caps.

		conformities 55. Demonstrate crimping operations of different terminal components by: - Crimping contacts on small gauge wires - Crimping lugs on small gauge wires - Crimping splices small gauge wires - Crimping plugs on big gauge cables - Check for non-conformities - Ensure the traceability of crimping operations on the associated technical sheet 56. Demonstrate Insertion and extraction of various contacts on different types of connector / Connect lugs on terminal blocks by: - Insertion/extraction on different connectors type (rectangular, circular, modules) using the appropriate tools - Associated checks - Coding change (full proofing devices) on rectangular connectors - Connecting lugs on terminal blocks and secure terminal block covers. 57. Demonstrate electrical tests using a multimeter: - Carry out a wire continuity check on the harness - Perform troubleshooting	Terminal types for connectors: pins, sockets, short-male contacts, sealing pins. Crimping techniques requirements of tools. Circuit identification. Reading of diagrams. Crimping procedures for small gauge wires with hand crimping pliers (for contacts, lugs and splices) and associated controls (Quality requirements). Crimping procedures for big gauge cables with pneumatic crimping tool and associated controls (Quality requirements). Wiring tools: Crimping pliers, locators, positioner, stripping pliers, cutting pliers. scissors, cable cutter, ruler and tape measure. Tools validity. Insertion and extraction tools and the associated standard practices. Safety rules and use technical documentation related to wiring practices Aeronautic electrical wires and cables: characteristics, references, types and gauges, shielded and coaxial cables, special cables, manufacturer marking, identification marking. Need of continuity test of the electrical cable in aircraft.

		in case of mistakes during insertion tasks. - Correct the wrong position contacts by extracting/re-inserting - Ensure the harness compliance according to quality and functional requirements after repair - Perform Quality Inspection on an existing installation: defects and non-conformities detection by visual inspection. - Carry out insulation test. Carry out continuity test	Wiring diagram understanding and troubleshooting method. Quality Inspection. Electrical tests: Conductor resistance test, High voltage test, Insulation resistance test. Continuity checks using a digital multimeter.
Professional Skill 45 Hrs. Professional Knowledge 15 Hrs.	Demonstrate planning and execution of Shaping and tying wires/cables to build a harness, assembly of harness components, fitting and installation harness in accordance with the drawing and check errors.	58. Demonstrate Shaping and tie wires/cables to build a harness: - Check wires/cables: references lengths (notion of tolerances) - Carry out the wires/cables identification in correlation with the technical instructions - Set wires/cables according to their destination (layout - wiring diagram) - Tie wires/cables with plastic ties or lacing tape - Install textile/plastic protective sheaths or sleeves - Install position markers (coloured scotch tape or lacing tape) - Identify harness and its different branches using labels. Inspection and Quality	Wire and cables harness requirements. Wiring installation and types. Wire identification. Placement of identification markings. Direct and indirect markings. Types of wire markings. Wiring diagram and layout drawing understanding, tying techniques using plastic ties or textile lacing tape, mechanical protection for harness (plastic and textile sleeves, shrinkable sleeves). Torquing specifications. Wire lock installation. Connector types: plugs/sockets, mobile/fixed, circular, rectangular, junction modules, grounding modules, ARINC connectors, terminal blocks, relay bases. Connector accessories: back shells, cable clamps, fool proofing devices, protective

		assurance 59. Demonstrate final assembly of harness components using a torque wrench, strap wrench, thread lock, lock wire and connector assembly tools, by: - Installation all connector accessories according to the work card - Tightening and torque the back shells on circular connectors and apply the appropriate locking procedures, marking procedures - Coding on rectangular connectors and install cable clamps - Perform Quality Inspection on an existing installation: defects and non-conformities detection.	covers, sealing plugs Terminal types: contacts, splices, lugs, spare wire end caps. Wiring tools: contacts insertion/extraction tools, fool proofing ejector. Wiring tools: Strap wrench, torque wrench, locking wire pliers, connector assembly plate. Consumable supplies: thread lock, lock wire.
		60. Demonstrate fitting and installation harness on different types of attaching part (+20 scenarios) by: - Inspecting the integrity of harness before beginning the installation tasks - Choosing the attaching parts / routing supports (plastic vee supports, metallic or plastic clamps, spacers, screws and washers) to be fastened to the structure panels according to the work card - Install attaching parts on the panels using ratchet,	Attaching parts (plastic vee supports, metallic or plastic clamps, spacers, screws and washers). Structure and fuselage parts (frames, stringers, brackets, panels). Harness fitting rules: special care for harness integrity, bending radii, position markers, routing, segregation, tightening.

		sockets, screwdrivers and torque wrench - Install harness on the different attaching points in accordance with 2D routing drawing - Bonding/grounding connections: torque the bonding/grounding terminals, apply protection varnish on the bonding/grounding terminals - Ensure protection of the connection elements with plastic caps or bags - Ensure traceability of the tasks on the associated traceability sheet - Check errors and solve problems.	
ENGINEERING DRAWING (30 Hrs.)			
Professional Knowledge ED- 30 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 (30 Hrs.)		
Professional Knowledge WCS- 30 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 FOR CORE 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/ dgt.gov.in

7. ASSESSMENT CRITERIA

LEARNING OUTCOME	ASSESSMENT CRITERIA
TRADE TECHNOLOGY	
1. Implement safe working practices, environment regulation, housekeeping and Aircraft Safety Practices to be observed in the industry/shop floor. (NOS: AAS/N9422)	Comply with the organization's safety and security policies and procedures
	Identify and exhibit the uses of Personal Protective Equipment (PPE).
	Demonstrate basic first aid and use them under different circumstances.
	Explain different fire extinguisher and use the same as per requirement.
	Follow organization's emergency procedures for accidents, fires or acts of unlawful interference.
	Describe and comply 5S concept & its application.
	Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner
	Demonstrate Aircraft Safety Practices
	Ensure all health and safety records are updated and procedures well defined.
2. Plan and Demonstrate assembly of parts made of different materials (Aluminium and Stainless steel, etc.) and of different thicknesses, with geometric constraints as per drawing and required tolerance and check for dimensional accuracy. (NOS: AAS/N9423)	Comply Marking out lines as per drawing on metals of different sections and fitting process
	Demonstrate Tracing for rivet pitch and edge distance calculation and drilling, Counter boring, Countersinking and thread cutting
	Exhibit adjustment of parts with geometric tolerances: perpendicularity, parallelism, flatness, rounded, angle
	Demonstrate thread cutting and Temporary fitting
	Demonstrate assembly of Aluminum and Stainless-steel parts of different thicknesses, with geometric constraints
	Check dimensional accuracy as per standard procedures
3. Exhibit bending of metal, squeeze riveting or "C" squeeze and angle profile as per drawing and check dimensional accuracy. (NOS: AAS/N9424)	Plan and execute the Tracing, cutting process with Hack saw, fitting process for bending
	Demonstrate bending on Aluminum, checking of dimensional accuracy and perform correcting errors
	Exhibit squeeze riveting or "C" squeeze on angle profile,
	Check dimensional accuracy and perform correcting errors

4. Plan and Demonstrate structure part manufacturing, assemble them, check dimensional accuracy and Evaluate functionality of the assembly. *(Example: little bended aircraft)* (NOS: AAS/N9425)	Plan and execute Tracing, Cutting, Fitting, Drilling, Counter drilling and Temporary fitting
	Demonstrate Rivet pitch and edge distance Check dimensional accuracy calculation
	Execute Temporary fitting, Riveting and correcting errors if any.
	Exhibit manufacture of primary parts with geometric constraints (angle, rounded, flatness)
	Demonstrate Assembly of structure parts and **c**heck dimensional accuracy
	Evaluate functionality of the assembly and exhibit correcting errors if any.
5. Realize PR sealant application on structure panels and check for correct bonding of PR sealant. (NOS: AAS/N9426)	Prepare the structure panel for application of PR sealant
	Demonstrate PR mixing
	Present rivets /fasteners covering and PR sealant application
	Check for perfection and exhibit correcting errors if any.
	Observe safety precautions for the above procedure
	Ensure to maintain the workshop cleanliness
6. Demonstrate riveted profile manufacturing (open and closed), assembly of equipment, electrical bonding, sealant application/ removal and leak test. (NOS: AAS/N9427)	Plan work in compliance with standard safety norms
	Demonstrate Open riveted box manufacturing by Bending, Drilling, counter drilling, Countersinking and Riveting
	Exhibit assemblies of anchor nuts, equipment and electrical harness supports
	Demonstrate Riveted closed profile manufacturing by Rolling, Shaping, Bending, Drilling, counter drilling, Countersinking and Riveting
	Demonstrate Pickling, cleaning, rivets and fasteners covering, PR mixing and PR sealant application
	Execute leak test by using a Schrader plug and compressed air.
	Check for dimensional accuracy as per standard procedure
	Demonstrate Removal of PR sealant and Surface cleaning
7. Exhibit fabrication of multi material composite sandwich panel with riveted installation, Inspection for desired quality, detection of non-conformities and Problem solving. (NOS: AAS/N9428)	Ascertain and select the tools and materials for the job.
	Plan the work in compliance with standard safety norms
	Exhibit Composite panel manufacturing with marking plies, calculating resin ratio.
	Make a curved panel by wet lay-up, Vacuum bag installation and Resin curing.
	Demonstrate Composite drilling, counter drilling, Countersinking and Temporary fitting

	Exhibit fabrication of a sandwich panel by tracing, fibre orientation, resin ratio calculation, composite lay-up, honeycomb cutting, vacuum bag and polymerization.
	Execute Composite riveted installation by Drilling, counter drilling, countersinking, deburring, Reaming, Temporary fitting and Rivets and fasteners fitting
	Perform removal of rivets and other fasteners using Metallic and composite assembly
	Demonstrate fabrication of a metal-composite assembly by Bending, Riveting, Drilling, Countersinking, Pinning, Rivets and fasteners installation
	Demonstrate Testing and Inspection for desired quality.
	Exhibit defects and non-conformities detection
	Demonstrate Problem solving and correcting errors.
8. Illustrate aircraft assembly fluid systems (Hydraulic, Pneumatic, Cooling, Fuel and Oxygen) and demonstrate installation of metallic pipes and equipment, screwing, torqueing, locking and check the assembly. (NOS: AAS/N9429)	Explain systems of Hydraulic, Pneumatic, Fuel, Oxygen and Flight controls of aircraft
	Describe the role of each components of hydraulic, pneumatic, fuel, oxygen and flight controls of aircraft.
	Demonstrate assembly on the mock-up all the different elements, checking and correcting errors according to the technical documentation.
	Exhibit operations before mounting piping **(**Check protections, Handling of pipes, Installation of plugs, check for damages if any**)**
	Demonstrate Pipe routing on mock-up as per technical documentation
	Exhibit operations of Screwing and Tightening different types of screws using appropriate torque wrench on structure panels
	Demonstrate Locking techniques on different subassemblies / structure panel and checking of Locking fault and correction of errors.
	Demonstrate installation of pipe with different items, connection of pipes, fitting of valves and torque tightening
	Exhibit checking of installation and correcting errors.
	Identify the hazard of each systems.
9. Demonstrate installation of Composite duct and flexible hose for aircraft fluid systems, installation	Exhibit installation of composite duct support collars, brackets, assembly of sleeves and bellows and torque tightening
	Demonstrate checking installation / assembly of composite duct and correcting errors

of overheat protection as per installation plans. (NOS: AAS/N9430)	Exhibit connection of flexible hose, assembly of fittings with torque wrench
	Demonstrate checking installation / assembly of flexible hoses and correcting errors
	Demonstrate checking of insulation sleeves comply with installation plans, standards and technical specifications
	Demonstrate Muff installation on duct coupling, connect Graviner and wire locking, assemble Over Heat Detection System (OHDS) on different ducts as per functional installation rules
	Exhibit checking of duct coupling, adjustment between the muff position and the Graviner, proper functioning and correcting errors
10. Illustrate assembly and fitting of different mechanical sub-assemblies (hooks, locking means, flight controls mechanical link rod and wires) and check for proper functioning. (NOS: AAS/N9431)	Plan work in compliance with technical documentation with standard installation.
	Perform disassembly of mechanical sub-assembly- classify, verify, identify and store the parts
	Perform assembly of mechanical sub-assembly - clearance gaps, torque tightening, lockage
	Demonstrate checking of bonding, leaks, correct assembly and proper functioning of all the assembled parts.
	Exhibit assembly of flight control chain components and tightening according to the standard torque mentioned in work card
	Demonstrate Testing of tension of a cable and functionality of flight controls
11. Exhibit and super vise surface treatment and Non-Destructive Testing. (NOS: AAS/N9432)	Ascertain and select tools and materials for the job.
	Plan and execute surface and corrosion treatments by Sanding, Pickling, Reworking, application of Alodine process, Zinc chromate touch-ups, Painting touch-ups
	Check the quality and correcting errors of the surface and corrosion treated parts
	Conduct Non-Destructive Testing by Crack detection method
	Demonstrate Non-Destructive Testing by Hot oil and chalk method
	Demonstrate Non-Destructive Testing by Dye penetrant method
	Exhibit Non-Destructive Testing by Magnetic particle inspection method
	Demonstrate Non-Destructive Testing by Ultrasonic and Eddy current inspection method

	Conduct Non-Destructive Testing by Fluro particle inspection test
12. Plan and Demonstrate assembly on the Hydraulic system, inspect assembly compliance of the system and exhibit leak tests. (NOS: AAS/N9433)	Demonstrate assembly of Hydraulic system components e.g., valve, pump, actuators, etc., position them relative to each other and tighten according to the standard torque
	Check the assembly compliance of the hydraulic system according to the requirements.
	Demonstrate leak tests of Hydraulic system using compressed air
	Check functionality of the assembled hydraulic system according to the technical documentation and correct errors.
13. Exhibit assembly on the Pneumatic system, inspect assembly compliance and demonstrate leak tests of the system. (NOS: AAS/N9433)	Demonstrate assembly of Pneumatic system components e.g. compressor, pressure gauge, filter, regulator, etc., position them relative to each other and tighten according to the standard torque
	Check the assembly compliance of the Pneumatic system according to the requirements.
	Demonstrate leak tests of Pneumatic system using compressed air
	Check functionality of the assembled Pneumatic system according to the technical documentation and correct errors.
14. Perform fitting and assembly of Oxygen components inspect assembly compliance and exhibit leak tests of the system. (NOS: AAS/N9434)	Demonstrate fitting and assembly of oxygen system components, position them relative to each other and tighten according to the standard torque
	Check the assembly compliance of the oxygen system according to the requirements.
	Demonstrate leak tests of oxygen system using compressed air
	Check functionality of the assembled oxygen system according to the technical documentation and correct errors.
15. Plan and Demonstrate Shielding by end, window and stop implementation and exhibit test. (NOS: AAS/N9435)	Plan and execute Shielding by end implementation (measurements, insulation, stripping, shield cutting, wire lead and solder sleeve installation, infra-red gun heating) and exhibit test
	Demonstrate Shielding by window implementation (measurements, insulation stripping, shield cutting, wire lead and solder sleeve installation, infra-red gun heating) and exhibit test

	Demonstrate Shielding by stop implementation (measurements, insulation stripping, shield cutting, shrinkable sleeve heating with hot airgun) and exhibit test
16. Plan and execute Stripping, crimping of different terminal components, Insertion and extraction of various contacts on different types of connector and quality and functional electrical tests. (NOS: AAS/N9436)	Prepare the job by analyzing the tasks
	Exhibit Stripping of different types of wires/cables (small gauge wires, shielded cables)
	Demonstrate crimping operations of different terminal components (contacts, lugs, splices)
	Exhibit Insertion on different connectors type (rectangular, circular, modules)
	Demonstrate extraction on different connectors type (rectangular, circular, modules)
	Exhibit checking of wire continuity on the harness
	Identify the mistakes during insertion task and comply
	Exhibit Quality Inspection on an installation
17. Demonstrate planning and execution of Shaping and tying wires/cables to build a harness, assembly of harness components, fitting and installation harness in accordance with the drawing and check errors. (NOS: AAS/N9437)	Plan work in compliance with standard safety norms.
	Ascertain and select the tools required to complete the task.
	Explain Wire and cables harness requirements and layout drawing
	Demonstrate Shaping and tying wires/cables to build a harness - Check lengths of wires/cables, identify wires/cables, set according to their layout/ wiring diagram, Tie wires/cables and Inspect for Quality assurance
	Exhibit final assembly of harness components - install all connector accessories, Tighten and torque connectors,
	Demonstrate quality Inspection for defects and non-conformities detection
	Plan and execute fitting and install harness on different types of attaching part - Choose attaching parts to be fastened to the structure panels, Install attaching parts on the panels, install harness on the attaching points as per drawing, torque the bonding terminals.
	Exhibit checking errors of fitting and installation harness and solve problems
18. Read and apply engineering drawing for	Read & interpret the information on drawings and apply in executing practical work.

different application in the field of work. (NOS: ASC/N9410)	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 - AERONAUTICAL STRUCTURE AND EQUIPMENT FITTER (CITS)			
For batch of 25 candidates			
Sr No.	**Name of the Tool &Equipment**	***Specification**	**Quantity**
List of Trainee's Tool kit & other equipment			
1	Steel Rule with metric & British graduation	200mm	25 nos.
2	Try Square.	150 mm	25 nos.
3	Hammer ball peen with handle.	0.45 kg with handle.	25 nos.
4	File flat - second cut with handle	25 cm	25 nos.
5	File half round second cut	25 cm	25 nos.
6	Rasp File	25 cm	25 nos.
7	Screw driver	FACOM AN 3,5 x 100 or Equivalent	25 nos.
Tools, Instrument & General Shop Outfit			
STRUCTURE WORKSHOP			
8.	Steel Rule with metric & British graduation	500mm	25 nos.
9.	Vernier Caliper	20 cm	25 nos.
10.	Scriber	15 cm	25 nos.
11.	Centre Punch	10 cm	25 nos.
12.	Hacksaw frame adjustable type	30 cm	25 nos.
13.	File flat smooth with handle	15 cm	25 nos.
14.	Needle files with handle	Set of 6	25 nos.
15.	File round with handle	20 cm 2nd cut	25 nos.
16.	File half round bastard with handle	30 cm	25 nos.
17.	Wooden mallet	50 mm	25 nos.
18.	Round angle ruler	Measuring Range: 0-180°	25 nos.
19.	Sheet metal scissor (Aviation Snip)	Straight	10 nos.

20.	Sheet metal scissor (Aviation Snip)	Bent	10 nos.
21.	Deburring tool hole	to deburr bores from diameter 2.0 to 6.0mm	25 nos.
22.	Handi clamps	Size. 50 mm ; Pressure. Holding: 20 kg	125 nos.
23.	Bonding brush	2.5 mm to 6.5 mm	25 nos.
24.	Sealant spatula kit	Set of 03	12 set.
25.	Metric feeler gauge	100 mm	12 nos.
26.	Flute deburring tool with blade	Suitable for Deburring tool from diameter 2.0 to 6.0mm	25 nos.
27.	Drawing compass	300 mm	25 nos.
28.	Cutting pliers	FACOM 405.10 or Equivalent	25 nos.
29.	Electrician scissors	FACOM 841 or Equivalent	25 nos.
30.	Workshop Bench fitted with 4 vices with compartments for keeping tools	4 ft. X 8 ft. X 3 ½ ft height	7 nos.
31.	Cleco pliers	6.5 mm	25 nos.
32.	Vice with rotation base	5 inch	15 nos.
33.	Air Compressor with dehumidifier	15 KW	1 no.
34.	Air reserve compressor tank	2000 L	2 nos.
35.	Pneumatic pipe + Pneumatic male female coupling	As required	25 nos.
36.	Overhead PPRC/MS Pneumatic arrangement as per the workshop design	As required	1 no.
37.	Vertical Pillar Drill machine with complete safety arrangement	20 mm drill capacity	4 nos.
38.	Hydraulic guillotine shear machine with complete safety arrangement	2100 mm to shear 5mm thick metal sheets	1 no.
39.	Belt saw with complete safety arrangement	300 mm length	2 nos.
40.	Belt sand with complete safety arrangement	300 mm length	2 nos.
41.	Linisher with complete safety arrangement	300 mm length	2 nos.
42.	Bench grinder with complete safety arrangement	150 mm wheel size	2 nos.
43.	Hydraulic sheet metal bending machine with complete safety arrangement	1200 mm, Flame/Nitriding to blade. Should be able to bend 5 mm plate	1 no.
44.	Hydraulic press with complete safety arrangement	5T	1 no.

45.	Dimple die set for flanged holes	38 mm	2 set.
46.	Tool chest equipped with metric and inch tools	Standard size	2 nos.
47.	Rolling sheet meal machine with complete safety arrangement	1800 x 2 mm (al)	1 no.
48.	Refrigerator for PR sealant and Resin stocking	165 - 200 L with -22 degrees temperature setting	1 no.
49.	Straight pneumatic drill	LBB16 S022-U (2200 RPM)	6 no.
50.	Pneumatic drill	5000 rpm	25 Nos.
51.	Angle sander 90°	20 000 tr/min	6 nos.
52.	Pneumatic extruder gun	for PR	6 nos.
53.	Gun type Drilling Machine	1500 tr/min (Manual Chuck with Key)	4 nos.
54.	Gun Type reaming machine	500 tr/min (Manual Chuck with Key)	15 nos.
55.	Right angle drilling machine	90° (Manual Chuck with Key)	8 nos.
56.	Angle drilling machine	120° (Manual Chuck with Key)	4 nos.
57.	Pneumatic belt sander	DOTCO 12L1382-36B2 BELT SANDER, 12-13 SERIES	4 nos.
58.	Pneumatic inline router	DOTCO 10L4018-01 INLINE ROUTER, 12-40 SERIES	2 nos.
59.	Pneumatic "C" riveting machine	Adjustable gap	5 nos.
60.	Pneumatic Squeeze riveting machine	Alligator type adjustable gap	5 nos.
61.	Riveting die set for squeeze machine	As per the sizes of Rivets	3 nos.
62.	Pneumatic rivet gun	3X	15 nos.
63.	Riveting die for rivet gun set	As per the sizes of Rivets	15 nos.
64.	Bucking bar set	Material Tungsten: Set of 5 Bucking Bars	3 set.
65.	Blind rivet gun machine	6.35mm	2 nos.
66.	Nose pieces set blind rivet	10 inches	2 nos.
67.	Drill bushes support	As per required size	25 nos.
68.	Dynamometric key	2 to 20 Nm	4 nos.
69.	Dynamometric key	20 to 200 Nm	2 nos.
70.	Deburring countersink	6 mm	12 nos.
71.	Granite surface plates	1000 x 700 mm	2 nos.
72.	Vernier Height gauge	500 mm	2 nos.
73.	V -block with clamp	150 X 150 X 200 mm	4 set.
74.	Double Ended Spanner	6 to 32 mm	5 set.
75.	Adjustable Spanner	300 mm	5 nos.
76.	Torque Wrench	14 to 68 Nm	5 nos.

77.	Torque tester	220 Nm	1 no.
78.	LGP Fasteners gauge	3.2 mm	5 nos.
79.	LGP Fasteners	4.1 mm	5 nos.
80.	Hi-Lite Fasteners gauge	5 /32 inches to 3/8 inches	5 nos.
81.	Comparator	LC 0.01mm Dial Indication	8 nos.
82.	Magnetic Comparator support	230 X 170 X dia 30 mm	2 nos.
83.	Try square	300 mm	12 nos.
84.	Angle Plate	150 X 150 X 250 mm	5 nos.
85.	Taps and die set	M5 to M12 fine threads	5 set.
86.	Manual Light	Battery capacity 6 watts	5 nos.
87.	Wire Gauge	Metric	5 nos.
88.	Radius gauge	1 to 7 mm	5 nos.
89.	Radius gauge	7.5 to 15 mm	5 nos.
90.	Radius gauge	15 to 30 mm	5 nos.
91.	Rivet Gauge	2.5mm, 3.3 mm, 4.1 mm	10 nos. each
92.	Go – No Go Gauge	6H7	5 nos.
93.	Vernier Depth gauge	300 mm	4 nos.
94.	Magnifier	X 5	5 nos.
95.	Micrometer	0 to 25 mm	4 nos.
96.	Mirror with handle	45 mm	5 nos.
97.	Reamer4.8 mm	4U9mm, 5U9mm	6 nos. each
98.	Fluted Hand Reamer	4.1H7	6 nos.
99.	Fluted Hand Reamer	4.76H7	6 nos.
100.	Fluted Hand Reamer	4.83H7	6 nos.
101.	Fluted Hand Reamer	6H7	25 nos.
102.	Counter-boring Mill	14 M8 with pilot 4mm	10 nos.
103.	Rivet Cutting Pliers	8 inches	5 nos.
104.	Pop Rivet Gun	manual	5 nos.
105.	Non Destructive Testing Equipment	Ultrasonic testing kit	1 no.
106.		Dye penetrant testing kit	1 no.
107.		Magnetic particle test kit	1 no.
108.		Eddy current testing kit	1 no.
109.	Mock up of -	Aircraft Hydraulic system	1 no.
110.		Aircraft Pneumatic system	1 no.
111.		Aircraft Oxygen system	1 no.
112.		Aircraft Fuel system	1 no.
COMPOSITE TOOLS			
113.	Scissor Kevlar	8 inches	15 nos.
114.	Venturi vacuum system	As per requirement	15 nos.
115.	Vacuum bag valve	As per requirement	As required

116.	Cutting ruler	300 mm	2 nos.
117.	Cutting table with vacuum arrangement	4 ft. X 8 ft. X 3 ½ ft height	2 nos.
118.	Air Catcher ATEX with inlets for Aluminum/composite dust	Made to design for vacuum tables for composite material	1 no.
119.	Stools for workbench	11 X 9 X 20 inches	25 nos.
120.	Vacuum gauge	Analog	25 nos.
121.	GUN for fastener installation - GB784	for blind rivet NAS1738… and NAS 1739…	2 nos.
122.	Nose 5U-681-25	for blind rivet NAS1738…	5 nos.
123.	Nose 5C-681-25	for blind rivet NAS 1739…	5 nos.
124.	Gage 269G3S	for blind rivet NAS1738… and NAS 1739…	6 nos.
125.	GUN for fastener installation - GB50	for blind rivet CCR264-3-3	2 nos.
126.	Nose 3C-715B-43	for blind rivet CCR264-3-3	5 nos.
127.	GUN for fastener installation - GB731	for Lock bolt fastener (GPL)	2 nos.
128.	nose LGP05-2480-20	for Lock bolt fastener (GPL)	5 nos.
129.	Gage 100-05	for Lock bolt fastener (GPL)	6 nos.
130.	Manual installation tool set for Visulok size 3/16	for Visu-Lok	5 nos.
131.	Drill jig for anchor nut	MS21055-3	10 nos.
132.	Drill jig for anchor nut	MS21047-3 & NAS1473-3	10 nos.
Piping Workshop			
133.	Workbench	4 Ft X 8 Ft X 3.5 ft	5 nos.
134.	protective mat	4 Ft X 8 Ft	10 nos.
135.	Stools for workbench	11 X 9 X 20 inches	25 nos.
136.	Set of a hydraulic Pipe wrench	6 mm to 32 mm	3 nos.
137.	Pipe cutter Manual	6 mm to 25 mm	5 nos.
138.	Pipe Bending Machine	Hydraulic	1 no.
139.	Pipe Bending tool	Manual	5 nos.
140.	Pipe Crimping Tool	Hydraulic or Manual	1 no.
141.	Frames for Assembly of Pneumatic/Hydraulic Panels	As per requirement	10 nos.
142.	Hand operated or Foot Operated Air pump with Dial Gauge	Standard	2 nos.
WIRING WORKSHOP			
143.	Stripping pliers	IDEAL Stripmaster 45-2835 or Equivalent	10 nos.
144.	Stripping pliers	IDEAL Strip master 45-2834 or Equivalent	10 nos.
145.	Crimping pliers	DMC 22520 / 2-01 or Equivalent	10 nos.
146.	Positioner	DMC 22520 / 2-02 or Equivalent	10 nos.
147.	Positioner	DMC 22520 / 2-06 or Equivalent	10 nos.

148.	Positioner	DMC 22520 / 2-08 or Equivalent	10 nos.
149.	Positioner	DMC 22520 / 2-09 or Equivalent	10 nos.
150.	Positioner	DMC 22520 / 2-23 or Equivalent	10 nos.
151.	Positioner	K127-2 or Equivalent	10 nos.
152.	Set of 12 points 1/4" sockets -inch- + bits	FACOM R.161B or Equivalent	25 nos.
153.	8 piece 1/4" long reach metric 12 points sockets on rack	FACOM REL.40 or Equivalent	25 nos.
154.	Cable tie gun	PANDUIT GTS-E or Equivalent	25 nos.
155.	Crimping pliers for isolating terminals	AMP 47386 or Equivalent	7 nos.
156.	Crimping pliers for lugs	AMP 576778 or Equivalent	2 nos.
157.	Crimping pliers for lugs	AMP 576779 or Equivalent	2 nos.
158.	Crimping pliers for lugs	AMP 576780 or Equivalent	2 nos.
159.	Crimping pliers for lugs	AMP 576781 or Equivalent	2 nos.
160.	Crimping pliers for lugs	AMP 576782 or Equivalent	2 nos.
161.	Crimping pliers for contacts	DMC 22520 / 1-01 or Equivalent	5 nos.
162.	Positioners for DMC 22520/1-01	DMC 22520 / 1-02 (TH1A) or Equivalent	5 nos.
163.	Cable cutters	FACOM 412.16 or Equivalent	3 nos.
164.	Hot air gun	STEINEL HG2320E or Equivalent	5 nos.
165.	Infrared generator	IR 1759-MK4-AT3130E or Equivalent	1 no.
166.	Connector pliers	FACOM 410 or Equivalent	5 nos.
167.	Digital Multimeter	Chauvin Arnoux CA5220 or Equivalent	5 nos.
168.	Strap wrench	GLENAIR TG70 or Equivalent	5 nos.
169.	Connector assembly tools	38999 Series or Equivalent	7 nos.
170.	Bit 3/32" x 50 mm	WERA 840/4 or Equivalent	5 nos.
171.	Full proofing extraction tool for EN 3545	AIR LB 001901 003 00 or Equivalent	2 nos.
172.	Key for male split nut for EN 3545	AIR LB 001901 001 00 or Equivalent	5 nos.
173.	Hexagon key	FACOM 83H.5/32" or Equivalent	5 nos.
174.	Brady Printer	BMP 71	1 no.
175.	Stools for workbench	11 X 9 X 20 inches	25 nos.
176.	Frames for Assembly of Wiring Panels	As per requirement	10 nos.
177.	Schrader Plug	¼ inch FPT	25 nos.
178.	Ohmmeter	Analog	5 nos.
LIST OF MISCELANEOUS AND SECURITY EQUIPMENT			
179.	Dust Vacuum cleaner	Karcher WD 60	3 nos.
180.	Green bin for recycled material	60 ltr	3 nos.

181.	Red bin for composite material	60 ltr	3 nos.
182.	Blue bin for metallic material	60 itr	3 nos.
183.	Scotch Brite Pads	Smooth and rough	As required
184.	Safety shower & Eye washer	Inlet connection ½ inch, 10 lpm	1 no.
185.	Kanban Trolleys 30 Bins	standard	3 nos.
186.	Sheet Metal Stacking Stand	With rollers	2 nos.
187.	Pigeon Hole Cabinets	8 cabinets	For 25 trainees
188.	Metal Almirah	1800 x 900 x 450 mm	10 nos.
189.	Stands for Installation Storing of Pneumatic Tools	6 feet X 3 feet	2 nos.
190.	Yellow Cabinet for storage of Hazardous Chemicals	Medium size	2 nos.
191.	First Aid Kit	Suitable for 10 persons	1 nos.
192.	Fire Extinguisher	5 kg ABC	6 nos.

CONSUMABLES AND RAW MATERIALS			
Consumables / Materials for STRUCTURE WORKSHOP			
1.	Safety glasses	General standard	50 + 2nos
2.	Safety Gloves (Cut resistance)	As per standard size	50 + 1nos
3.	Safety Shoes	As per trainees requirement	25 + 1 nos
4.	Aprons	As per trainees requirement	25 + 1nos
5.	Cleaning brush with handle	63 mm	25 nos.
6.	File card brush with handle	40 mm width	15 nos.
7.	Pneumatic oil	Machine oil	25 ltr
8.	Belt for belt saw	As per available machine	6 nos.
9.	Belt for pneumatic belt sander	As per available machine	6 nos.
10.	Belt for belt band Sander	120 Grit Size	6 nos.
11.	Disc for linisher	120 Grit Size	6 nos.
12.	Blade for hacksaw for Aluminium	14 Teeth per inch	As required
13.	Cleco pin sheet metal	2.5mm,3.2mm,4mm,	As required
14.	WNX pin sheet metal	2.5mm,3.2mm,4mm	As required
15.	Micrometric stop-countersink	According to pilot drill size	As required
16.	Micrometric cutter with pilot	2.5mm,3.2mm,4mm	As required
17.	Manual cutter countersink 6mm	6 mm	As required
18.	Vice jaw pad	As required	As required
19.	Solid round rivet Length 10 mm	2.5 mm, 3.2 mm, 4 mm, 4.8 mm	As required
20.	Solid countersunk rivet Length 10 mm	2.5 mm, 3.2 mm, 4 mm, 4.8 mm	As required
21.	Pop Rivets	Standard size	As required
22.	Drill bush	2.5 mm, 3.3 mm, 4.1 mm, 4.8 mm, 6 mm	10 nos. of each
23.	Drill Collets	ø2.5 mm, ø3.3mm	10 nos.

			each
24.	HSS drill bit (for drilling aluminum only)	2.5 mm,3mm, 3.3 mm, 4.1mm, 4.6mm, 4.8 mm, 5mm, 5.5mm, 5.7mm, 6mm	As required
25.	HSS COBALT (5% or 8%) drill bit (for hard metals steel / titanium)	2.5 mm,3mm, 3.3 mm, 4.1mm, 4.6mm, 4.8 mm, 5mm, 5.5mm, 5.7mm, 6mm	As required
26.	Carbide drill bit (for composite only)	2.5 mm, 3.3 mm, 4.1mm, 4.8 mm	As required
27.	Sheet metal Aluminium 2024 thickness 1.0 mm, 1.2 mm, 1.5 mm, 2.0 mm, 3.0mm, 5.0mm	4ft X 8 ft	As required
28.	Block Aluminium 2024 thickness 10.0 mm, 20.0 mm	120 x 100 mm	As required
29.	Sheet metal Aluminium 5052 thickness 1.0 mm, 1.2 mm, 1.5 mm, 2.0 mm, 3.0mm 5.0mm	4ft X 8 ft	As required
30.	Angle Aluminium 2mm 25 x 25 mm	2000 mm	As required
31.	Angle Aluminium 2mm 30 x 30 mm	2000 mm	As required
32.	Sheet metal 316L thickness 1.5 mm, 2.0 mm	4ft X 8 ft	As required
33.	Sheet metal TA6V th 1.5 mm, 2.0 mm	4ft X 8 ft	As required
34.	Wire-lock 0,8 mm Stainless steel	3 kg	1 nos.
35.	Sheet metal S320 steel 1.5 mm, 2 mm	4ft X 8 ft	As required
36.	Angle steel S320 3mm 40 x 40 mm	6000 mm	50 nos.
37.	CFRP plate –	2mm, 5 mm	As required
38.	CFRP angle – 21x21x2	-L60, L75	As required
39.	CFRP angle 25x25x2	L130	As required
40.	Honeycomb 6mm	thickness 12.7 mm, 19 mm	10 m^2
41.	Plastic scraper set	Standard set	21 set.
42.	Diamond grinding wheel	80 mm	50 nos.
43.	Kevlar drill bit	2.5 mm, 3.3 mm, 4.1mm, 4.8 mm	As required
44.	Carbide micrometric cutter with pilot	3.3 mm, 4.1 mm, 4.8 mm	25 nos. each
45.	Resin	LY5052 1 Kg kit	25 nos.
46.	Carbon UD	1 roll	5 nos.
47.	Plain weave carbon	1 roll	5 nos.
48.	Plain wave Fibre glass	1 roll	5 nos.
49.	PTFE coated Fibre glass	1 roll	5 nos.
50.	Nylon Bagging Film	1 roll	5 nos.
51.	Release film non perforated	1	5 nos.
52.	Fibre glass Bleeder Cloth	1 roll	5 nos.
53.	Peel Ply	1 roll	5 nos.
54.	Release film perforated	1 roll	5 nos.

55.	Sanding discs ROLOC 50 mm	120 grit	50 nos.
56.	Sand drum kits	120	As required
57.	PR sealant 1440 A 2	1440 A 2	25 nos.
58.	PR sealant 1440 B 2	1440 B 2	25nos.
59.	Blue varnish bonding	50 grams	25 nos.
60.	Adhesive tape	25 mm	As required
61.	Adhesive tape	50 mm	As required
62.	Blue prussian	50 grams	25
63.	Workbench protective mat	4 Ft X 8 Ft	10 nos.
64.	Universal head blind rivet	D5/32 – NAS1738M-05	As required
65.	Universal head blind rivet	D5/32– NAS1738M-06	As required
66.	Countersunk head blind rivet	NAS1739B05-3 or CR2248-5-3	As required
67.	Blind rivets	CCR264-3-3	As required
68.	Protruding head blind rivet	NAS1738B05-04	As required
69.	Protruding head blind rivet	NAS1738B05-05 or CR2249-5-5 or equivalent	As required
70.	Bolts	NAS1801-3D-5 Or equivalent	As required
71.	Lock bolt fastener	GPL8TP-V06-3 or LGPL4SP-V06-3 or equivalent and associated flanged collar	As required
72.	Lock bolt fastener	GPL8TP-V06-4 or LGPL4SP-V06-4 or equivalent and associated flanged collar	As required
73.	Lock bolt fastener	GPL8TP-V06-5 or LGPL4SP-V06-5 or equivalent and associated flanged collar	As required
74.	Lock bolt fastener	GPL8TP-V06-7 or LGPL4SP-V06-7 or equivalent and associated flanged collar	As required
75.	Lock bolt protruding head	D3/16 and associated collar	As required
76.	Lock bolt protruding head	D3/16 GPL3SP-V06-… or equivalent and associated collar	As required
77.	Hi-lite	EN6115T3-3 or equivalent and associated collar	As required
78.	Hi-lite	EN6115T3-4 or equivalent and associated collar	As required
79.	Hi-lite	EN6115T3-5 or equivalent and associated collar	As required
80.	Hi-lite	EN6115T3-6 or equivalent and associated collar	As required
81.	Hi-Lite	protruding head D3/16 and associated collar	As required
82.	Hi-Lite	protruding head D3/16 EN6115V3-… or equivalent and associated collar	As required

83.	Hi-Lite	countersunk head D3/16 EN6114T3-… or equivalent and associated collar	As required
84.	Hexagonal head blind bolt –	PLT210-06-… or equivalent	As required
85.	Hexagonal head bolt	D3/16 – NASM1801-3-…	As required
86.	Hexagonal nut	D3/16 – NAS1726-3	As required
87.	Straight two lugs nut plate	D3/16 – NASM21047-3 or NASM21059-3 or equivalent	As required
88.	Anchor nut (nut plate) two lugs –	MS21047-3 or equivalent	As required
89.	Anchor nut (nut plate) angle –	MS21055-3 or equivalent	As required
90.	Cherry-max rivets 3,2mm	3.2 mm	As required
91.	Cherry-max rivets 4mm	4 mm	As required
92.	Isopropyl alcohol	As per requirement	As required
Consumables / Materials for PIPING WORKSHOP			
93.	Nut lock washers	¼ to 1 inch	As required
94.	Wire coil for Wire lock	As per requirement	As required
95.	Nut retainer	As per requirement	As required
96.	Pin and castle nut	As per requirement	As required
97.	Self-locking nut	As per requirement	As required
98.	Aluminum Pipe	1/4th Inch	As required
99.	Aluminum Pipe	1/2th Inch	As required
100.	Aluminum Pipe	1Inch	As required
101.	Aluminum Straight Connector	1/4th Inch	As required
102.	Aluminum Straight Connector	1/2th Inch	As required
103.	Aluminum Straight Connector	1Inch	As required
104.	Aluminum L Connector	1/4th Inch	As required
105.	Aluminum L Connector	1/2th Inch	As required
106.	Aluminum L Connector	1Inch	As required
107.	Aluminum T Connector	1/4th Inch	As required
108.	Aluminum T Connector	1/2th Inch	As required
109.	Aluminum T Connector	1Inch	As required
110.	PU Pipe	1/2th Inch	As required
111.	PU L connector	1/2th Inch	As required
112.	PU T Connector	1/2th Inch	As required
113.	PU Straight Connector	1/2th Inch	As required
114.	Rubber Hose R1 w/End Fitting	3/8" X 1mtr	As required
Consumables / Materials for WIRING WORKSHOP			
115.	cable tie (tie-rap)	NSA935401-03 or Equivalent	As required
116.	cable tie (tie-rap)	NSA935401-04 or Equivalent	As required
117.	cable tie (tie-rap)	NSA935401-05 or Equivalent	As required
118.	cable tie (tie-rap)	NSA935401-10 or Equivalent	As required
119.	Lancing tape	Roll NSA8420-3 or Equivalent	As required

120.	Lancing tape	Roll NSA8420-7 or Equivalent	As required
121.	Terminal	NSA936501TA1604 or Equivalent	As required
122.	Terminal	NSA936501TA2206 or Equivalent	As required
123.	Terminal	NSA936501TA2005 or Equivalent	As required
124.	Splice	EAR 99 D 436-37 (9A991.d) or Equivalent	As required
125.	Insertion/removal tools	M81969/1401	As required
126.	Insertion/removal tools	M81969/3901	As required
127.	Insertion/removal tools	M81969/1411	*70*
128.	Cables	CF22 ou DR22 or Equivalent	As required
129.	Cables	CF24 ou DR24 or Equivalent	As required
130.	Cables	PF24 ou DRB24 or Equivalent	As required
131.	Cables	MLB24 or Equivalent	As required
132.	Cables	MLB22 or Equivalent	As required
133.	Contacts / sockets	EN 3155-003F2222 or Equivalent	As required
134.	Contacts / sockets	EN 3155-008M2222 or Equivalent	As required
135.	Contacts / sockets	EN 3155-014M2018 or Equivalent	As required
136.	Contacts / sockets	EN 3155-015F2018 or Equivalent	As required
137.	Contacts / sockets	EN 3155-016M2018 or Equivalent	As required
138.	Contacts / sockets	EN 3155-016M2222 or Equivalent	As required
139.	Contacts / sockets	EN 3155-018M2018 or Equivalent	As required
140.	Contacts / sockets	EN 3155-019F2018 or Equivalent	As required
141.	Contacts / sockets	EN3155 - 017FA2200 or Equivalent	As required
142.	Silicone tape	1 inch	12 nos.
143.	Silicone tape	2 inch	5 nos.
144.	Solders sleeve and heat shrinkable sleeve	ASNE0160-1-0H	As required
145.	Solders sleeve and heat shrinkable sleeve	ASNE0160-1-1H	As required
146.	Solders sleeve and heat shrinkable sleeve	ASNE0718-02	10 set.
147.	Ribbon - Labels white	M71C-2000-595-WT	4 nos.
148.	Ribbon - black ink	M71-R4300	3 nos.
149.	Ribbon - black ink	M71-R6000	3 nos.
150.	Ribbon - red ink	M71-R6000-RD	01 no.
151.	Ribbon - green ink	M71-R6000-GN	01 no.
MISCELANEOUS Consumables / Materials			
152.	Ear plugs	As per requirement	As required
153.	Vinyl Gloves	As per requirement	As required
154.	Dust Mask	As per requirement	As required
155.	Ear Plug Dispenser	As per requirement	2 nos.

156.	Plastic Drums for Storage of Rivets	As per requirement	15 nos.
157.	Wire Extension Board	Industrial Type with 20 Mtr Wire	5 nos.
158.	Dust Pan with Brush	standard	50
159.	Glycerol	As per requirement	5 L
160.	Grease	As per requirement	5 Kgs
161.	Cleaning solvent (Alcohol)	As per requirement	As required
162.	Box - 2500 labels	BM71-19-423	01 no.
163.	Box - 100 labels	M71-22-423	01 no.
FURNITURE			
1.	Class Room Tables	(3ft X 2ft) / Dual desk may also be allowed	13nos.
2.	Chair for Trainer	(armed) movable	02 nos.
3.	Laptop	with latest configuration	02 nos.
4.	Table for Trainer	(4 ½ ft X 2 ½ ft) with Drawer and cupboard	02 nos.
5.	Computer Table	standard	02 nos.
6.	White Board	6ft X 4 ft.	01 no.
7.	LCD Projector Screen	standard	01 no.
8.	Wall Clock	standard	01 no.
9.	Laser Printer with scanner	As per latest configuration	01 no.
10.	Steel Cupboard	with 8 pigeon lockers	04 nos.
11.	Steel cupboard	180x90x45cm	20 nos.
12.	Steel cupboard	120x60x45cm	04 nos.
13.	Multi drawer tool rack trolley	with minimum 4 drawers and 20 tool capacity	04 nos.

NOTE: -

1. All tools must be hardened, toughened and grounded.
2. No additional items are required to be provided to the batch working in the second and third shift except the items under trainee's toolkit.


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