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

COMPETENCYBASEDCURRICULUM

VEHICLE TECHNICIAN

(Duration: Two Years)

CRAFTSMEN TRAINING SCHEME (CTS)

(Flexi-MoU)

NSQF LEVEL- 4

SECTOR – AUTOMOTIVE

Directorate General of Training

VEHICLE TECHNICIAN

CRAFTSMEN TRAINING SCHEME (CTS)

Under Flexi-MoU

(Designed in 2023)

NSQF LEVEL – 4

(Version: 1.0)

Developed By

Suzuki Motor Gujarat Pvt. Limited

105/109, GJ SH 221, Hansalpur Becharaji, Gujarat 382130

&

Government of India

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE

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

Kolkata – 700 091

www.cstaricalcutta.gov.in

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1. COURSE INFORMATION

Flexi- MoU is one of the pioneer programmes under NCVET on the basis of the MoU in between DGET & Suzuki Motor Gujarat Pvt. Limited for propagating vocational training to allow industries to take advantage of various schemes for conducting training programme in higher employment potential courses according to needs of industries. The concept of Flexi- MoUs was introduced in June-July 2014.DGT and Suzuki Motor Gujarat Pvt. Limited have decided to sign this memorandum of understanding to provide an opportunity to the youth to acquire skills related to Automobile and Manufacturing industry through specially designed "Learn and Earn" approach consisting a mix of theoretical and On-the-Job Training (OJT) components and hence improve their employability potential & to contribute in the overall growth of Automobile and manufacturing industry by creating a pool of skilled resources.

During the two-year duration, a candidate is trained on subjects Professional Skill, Professional Knowledge, Engineering Drawing, Workshop Science & Calculation and Employability Skills. In addition to this, a candidate is entrusted to make/do project work and Extra Curricular Activities to build up confidence. The practical skills are imparted in simple to complex manner & simultaneously theory subject is taught in the same fashion to apply cognitive knowledge while executing task.

The content broadly covers skills in manufacturing process of automobiles components and automobiles in today's automobile industry. The year wise course coverage is categorized as below:

FIRST YEAR - In the first year, the contents covered are safety aspects related to trade, familiarization with automobile systems and components, vehicle engine components, and basic automobile manufacturing process such as basic fitting operation (marking, filling, sawing, chiseling, drilling tapping & grinding), basic brazing/welding operation using Gas, MIG& ERW (but joint, lap joint, T-joint), basic blanking & stamping operations (sheet metal work), basic surface preparation painting work, Injection moulding process, Basic casting process (LPDC, HPDC), basic machining process, heat treatment, basic gear manufacturing process basic vehicle assembly and basic vehicle inspection & testing process. This year also covers practical training starting with practice with tools & measuring instruments viz. Vernier caliper, micrometer, height gauge, dial gauge, slip gauge, feeler gauge, Go, No go gauges etc. This is followed by on job training in practice in press shop (blanking & stamping), fabrication & weld shop, Injection moulding shop ,Casting shop, Machine shop, Power transmission assembly shop, paint shop, and vehicle assembly lines including line inspection and final testing.

SECOND YEAR - In this year, the job covers installation of vehicle interior components and assembling engine, power train components, suspension and brake assembly. This is followed by installation of Final line assembly and under body components. The final year course also covers automobile pollution, testing and measures to control vehicular pollution, function of automation in manufacturing & automation components. Trainee also learns the Quality control and inspection & testing process in an automobile company which includes on-line stage inspection to final inspection & testing of completely assembled vehicles.

2. TRAINING SYSTEM

2.1 GENERAL

The Directorate General of Training (DGT) under Ministry of Skill Development, and Entrepreneurship offers a range of vocational training courses catering to the need of different sectors of economy/labor market. DGT is futuristic in preparing the prospective Indian workforce in building skills, and capabilities as per the needs of the industry. In this quest, it has changed the paradigm of growth to a job-oriented training by partnering with industry to be an enabler of responsible, sustainable, and inclusive growth. Towards this objective, DGT signed this MOU with Industrial Training Partner (ITP).

Vehicle Technician trade under CTS (Flexi-MoU) is of two years' duration. It mainly consists of Domain area, and Core area. The Domain area (Trade Theory, and Practical) imparts professional skills, and knowledge, while Core area (Employability Skills) impart requisite core skill, knowledge, and life skills. After passing out of the training programme, the trainee is awarded National Trade Certificate (NTC) by DGT under Flexi-MoU which is recognized worldwide.

Industrial Training Partner (ITP) shall conduct courses at the Industry Partner's location. On-the-job training will be conducted inside the Plant premises. It will also ensure the eligible trainees take up Apprenticeship / higher education in suitable streams, and shall also guide the students to become Entrepreneurs. Industrial Training Partner (ITP) will strictly follow the policy guidelines for Flexi-MoU as in place from time to time. No deviation for the same would be permitted. Admission, and Exam for trades run under Flexi-MoU at training locations of Industrial Training Partner. Theory content is provisioned to be 25%, and practical content is provisioned to be 75%.

Trainees broadly need to demonstrate that they are able to:

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

2.2 PROGRESSIONPATHWAYS

- Can take admission in diploma course in notified branches of Engineering by lateral entry.
- Can join Apprenticeship programme in different types of industries leading to National Apprenticeship certificate (NAC).
- Can join Crafts Instructor Training Scheme (CITS) in the trade for becoming instructor in ITIs.

2.3 COURSE STRUCTURE

Table below depicts the distribution of training hours across various course elements during period of two-years:

S No.	Course Element	Notional Training Hours	
		1st Year	2nd Year
1	Professional Skill (Trade Practical)	300	300
2	Professional Knowledge (Trade Theory)	180	240
3	Employability Skills	120	60
4	On the job Training	1560	1560
	Total	**2160**	**2160**

2.4 ASSESSMENT AND CERTIFICATION

The trainee will be tested for his skill, knowledge and attitude during the period of course through formative assessment and at the end of the training programme through summative assessment as notified by the DGT from time to time.

a) The Continuous Assessment (Internal) during the period of training will be done by Formative Assessment Method by testing for assessment criteria listed against learning outcomes. The ITP has to maintain individual *trainee portfolio* as detailed in assessment guideline. The marks of internal assessment will be as per the formative assessment template provided on www.bharatskills.gov.in.

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

2.4.1 PASS REGULATION

For the purposes of determining the overall result, weightage of 100% is applied for six months and one-year duration courses and 50% weightage is applied to each examination for two years courses. The minimum pass percent for Trade Practical and Formative assessment is 60% and for all other subjects is 33%. 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 assessment. Due consideration should be given while assessing for teamwork, avoidance/reduction of scrap/wastage and disposal of scrap/ wastage as per procedure, behavioral attitude, sensitivity to environment and regularity in training. The sensitivity towards OSHE (Occupational Safety and Health Environment) and self-learning attitude are to be considered while assessing competencies.

Assessment will be evidence based, comprising the following:

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

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

Performance Level	Evidence
(a)Weightage in the range of 60-75% to be allotted during assessment	
For performance in this grade, the candidate should produce work which demonstrates attainment of an acceptable standard of craftsmanship with occasional guidance, and due regard for safety procedures and practices.	• Demonstration of good skill in the use of hand tools, machine tools and workshop equipment. • 60-70% accuracy achieved while undertaking different work with those Demanded by the component/job. • A fairly good level of neatness and consistency in the finish. • Occasionalsupport in completing the project/job.
(b)Weightage in the range of above 75%-90% to be allotted during assessment	
For this grade, a candidate should produce work which demonstrates attainment of a reasonable standard of craftsmanship, with little guidance, and regard for safety procedures and practices.	• Good skill levels in the use of hand tools, machine tools and workshop equipment. • 70-80% accuracy achieved while undertaking different work with those demanded by the component/job. • A good level of neatness and consistency in the finish • Little support in completing the project/job.
(c)Weightage in the range of above 90% to be allotted during assessment	
For performance in this grade, the candidate, with minimal or no support in organization and execution and with due regard for safety procedures and practices, has produced work which demonstrates attainment of a high standard of craftsmanship.	• High skill levels in the use of hand tools, machine tools and workshop equipment. • Above 80% accuracy achieved while undertaking different work with those demanded by the component/job. • A high level of neatness and consistency in the finish. • Minimal or no support in completing the project.

Mechanical Sub-Assembly Technician; Mechanical Sub-Assembly Technician assembles together the mechanical subsystems. The individual at work is responsible for assembling mechanical modules from moulded, welded or forged components to produce the final mechanical sub assembly of the product.

Assembler, Automobile; Assembler (Automobile) assembles different parts and units of automobile, installs them on frame and makes necessary connections, adjustment, settings etc. according to specifications. Assembles engine, gear box, front and rear axles etc. individually according to specifications and ensures their stipulated performance. Places body frames, side members, supporting frames etc. in special jigs and secures them tightly by fixing bolts and nuts to different parts. Assists Spot Welder to spot weld body frame. Fits front and rear axle to body and tightens with nuts and bolts. Collects various components and parts from subassembly or from nearby bins and fits them to body or chassis as appropriate. Lifts assembled engine manually or using hoisting equipment carefully, places it over engine frame of chassis and secures it in position with bolts and nuts. Fits clutch, gear box propeller shaft, etc. and makes necessary settings and adjustments. Gathers such parts like radiator, alternator, water pump, hydraulic/vacuum brakes etc. from nearby sub-assembly line and fits them to vehicle. Makes necessary adjustments, connections and alterations to fittings as directed. Checks for wheel alignment using special equipment and makes necessary adjustments to brakes. Delivers assembled vehicle to trim line for fitting of upholstery, door and window glasses, door locks and other fittings. Lubricates various moving parts of vehicle with grease or oil. May assemble only engine, gear boxes, axles, hydraulic brake system etc. in sub-assembly line and be designated accordingly.

Assembler, Stationary Petrol Engine; Assembler, Stationary Petrol Engine assembles stationary petrol engine with finished components, tunes engine and tests performance. Checks condition and cleaning of various engine parts such as crankshaft, camshaft, connecting rod, pistons, tappets, valves, valve guides, spring etc. and measures appropriate parts to assess serviceability, reconditioning or replacement as necessary. Scrapes bearings, grinds valves, files piston rings, assembles pistons with connecting rods and fits camshaft, crankshaft, fly wheel, cylinder block, piston assemblies, valves etc. according to design in order of sequence using hoisting device, stand, special tools and other implements ensuring necessary movement and clearances as specified. Sets valve timing, meshes timing wheels on cam and crankshafts and fastens cylinder head with gasket on cylinder block. Assembles and fits fuel pumps lubrication and fuel pipes, sparking plugs etc. Fits distributor according to ignition timing and makes electrical connections with battery, ignition coil, plugs cut out, etc. Fits radiator, fan pulleys, water pump, etc. Sets tappets and starts engine. Tunes engine and runs it for prescribed number of hours. May test engine horse power, solder nipples, anneal pipes etc. May suggest alterations in fittings.

Assembler, Stationary Diesel Engine; Assembler, Stationary Diesel Engine assembles stationary diesel engine from finished components, makes adjustment, sets alignments, clearances etc. and ensures stipulated performance. Places diesel engine block on jig or other fixture using hoisting equipment. Fits or assembles various parts to engine block such as crank shaft, cam shaft, main bearing, connecting rods, timing gears pistons, fuel pump, atomiser, automatic timing mechanism, exhaust manifold suspension, etc. using spanners, wrenches, screw drivers and

other special tools and devices. Collects various parts like nuts, bolts, washers etc. from nearby bins and fits or screws them to cylinder head. Checks assembled units or parts at every stage for prescribed accuracy, alignment, tolerance etc. using special tools. Records part number fitted or assembled to engine block and notes factual details or position regarding clearances, adjustments etc. made. Assembles other sub-assemblies like starter, alternator timing chain, heater assembly switch, radiator etc. Places assembled engine at central places for engine test. May conduct engine test on dynamo meter and note actual tuning conditions and make necessary adjustments. May overhaul and repair engines or other components.

Assembler, Electrical Accessories; Assembler, Electrical Accessories assembles mechanical parts of electrical equipment, such as light sockets, switches, terminal boards, and plugging devices: Fits together parts, such as socket bases, shafts, contact fingers, and springs, in specified sequence, using fixtures, screwdrivers, and air nut runners. Tests actions of moving parts and listens for unusual sounds to detect defective parts for faulty operation. Verifies completed assembly against pictorial drawings.

CNC Operator - Machining Technician; CNC Operator-Machining Technician sets up base level operations of different machine tools and same can be performed both manually and through automatic machines/robots. Machining Technician Level 3 is often called Assistant Machinist, Junior Machinist, Lathe Operator, Apprentice Machinist, Semi-Skilled Operator. This role primarily involves supporting the Machine Operator in all pre machining activities, machining of the actual part, ad hoc repair work like in auto service stations, gauging, deburring and inspection activities.

In summary the Automotive Manufacturing Technician will be part of the team of manufacturing technicians of four wheelers in a vehicle manufacturing plant or in other manufacturing industry and performing jobs viz. Fitting, Welding, Sheet metal Forming, CNC machine operating, Painting, and Assembling electrical and mechanical components using appropriate hand & power tools to produce a vehicle.

Reference NCO-2015:

a) 8211.0101 - Mechanical Sub-Assembly Technician
b) 8211.1200 - Assembler, Automobile
c) 8211.0500 - Assembler, Stationary Petrol Engine
d) 8211.0600 - Assembler, Stationary Diesel Engine
e) 8212.0400 - Assembler, Electrical Accessories
f) 7223.5002 - CNC Operator –Machining Technician

Reference NOS:

ASC/N9462, ASC/N9463, ASC/N9464, ASC/N9465, ASC/N9466, ASC/N9467, ASC/N9468, ASC/N9469, ASC/N9470, ASC/N9471, ASC/N9472, ASC/N9473, ASC/N9474, ASC/N9475

4. GENERAL INFORMATION

Name of the Trade	**VEHICLE TECHNICIAN (Flexi MoU)**
NCO–2015	8211.0101, 8211.1200, 8211.0500, 8211.0600, 8212.0400, 7223.5002
NOS Covered	ASC/N9462, ASC/N9463, ASC/N9464, ASC/N9465, ASC/N9466 ASC/N9467, ASC/N9468, ASC/N9469, ASC/N9470, ASC/N9471, ASC/N9472, ASC/N9473, ASC/N9474, ASC/N9475
NSQF Level	Level – 4
Duration of Craftsmen Training (Instructional Hours)	Two years (4320 Hours)
Entry Qualification	Passed 10th Class examination or its equivalent.
Minimum Age	18 years as on first day of academic session.
Eligibility for PwD	LD, LC, DW, AA, DEAF, HH
Unit Strength (No. Of Student)	30
Space Norms	192 Sq. m.
Power Norms	17 KW
Instructors Qualification for	
(i) Vehicle Technician Trade	Degree in Mechanical Engineering or Automobile Engineering from recognized Engineering College /university with one year experience in the relevant field. **OR** Diploma in Mechanical Engineering or Automobile Engineering from recognized board of technical education with two years' experience in the relevant field. **OR** NTC/NAC in the Trade of "Automotive Manufacturing" with 3 years' post-qualification experience in the relevant field. **Desirable: -** Preference will be given to a candidate with CIC (Craft Instructor Certificate) in Motor Mechanic trade. ***Out of two Instructors required for the unit of 2(1+1), one must have Degree/Diploma and other must have NTC/NAC qualifications.***

(ii) Workshop Calculation and Science	B.Voc./Degree in Engineering from AICTE/UGC recognized Engineering College/University with one-year experience in the relevant field. **OR** 03 years Diploma in Engineering from AICTE/recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years' experience in the relevant field. **OR** NTC/NAC in any one of the engineering trades with three years' experience. **Essential Qualification:** National Craft Instructor Certificate (NCIC) in relevant trade **OR** NCIC in RoDA or any of its variants under DGT
(iii) Engineering Drawing	B.Voc./Degree in Engineering from AICTE/UGC recognized Engineering College/University with one-year experience in the relevant field. **OR** 03 years Diploma in Engineering from AICTE/ recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years' experience in the relevant field. **OR** NTC/NAC in any one of the Electrical groups (Gr-II) trades categorized under Engg. Drawing'/ D'man Mechanical / D'man Civil' with three years' experience. **Essential Qualification:** National Craft Instructor Certificate(NCIC)in relevant trade **OR** NCIC in RoDA/D'man (Mech/Civil) or any of its variants under DGT.
(iv) Employability Skill	MBA/BBA/Any Graduate/ Diploma in any discipline with Two years' experience with short-term ToT Course in Employability Skills (Must have studied English/Communication Skills and Basic Computer at 12th/Diploma level and above) **OR**

	Existing Social Studies Instructors in it is with short term ToT Course in Employability Skills
(v)Minimum age for Instructor	21 years
List of Tools and Equipment	As per Annexure-I

5. LEARNING OUTCOME

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

LEARNING OUTCOME

FIRST YEAR

1. Recognize & comply Health, Safety & Environment practices in a vehicle manufacturing plant. (NOS: - ASC/N9462)
2. Identify & explain about automobile industry in India, different types of vehicles, vehicle Id. Nos. of different components of vehicles, and perform on job training in various shops & conveyor systems. (NOS: - ASC/N9463)
3. Explain, perform & maintain hand & power tools and equipment used in a workshop & vehicle manufacturing plant and develop skills to assemble components using fasteners on conveyor line. (NOS: - ASC/N9464)
4. Recognize vehicle body parts & components, their functions and assembles components on actual manufacturing lines. (NOS: - ASC/N9465)
5. Explain elements of vehicle manufacturing process and perform to make components in Blanking & Stamping shop. (NOS: - ASC/N9466)
6. Plan & Organise to make Injection moulded components. (NOS: - ASC/N9467)
7. Plan & Organise to make components in die casting and machine shop. (NOS: - ASC/N9468)
8. Plan & Organise heat treatment of components. (NOS: - ASC/N9468)
9. Plan & organize to perform arc, gas and Electric resistance (ER) welding and conduct inspection of weld joints to find welding defects. (NOS: - ASC/N9469)
10. Plan & organize to perform surface preparation & painting, check dry film thickness (DFT) using Elcometer and analyse painting defects. (NOS: - ASC/N9470)
11. Plan & prepare for assembling vehicle components and perform components assembly work in different assembly processes. (NOS: - ASC/N9471)
12. Read, and apply engineering drawing for different application in the field of work. (Mapped NOS: CSC/N9401)
13. Demonstrate basic mathematical concept, and principles to perform practical operations. Understand, and explain basic science in the field of study. (Mapped NOS: CSC/N9402)

SECOND YEAR

14. Plan & organize work and assemble vehicle interior components viz. electrical harness, internal wiring, dash board, instruments, switches, seats, fire wall, ducts, headliner, weather strip, shock absorbers etc. on different type of conveyor system lines. (NOS: - ASC/N9472)
15. Explain and perform installation of power train, suspension and brake system components using appropriate hand & power tools. (NOS: - ASC/N9472)

16. Plan & Organise to perform engine and transmission assembly activities. (NOS: - ASC/N9473)
17. Plan & organize to perform work and assemble Final line assembly components on vehicle viz. Rear pillar trim, trunk lid latch, radiator, hoses, seat belt, steering shaft, air conditioning system, parking brake, glove box, garnish, battery cable, silencer, front grille, moulding, console box, head & back lights, turn signals, front & rear glass, etc. using appropriate hand & power tools. (NOS: - ASC/N9474)
18. Select proper tools and Explain & perform installation of electrical and electronics components in vehicle. Check functionality after installation and recognize the function of automation in vehicle assemble and material handling. (NOS: - ASC/N9474)
19. Recognise the harmful effect of pollution in general & pollution generated by automobiles. Explain & assemble the components designed to control pollution in vehicle, like ECM and Catalytic convertor. Conduct Emission test as per standard procedure. (NOS: - ASC/N9475)
20. Explain & perform different types of quality control & inspection tests on assembly line and tester line and conduct final inspection & testing. (NOS: - ASC/N9475)
21. Read, and apply engineering drawing for different application in the field of work. (Mapped NOS: CSC/N9401)
22. Demonstrate basic mathematical concept, and principles to perform practical operations. Understand, and explain basic science in the field of study. (Mapped NOS: CSC/N9402)

6. ASSESSMENT CRITERIA

LEARNING OUTCOME	ASSESSMENT CRITERIA
FIRST YEAR	
1. Recognize & comply Health, Safety & Environment practices in a vehicle manufacturing plant. (NOS: - ASC/N9462)	Practice and understand precautions to be followed while working in assembly line.
	Safe use of equipment generally used in assembly line with operating standard.
	Understand class of fire and be able to operate fire extinguishers.
	Practical use and understanding of PPEs.
2. Identify & explain about automobile industry in India, different types of vehicles, vehicle Id. Nos. of different components of vehicles, and perform on job training in various shops & conveyor systems. (NOS: - ASC/N9463)	Identification of different types of vehicle.
	Identification of Vehicle Identification Number, Chassis No. &Engine no.
	Identification of different types of vehicle and engine components.
	Plant and personal safety demonstration.
	Familiarization with different components in the vehicle
	On the job training in various production shops to get acquainted to the vehicle manufacturing process
	Hands on training on conveyor line and sub assembly.
3. Explain, perform & maintain hand & power tools and equipment used in a workshop & vehicle manufacturing plant and develop skills to assemble components using fasteners on conveyor line. (NOS: - ASC/N9464)	Working with tools used in vehicle assembly.
	Use of Vernier Calliper, Micrometer and height gauge
	Working with Electric &pneumatic powered tools.
	Working with hand drill, hammers, punches and chisel.
	Working with files, drill, reamer and tap.
	Using wrench, screwdriver and pliers.
	Use of Allen key.
	Understanding of types and sizes of fasteners and picking of defined number of fasteners.
	Gap setting and checking with feeler Gauge.
	Operating of spot welding guns and other welding machines.
	Practice on different types of Conveyor
4. Recognize vehicle body parts & components, their functions and assemble components on actual manufacturing lines. (NOS: - ASC/N9465)	On the job training on the actual manufacturing lines and identifying various components their function assembly and fitment procedure.

5. Explain elements of vehicle manufacturing process and perform to make components in Blanking, Stamping shop. (NOS: - ASC/N9466)	Blanking, stamping and Injection moulding shops.
	Engine assembly shop.
	Conveyors.
	Spot welding guns.
	Pneumatic tools.
	Electric tools.
	Sealant application gun.
	Special tools and equipment.
6. Plan & Organise to make Injection moulded components. (NOS: - ASC/N9467)	Describe the purpose and use of Injection moulding machine
	Understand Plastic material classification
	Injection moulding process
	Injection moulding defects
7. Plan & Organise to make components in die casting and machine shop. (NOS: - ASC/N9468)	Describe the purpose and use of die casting machine
	Die casting process (LPDC and HPDC)
	Die casting defects
8. Plan & Organise heat treatment of components. (NOS: - ASC/N9468)	Definition and purpose of Heat treatment
	Types Heat Treatment process
	Heat treatment Equipment and Quenchants
	Case hardening and surface hardening
9. Plan & organize to perform arc, gas and Electric resistance (ER) welding and conduct inspection of weld joints to find welding defects. (NOS: - ASC/N9469)	Basic understanding of automotive welding process.
	Carry out welding training and understanding of different types of welding
	Inspect welding joints using visual, DP & MP tests
10. Plan & organize to perform surface preparation & painting, check dry film thickness (DFT) using Elcometer and analyse painting defects. (NOS: - ASC/N9470)	Paint MS sheet panels following the correct painting procedure i.e. Surface preparation, primer, intermediate coat & final coat.
	Inspect the painted panel note down the defects
	Take painted surface DFT at various locations using Elcometer.
11. Plan & prepare for assembling vehicle components and perform components assembly work in different assembly	Basic understanding of automotive Assembly process in plant.
	Hands on training on different Assembly processes in workshop

processes. (NOS: - ASC/N9471)	
12. Read, and apply engineering drawing for different application in the field of work. (NOS:CSC/N9401)	Read & interpret the information on drawings, and apply in executing practical work.
	Read & analyze the specification to ascertain the material requirement, tools, and assembly/ maintenance parameters.
	Encounter drawings with missing/unspecified key information, and make own calculations to fill in missing dimension/parameters to carry out the work.
13. Demonstrate basic mathematical concept, and principles to perform practical operations. Understand, and explain basic science in the field of study. (NOS:CSC/N9402)	Solve different mathematical problems
	Explain concept of basic science related to the field of study
SECOND YEAR	
14. Plan & organize work and assemble vehicle interior components viz. electrical harness, internal wiring, dash board, instruments, switches, seats, fire wall, ducts, headliner, weather strip, shock absorbers etc. on different type of conveyor system lines. (NOS: - ASC/N9472)	Installation of following components in the vehicle.
	Harness & controls and other electrical items viz.Junction box, Switches, Relays, Dash board instruments and complete all internal wiring.
	Pedal Assembly.
	Insulator or Fire wall
	Air duct, heater duct, heater.
	Head liner.
	Weather-strip,
	Horn
	Stop switch
	Front/ rear shock absorber, shift cable
	Washer tank
	Front/ rear seat belt
	Installation of components in the vehicle along with familiarization of tools conveyor system and automation.
15. Explain and perform installation of suspension and brake system components using appropriate hand & power tools. (NOS: - ASC/N9472)	Installation of following components in the vehicle
	Brake tube
	Filler neck.
	Fuel pipe, fuel tank, canister.
	Rear axle, stabilizer bar
	Knuckle, tie rod

	Exhaust System
	Tyre
	Front/rear seat
	Front/ rear bumper
	Familiarization of tools, conveyor systems and automation
16. Plan & Organise to perform engine and transmission assembly activities. (NOS: - ASC/N9473)	Engine classification, mountings, transmission, driveshaft, propeller shaft, Differential, Clutch and Various joints
	Suspension components
	Construction of various components in power train
17. Plan & organize to perform work and assemble Final line assembly components on vehicle viz. Rear pillar trim, trunk lid latch, radiator, hoses, seat belt, steering shaft, air conditioning system, parking brake, glove box, , garnish, battery cable, silencer, front grille, moulding, console box, head & back lights, turn signals, front & rear glass, etc. using appropriate hand & power tools. (NOS: - ASC/N9474)	Installation of following components in the vehicle
	Rear pillar trim, trunk lid latch.
	Console bracket, carpet, trunk room trim.
	License plate lamp, radiator, hose
	Seat belt, centre pillar trim
	Heat hose, steering shaft
	Air-conditioner components, A/c gas
	Parking brake, garnish
	Glove box, battery tray, seat belt, anchor cover, garnish
	Rear combination lamp, sun visor
	Air cleaner, front/rear seat
	Battery cable, silencer
	Front grille, drip moulding
	Front turn signal lamp, console box
	Front/rear glass, roof moulding
	Combination meter
	Familiarization of tools, conveyor systems and automation
18. Select proper tools and Explain & perform installation of electrical and electronics components in vehicle. Check functionality after installation and recognize the function of automation in vehicle assemble and material handling. (NOS: - ASC/N9474)	Installation of electrical components in vehicle assembly line.
	Installation of electronic components in vehicle assembly line.
	Function of automation equipment in vehicle assembly line.
	Function of automation equipment in material handling.
	Function of automation equipment in testing.

19. Recognise the harmful effect of pollution in general & pollution generated by automobiles. Explain & assemble the components designed to control pollution in vehicle, like ECM and Catalytic convertor. Conduct Emission test as per standard procedure. (NOS: - ASC/N9475)	Installation of components In the vehicle along with familiarisation of tools, conveyor systems and automation.
	Electronic control systems.
	Catalytic convertors.
	Measurement techniques and hands on training on measurement.
	Emission standards & Test procedures.
20. Explain & perform different types of quality control & inspection tests on assembly line and tester line and conduct final inspection & testing. (NOS: - ASC/N9475)	Vehicle testing on plant tester line.
	Wheel alignment.
	Toe in adjustment.
	Head lamp beam adjustment.
	Drum test.
	Brake test.
	Emission test.
	Shower test.
	Road test.
	Final Inspection.
	ID plate punching.
21. Read, and apply engineering drawing for different application in the field of work. (NOS:CSC/N9401)	Read & interpret the information on drawings, and apply in executing practical work.
	Read & analyze the specification to ascertain the material requirement, tools, and assembly/ maintenance parameters.
	Encounter drawings with missing/unspecified key information, and make own calculations to fill in missing dimension/parameters to carry out the work.
22. Demonstrate basic mathematical concept, and principles to perform practical operations. Understand, and explain basic science in the field of study. (NOS: CSC/N9402)	Solve different mathematical problems
	Explain concept of basic science related to the field of study

7. TRADE SYLLABUS

SYLLABUS – VEHICLE TECHNICIAN			
FIRST YEAR			
Duration	**Reference Learning Outcome**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
Professional Skill 03 Hrs. Professional Knowledge 07 Hrs. On the Job Training 50 Hrs.	Recognize & comply safe working practices, environment regulation and housekeeping.	**Workshop Safety** • Importance of trade training, List of tools & Machinery used in the trade. • Safety attitude development of the trainee by educating them to use Personal Protective Equipment (PPE). • First Aid Method and basic training. • Safe disposal of waste materials like cotton waste, metal chips/burrs etc. • Hazard identification and avoidance. • Safety signs for Danger, Warning, caution & personal safety message. • Preventive measures for electrical accidents & steps to be taken in such accidents. • Use of Fire extinguishers. • Practice and understand precautions to be followed while working in fitting jobs. • Safe use of tools and equipment used in the trade.	**Workshop Safety** • All necessary guidance to be provided to the new comers to become familiar with the working of Industrial Training Institute system including stores procedures. • Soft Skills, its importance and Job area after completion of training. • Importance of safety and general precautions observed in the in the industry/shop floor. • Introduction of First aid. Operation of electrical mains and electrical safety. Introduction of PPEs. • Response to emergencies e.g.; power failure, fire, and system failure. • **Importance of housekeeping & good shop floor practices.** Introduction to 5S concept & its application. • **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 03 Hrs. Professional Knowledge 07 Hrs. On the Job Training 50 Hrs.	Recognize & comply Health, Safety & Environment practices in a vehicle manufacturing plant.	**Health and safety in Manufacturing Environment** • Practice and understand precautions to be followed while working in assembly line • Safe use of equipment generally used in assembly line with operating standard. • Understand class of fire and be able to operate fire extinguishers. • Practical use and understanding of PPEs.	**Health and safety in Manufacturing Environment** • Precautions to be followed while working in assembly Line • Safe use of equipment generally used in assembly line • Maintaining health and safety for workers in assembly line • Emergency and evacuation procedures to be • followed in the assembly line • First-Aid, nature and causes of injury and utilization of first-aid. • Safety: - its importance, classification, personal, general, workshop and machine safety. • Safety signs and norms. • Fires: - types, causes, classes • Use of personal protective Equipment (PPE), standardization
Professional Skill 20 Hrs. Professional Knowledge 60 Hrs. On the Job Training 310 Hrs.	Identify & explain about automobile industry in India, different types of vehicles, vehicle Id. Nos. of different components of vehicles, and perform on job training in various shops & conveyor systems.	**Basics of Automobile and Manufacturing Process** • Identification of different types of vehicle. • Identification of Vehicle Identification Number, Chassis No. & Engine no • Identification of different types of vehicle and engine components. • Plant and personal safety demonstration. • Familiarization with different components in the vehicle • On the job training in various production shops to get acquainted to the vehicle manufacturing process • Hands on training on conveyor	**Basics of Automobile and Manufacturing Process** • Knowledge about automobile industry • Basic automotive terms and familiarisation to various types of vehicles • Basics of Vehicle manufacturing process • Basics of Blanking process • Basics of Stamping process • Basics of Welding process • Basics of Painting process • Basics of Assembly process • Basics of Vehicle Inspection and testing process • Introduction to Tools and equipment used in vehicle manufacturing

		line and sub assembly	• Conveyors types • Spot Welding guns • Stamping presses • Pneumatic tools • Electric tools • Sealant application guns • Special tools and equipment
Professional Skill 09 Hrs. Professional Knowledge 20 Hrs. On the Job Training 91 Hrs.	Explain, perform & maintain hand & power tools and equipment used in a workshop & vehicle manufacturing plant and develop skills to assemble components using fasteners on conveyor line.	**Tools and Workshop Equipment** • Practice working with tools used in vehicle assembly • Practice working with pneumatic tools, Use of Vernier calliper, Micrometer and height gauge • Working with hand drill, hammer punches and chisel • Practical with drill reamer and tap • Practical with wrench screwdriver and pliers • Use of Allen key • Understanding of types and sizes of fasteners and picking of defined number of fasteners • Gap setting and checking with feeler Gauge • Operating of spot welding guns and other welding machines • Practice on different types of Conveyor	**Tools and Workshop Equipment** Common tools and material used in assembly Process • Types and sizes of spanners and screw drivers and Allen keys Taps wrenches and dies • Gauges • Files • Drilling machines and drills • Cutting machines • Pneumatic guns • Measuring instruments • Special purpose tools • Fasteners • General equipment in weld shop • Grinding, boring machines and screw jack • Hydraulic presses • Special purpose machines • Conveyor types
		Vehicle body assembly	**Vehicle body assembly**
Professional Skill 06 Hrs. Professional Knowledge 12 Hrs. On the Job Training 72 Hrs.	Recognize vehicle body parts & components, their functions and assemble components on actual manufacturing lines.	**Structure of Vehicle Body** • On the job training on the actual manufacturing lines and identifying various components their function assembly and fitment procedure	**Structure of Vehicle Body** • Structure of car vehicle body • On the job training on the actual manufacturing lines and identifying various components their function assembly and fitment procedure.
Professional Skill 06 Hrs.	Explain elements of vehicle mfg. process &	**On the job training** Hands On training in 1. Blanking and stamping shops	**Elements of Vehicle manufacturing process** 1. Blanking process

Professional Knowledge 12 Hrs. On the Job Training 72 Hrs.	perform to make components in Blanking & Stamping shop		2. Stamping press tools and dies
Professional Skill 06 Hrs. Professional Knowledge 12 Hrs. On the Job Training 72 Hrs.	Plan & Organise to make Injection moulded components	**Injection moulding** • Basics of injection moulding process • Operate injection moulding process • Inspect injection moulded components	**Injection moulding** • Injection moulding process • Injection moulding machine and parameters • Basic understanding of plastic material used in injection moulding • Injection moulding defects
Professional Skill 26 Hrs. Professional Knowledge 55 Hrs. On the Job Training 279 Hrs.	Plan & Organise to make components in die casting and machine shop. Plan & Organise heat treatment of components. Plan & Organise to make transmission assembly.	**Die casting , Machine shop, heat treatment and Engine assembly transmission assembly** 1.on the job training on actual manufacturing lines and identifying various components and their functions and their assembly procedures	**Die casting , Machine shop, heat treatment and Engine assembly transmission assembly** 1.Describe the purpose and use of die casting machine 2.Die casting process (LPDC and HPDC) 3.Die casting defects 4.Definition and purpose of Heat treatment 5.Types Heat Treatment process 6.Heat treatment Equipment and Quenchants 7.Case hardening and surface hardening 8.Engine assembly procedure 9.Transmission assembly procedure
Professional Skill 12 Hrs. Professional Knowledge 25 Hrs. On the Job Training 113 Hrs.	Plan & organize to perform arc and Electric resistance (ER) welding and conduct inspection of weld joints to find welding defects.	**Welding** • Basics of automotive welding process • Carry out welding training and understanding of different types of welding • Inspect welding joints using visual, DP & MP tests.	**Welding** • Weld equipment and parameters • Types of welding • Welding defects • Welding inspection

Professional Skill 09 Hrs. Professional Knowledge 20 Hrs. On the Job Training 91 Hrs.	Plan & organize to perform surface preparation & painting, check dry film thickness (DFT) using Elcometer and analyse painting defects.	**Painting** • Paint MS sheet panels following the correct painting procedure i.e. Surface preparation, primer, intermediate coat & final coat. • Inspect the painted panel note down the defects • Take painted surface DFT at various locations using Elcometer.	**Painting** • Basic knowledge of automotive paining process • Terminology for painting • Sealant application guns • Paint equipment and parameters • Painting defects • Paint inspection & thickness measurement
Professional Skill 20 Hrs. Professional Knowledge 70 Hrs. On the Job Training 360 Hrs.	Plan & prepare for assembling vehicle components and perform components assembly work in different assembly processes.	**Assembly** • Basic understanding of automotive Assembly process in plant • Hands On training on different Assembly processes in workshop	**Assembly** • Various assembly processes • Pneumatic tools and electrical tools • Torque wrenches • Types of assembly conveyors • Filling and testing equipment • Vehicle Inspection and testing • Tester line equipment • Testing parameters and its
ENGINEERING DRAWING: 30 HRS.			
Professional Knowledge ED- 30 Hrs.	Read, and apply engineering drawing for different applications in the field of work.	Introduction to Engineering Drawing, and Drawing Instruments – Conventions Sizes, and layout of drawing sheets Title Block, its position, and content Drawing Instrument Lines- Types, and applications in drawing Free hand drawing of – Geometrical figures, and blocks with dimension Transferring measurement from the given object to the free hand sketches. Free hand drawing of hand tools, and measuring tools. Drawing of Geometrical figures: Angle, Triangle, Circle, Rectangle, Square, Parallelogram. Lettering & Numbering – Single Stroke. Dimensioning Types of arrowhead Leader line with text Position of dimensioning (Unidirectional, Aligned) Symbolic representation – Different symbols used in the related trades.	

		Concept, and reading of Drawing in Concept of axes plane, and quadrant Concept of Orthographic, and Isometric projections Method of first angle, and third angle projections (definition, and difference) Reading of Job drawing of related trades.
WORKSHOP CALCULATION, and 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.	**Unit, Fractions** Classification of unit system Fundamental, and Derived units F.P.S, C.G.S, M.K.S, and SI units Measurement units, and conversion Factors, HCF, LCM, and problems Fractions - Addition, subtraction, multiplication & division Decimal fractions - Addition, subtraction, multiplication & division Solving problems by using calculator **Square root, Ratio, and Proportions, Percentage** Square, and square root Simple problems using calculator Applications of Pythagoras theorem, and related problems Ratio, and proportion Ratio, and proportion - Direct, and indirect proportions Percentage Percentage - Changing percentage to decimal, and fraction **Material Science** Types metals, types of ferrous, and nonferrous metals Physical, and mechanical properties of metals **Mass, Weight, Volume, and Density** Mass, volume, density, weight, and specific gravity, numerical related to L,C,O section only Related problems for mass, volume, density, weight, and specific gravity **Speed, and Velocity, Work, Power, and Energy** Speed, and velocity - Rest, motion, speed, velocity, difference between speed, and velocity, acceleration, and retardation Speed, and velocity - Related problems on speed & velocity Work, power, energy, HP, IHP, BHP, and efficiency **Heat & Temperature, and Pressure** Concept of heat, and temperature, effects of heat, difference between heat, and temperature, boiling point & melting point of different metals, and non-metals

		Concept of pressure - Units of pressure, atmospheric pressure, absolute pressure, gauge pressure, and gauges used for measuring pressure **Basic Electricity** Introduction, and uses of electricity, electric current AC,DC their comparison, voltage, resistance, and their units **Mensuration** Area, and perimeter of square, rectangle, and parallelogram Surface area, and volume of solids - cube, cuboid, cylinder, sphere, and hollow cylinder Finding the lateral surface area, total surface area, and capacity in liters of hexagonal, conical, and cylindrical shaped vessels **Levers, and Simple machines** Simple machines - Effort, and load, mechanical advantage, velocity ratio, efficiency of machine, relationship between efficiency, velocity ratio, and mechanical advantage Lever & Simple machines - Lever, and its types **Trigonometry** Measurement of angles Trigonometrical ratios Trigonometrical tables

Project work

a) Make a chart showing different types of vehicles / automobiles.
b) Make chart explaining power transmission in a vehicle.
c) Prepare models of different types of chassis or frames of vehicles.
d) Prepare working model of battery charging system.
e) Prepare a working model of lead-acid battery.
f) Prepare a model of Steering system.
g) Make charts of how catalytic convertor works or how a muffler works.

Note: The duration of Professional skills (Trade practical) and Professional knowledge (Trade theory) are indicative only. The Training Institute has the flexibility to adopt suitable training duration for effective training.

SYLLABUS – VEHICLE TECHNICIAN			
SECOND YEAR			
Duration	**Reference Learning Outcome**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
Professional Skill 25 Hrs. Professional Knowledge 40 Hrs. On the Job Training 205 Hrs.	Plan & Organise to perform engine and transmission assembly activities.	**Engine assembly and transmission assembly** • On the job exposure on engine assembly • On the job exposure on Transmission assembly	**Engine assembly and transmission assembly** • Engine classification, mountings, transmission, driveshaft, propeller shaft, Differential, Clutch and Various joints • Construction of various components in power train
Professional Skill 25 Hrs. Professional Knowledge 45 Hrs. On the Job Training 230 Hrs.	Plan & organize work and assemble vehicle interior components viz. electrical harness, internal wiring, dash board, instruments, switches, seats, fire wall, ducts, headliner, weather strip, shock absorbers etc. on different type of conveyor system lines.	**Vehicle interior assembly** Installation of following components in the vehicle; • Harness & controls and other electrical items viz. Junction box, Switches, Relays, Dash board instruments and complete all internal wiring. • Pedal Assembly, • Insulator or Fire wall • Air duct, heater duct, heater, • Head liner • Weather-strip, • Horn, • Stop switch • Front/ rear shock absorber, shift cable • Washer tank • Front/ rear seat belt • Installation of components in the vehicle along with familiarization of tools conveyor system and automation	**Vehicle interior assembly** Understanding the function and construction of the following components and system • Harness & controls and other electrical items viz. Junction box, Switches, Relays, Dash board instruments and complete all internal wiring. • Pedal Assembly, • Insulator or Fire wall • Air duct, heater duct, heater, • Head liner • Weather-strip, • Horn, • Stop switch • Front/ rear shock absorber, shift cable • Washer tank • Front/ rear seat belt • Installation of components in the vehicle along with familiarization of tools conveyor system and automation
Professional Skill 35 Hrs.	Explain and perform	**Power train, suspension and Brake Assembly**	**Power train, suspension and Brake Assembly**

Professional Knowledge 55 Hrs. On the Job Training 300 Hrs.	installation of power train, suspension and brake system components using appropriate hand & power tools.	Installation of following components in the vehicle; • Brake tube • filler neck • Fuel pipe, fuel tank, canister • Rear axle, stabilizer bar • Knuckle, tie rod • Exhaust System • Tyre, • front/rear seat • Front/ rear bumper • Familiarization of tools, conveyor systems and automation	Understanding the function and construction of the following components and system • Brake tube • filler neck • Fuel pipe, fuel tank, canister • Rear axle, stabilizer bar • Knuckle, tie rod • Exhaust System • Tyre, • front/rear seat • Front/ rear bumper • Installation of components in the vehicle along with familiarization of tools, conveyor systems and automation
Professional Skill 35 Hrs. Professional Knowledge 55 Hrs. On the Job Training 300 Hrs.	Plan & organize to perform work and assemble Final line assembly components on vehicle viz. Rear pillar trim, trunk lid latch, radiator, hoses, seat belt, steering shaft, air conditioning system, parking brake, glove box, garnish, battery cable, silencer, front grille, moulding, console box, head & back lights, turn signals, front & rear glass, etc. using appropriate hand & power tools.	**Final line assembly** Installation of following components in the vehicle; • Rear pillar trim, trunk lid latch • Console bracket, carpet, trunk room trim • License plate lamp, radiator, hose • Seat belt, centre pillar trim • Heat hose, steering shaft • Air-conditioner components, A/c gas • Parking brake, garnish • Glove box, battery tray, seat belt, anchor cover, garnish • Rear combination lamp, sun visor • Air cleaner, front/rear seat • Battery cable, silencer • Front grille, drip moulding • Front turn signal lamp, console box • Front/rear glass, roof moulding • Combination meter • Familiarization of tools, conveyor systems and automation	**Final line assembly** Understanding the function and construction of the following components and system • Rear pillar trim, trunk lid latch • Console bracket, carpet, trunk room trim • License plate lamp, radiator, hose • Seat belt, centre pillar trim • Heat hose, steering shaft • Air-conditioner components, A/c gas • Parking brake, garnish • Glove box, battery tray, seat belt, anchor cover, garnish • Rear combination lamp, sun visor • Air cleaner, front/rear seat • Battery cable, silencer • Front grille, drip moulding • Front turn signal lamp, console box • Front/rear glass, roof moulding • Combination meter • Installation of components in the vehicle along with familiarization of tools,

			conveyor systems and automation
Professional Skill 30 Hrs. Professional Knowledge 50 Hrs. On the Job Training 250 Hrs.	Select proper tools and Explain & perform installation of electrical and electronics components in vehicle. Check functionality after installation and recognize the function of automation in vehicle assemble and material handling.	**Automotive Electrical and Electronics** • Installation of electrical components in vehicle assembly line • Installation of electronic components in vehicle assembly line • Function of automation equipment in vehicle assembly line. • Function of automation equipment in material handling • Function of automation equipment in testing	**Automotive Electrical and Electronics** • Basics of Electrical and Electronic Engineering • Current voltage and resistance • Ohm's Law • Types of Electrical Materials • Direct Current and Alternating current • Function of current • Heat generation action • Chemical Action • Magnetic Action • Parallel and Series connections • Function and working principal of electrical components in vehicle assembly line • Alternator • Distributor • Wiper Motor • Wiring Harness and Connectors • Function and working principle of electronic components in vehicle assembly line • Electronic Control Module • Sensors and actuators • Air Bags • ABS & EBD • Electronic power steering • Function of automation equipment in vehicle assembly line • Function of automation equipment in material handling • Function of automation equipment in testing
Professional Skill 10 Hrs. Professional Knowledge	Recognize the harmful effect of pollution in general & pollution	**Automotive Pollution & Control & Emission Measurements** • Installation of components In the vehicle along with familiarisation of tools, conveyor	**Automotive Pollution & Control & Emission Measurements** • Understanding the function and construction of the following components and

20 Hrs. On the Job Training 90 Hrs.	generated by automobiles. Explain & assemble the components designed to control pollution in vehicle, like ECM and Catalytic convertor. Conduct Emission test as per standard procedure.	systems and automation • Electronic control systems • Catalytic convertors • Measurement techniques and hands on training on measurement • Emission standards & Test procedures	system • Importance of pollution and emission control in automobile Vehicular emission • Factors influencing motor vehicle emission • Electronic control systems • Catalytic convertors • Evaporative emission control • Influence of engine variables on emissions • Pollutant formation in SI & CI Engines • Control of Emissions from SI & CI Engines • Measurement techniques • Emission standards & Test procedures
Professional Skill 20 Hrs. Professional Knowledge 35 Hrs. On the Job Training 185 Hrs.	Explain & perform different types of quality control & inspection process on assembly line and tester line and conduct final inspection& testing.	**Quality Control and Inspection** • Vehicle testing on plant tester line • Wheel alignment • Toe in adjustment • Head lamp beam adjustment • Drum test • Brake test • Emission test • Shower test • Road test • Final Inspection • ID plate punching	**Quality Control and Inspection** • Different types of quality control processes used in automotive manufacturing shop • Statistical Process Control • Functions of various departments in quality control procedures • Product development department • Production department • Quality Department • Marketing Department • Inspection Process • Final Audit Tests • Vehicle Identification Number (VIN)
ENGINEERING DRAWING: 30 HRS.			
Professional Knowledge ED- 30 Hrs.	Read, and apply engineering drawings for different applications in the field of work.	Reading of Electrical, Electronic & Mechanical Signs, and Symbols used in Automobiles. Sketches of Electrical, Electronic & Mechanical components used in Automobile. Reading of Electrical wiring diagram, and Layout diagram used in Automobile. Drawing of Electrical circuit diagram used in Automobile.	

		Drawing of Block diagram of Instruments & equipment of trades
WORKSHOP CALCULATION, and 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.	**Friction** Friction - Advantages, and disadvantages, simple problems related to friction Friction - Lubrication **Estimation, and Costing** Estimation, and costing - Simple estimation of the requirement of material, etc., as applicable to the trade Estimation, and costing - Problems with estimation, and costing

In-plant training/ Project work

a) Make electrical circuit diagrams with load calculations.
b) Make electronic circuit diagrams to show how different transistors work.
c) Prepare model of side indicator lights or parking lights.
d) Prepare charts showing interior components of a vehicle.
e) Test emission of diesel and petrol vehicles and prepare reports.
f) Make charts of how catalytic convertor works or how a muffler works.

Note: The duration of Professional skills (Trade practical) and Professional knowledge (Trade theory) are indicative only. The Training Institute has the flexibility to adopt suitable training duration for effective training.

SYLLABUS FOR CORE SKILLS
1. Employability Skills (Common for all CTS trades) (First Year-120 Hrs. + Second Year- 60 Hrs.)

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

ANNEXURE-I

List of Tools & Equipment		
Vehicle Technician (For batch of 30 candidates)		
Course: Vehicle Technician		
SL NO	**TOOLS, EQUIPMENT, MACHINERIES AND VEHICLES**	**QTY**
1.	CNC Vertical head machine	1 no.
2.	CNC Horizontal head machine	1 no.
3.	CNC Milling tools different size	5 nos.
4.	CNC Boring tools	5 nos.
5.	Bench vice	30 no.
6.	Drilling machine	2 nos.
7.	Double ended spanner set 6-32mm	05set
8.	Ring spanner set 6-32mm	05 set
9.	Tubular spanners 8,10,12,14,16,17mm	5 nos.
10.	Socket spanners 6-32 mm with T bar and ratchet	05 set
11.	Allen keys 4-12mm in steps of 2mm	05 set
12.	Screw driver (flat) 20cm x 9mm blade	05 no.
13.	Screw driver (flat) 30cm x 9 mm blade	05 no.
14.	Screw driver (Philips type) 100 -300mm set of 5 pieces	05 set
15.	Hammer ball peen 0.75 kg	5 nos.
16.	Mallet hammer	5 nos.
17.	Hammer rubber	5 nos.
18.	Nose pliers straight 15 cm	5 nos.
19.	Combination pliers 15 cm	5 nos.
20.	Circlip plier external & contracting 6”	5 nos.
21.	Circlip pliers external & contracting 7”	5 nos.
22.	Feeler gauge 20 blades metric	5 nos.
23.	Adjustable spanner 20 cm	5 nos.
24.	Spark plug spanner 12,14,17mm	5 nos.
25.	File different shapes and size of 15cm	05 set
26.	Drill bits 3mm to 16mm	02 set
27.	Tap set M6 to M12	02 set
28.	Pneumatic Gun / Pneumatic drill	5 nos.

29.	Battery gun / Battery drill	5 nos.
30.	Socket set	5 nos.
31.	Screw Bit set	5 nos.
32.	Torque wrench 0-50 NM	01 no.
33.	Digital Multi meter	01 no.
34.	Tappet adjuster	01 no.
35.	Air compressor 200 liters capacity	01 no.
36.	Impact screw driver for flat and Philips type	01 set
37.	Pneumatic tyre inflator	01 no.
38.	Measuring Jars (Different capacity)	01 Set
39.	4 Pole lift	2 nos.
40.	Slat conveyor for assembly training	1 no.
41.	Desktop computers for Basic training	10 nos.
42.	Engine (Petrol MPFI) for dismantling and assembly	2 nos.
43.	Engine (Diesel DDIS) for dismantling and assembly	2 nos.
44.	Transmission for assembly and disassembly training	2 nos.
45.	4- Wheeler vehicle	2 nos.
46.	Cut section of main parts and systems for training • Oil filter and Cooler • Motor Assembly Starter • Generator Assembly • Diesel Injector • Injector fuel • Turbo Charger assembly • A/C Compressor • High Pressure pump • Strut Assy. Front • Cut section Engine • Pump Assembly Fuel • Column Assembly with EPS • Brake Booster • Absorber Assy. Rear • CNG Regulator	1 no. each
47.	Manufacturing line with all modern manufacturing techniques and equipment to facilitate Hands on training for the students • Blanking line • Stamping presses • Weld shop fully equipped with welding equipment • Paint shop with all equipment and process • Assembly shop slat and overhead conveyors • Vehicle Testing line (head light, brake, drum and emission tester)	
48.	Welding Simulator	1 no.

49.	Painting Simulator	1 no.
50.	Simulator for Fitting and assembly of fasteners	30 nos.

ABBREVIATIONS

CTS	Craftsmen Training Scheme
ATS	Apprenticeship Training Scheme
CITS	Craft Instructor Training Scheme
DGT	Directorate General of Training
MSDE	Ministry of Skill Development and Entrepreneurship
NTC	National Trade Certificate
NAC	National Apprenticeship Certificate
NCIC	National Craft Instructor Certificate
LD	Locomotor Disability
CP	Cerebral Palsy
MD	Multiple Disabilities
LV	Low Vision
HH	Hard of Hearing
ID	Intellectual Disabilities
LC	Leprosy Cured
SLD	Specific Learning Disabilities
DW	Dwarfisms
MI	Mental Illness
AA	Acid Attack
PwD	Person with disabilities