

**GOVT. OF NCT OF DELHI
DEPARTMENT OF TRAINING AND TECHNICAL EDUCATION
INDUSTRIAL TRAINING INSTITUTE,
ARAB KI SARAI, NEW DELHI -110013
CIRCULAR**

Subject: **Setting up a Laboratory Automobile Trade**

We are looking for a vendor/supplier for providing Machinery, Tools and Equipment to set up a Automobile Lab in the Institute and also provide estimated rates for the same.

Sealing tenders are hereby invited from reputed and experienced firms/agencies having expertise in establishing technical laboratories for Industrial Training Institute for setting up a Automobile Trades Laboratory at ITI AKS, Nizamuddin, New Delhi.

Scope of Work:

Supply, installation and commissioning of equipment, tools and furniture required for Mechanical Trades (such as Fitter, Turner, Machinist and related trades) as per specification mentioned in the tender document.

Eligibility Criteria:

The bidder must be a registered firm/ company with a valid GST and PAN. Minimum three years of experience in supply and setup of Automobile Lab in educational or training Institution.

The bidder must have executed at least two similar works of Rs.10 Lakhs or above in the last three financial years.

Tender Details:

Tender No. ITI/ITI(AKS)/AutomobileLab/2025-26 _____

Estimated Cost : As per tender document EMD: Rs. _____ (refundable)

Availability of Tender Document: From 27/02/ 2026 to 31/03 /2026 (on working days, between 10:00 am and 4:00 pm) at the office of the Principal, ITI AKS, Nizamuddin.

Date & Time of Opening of Tender: 31/03/ 2026 at 3:00 pm

Note:

The Principal, ITI AKS, Nizamuddin, reserves the right to reject any or all tenders without right to reject any or all tenders without assigning any reason thereof.

For further details and complete tender documents, please contact:

The Principal
ITI AKS, Nizamuddin
New Delhi – 110013
Email: itiaks2011@gmail.com

List of Equipment with Quantity

S.No	Description	Quantity
1	Training Simulators	1 Set
	1.1 LMV Driving Simulator	1 No.
	1.2 Two-Wheeler Driving Simulator	1 No.
	1.3 Three-Wheeler Driving Simulator	1 No.
	1.4 Paint Simulator (VR)	1 No.
	1.5 Welding Simulator (VR)	1 No.
2	Automotive Lab Training Equipment	1 Set
	2.1 Alternator Working Trainer	1 No.
	2.2 Anti Braking System Training Board	1 No.
	2.3 Air Bag Trainer	1 No.
	2.4 Car Steering Trainer	1 No.
	2.5 Lighting Training Board	1 No.
	2.6 Power Door Lock System Trainer	1 No.
	2.7 Power Window System Trainer	1 No.
	2.8 Working Model of Anti Braking System	1 No.
	2.9 MPFI fuel injection Trainer	1 No.
	2.10 Learning Facilitation Board	1 No.
3	Miscellaneous Works	
	3.1 Simulator & Equipment Cabins	As per Requirement.
	3.2 Electrical Works	As per Requirement.
	3.3 Air Conditioners	As Per Requirement
	3.4 Internet connectivity	Per Requirement
	3.5 UPS / Inverter System	As per Requirement.

Module-wise Technical Specifications

Technical Specifications for Driving & Skill Simulators

The scope shall include design, supply, installation, testing, commissioning, instructor training, and a minimum three-year onsite warranty support of a complete systems mentioned below with hardware, software, and accessories as applicable. Software Hardware glitches shall be covered in onsite warranty. Software updates shall be regularly required as applicable at no extra cost.

<u>S. No</u>	<u>Description</u>	<u>Quantity</u>
<u>1</u>	Training Simulators 1. The scope shall include design, supply, installation, testing, commissioning, instructor training, and a minimum three-year onsite warranty support of a complete Simulator system with hardware, software, and accessories.	1 Set
<u>1.1</u>	LMV Driving Simulator • Driving Car Simulator – LMV (Light Motor Vehicle) • Suitable for Indian driving conditions and Indian Motor Vehicle Act compliant. System Configuration & Hardware Specification Required 1. Display System I. Three (3) LED Monitors – minimum 22 inch. II. Field of View (FOV): Minimum 210 degrees III. Rear-view and left/right side mirrors displayed on screen 2 Computing System One Desktop PC with minimum configuration: I. Intel i5 Processor or similar II. 8 GB RAM III. 120 GB SSD IV. Dedicated Graphics Card – minimum 8 GB GDDR6 V. Windows 10 Pro or similar VI. Keyboard & Mouse one each VII. HDMI Cables and Power Cables as required 3. Simulator Frame & Body I. Open cabin arrangement with vehicle controls II. Frame made of MS structure with high-grade powder coating & CNC and laser cutting used in manufacturing for precision. III. FRP front cover	1 No.

	IV. Use of stainless-steel nuts, bolts, and fasteners 4. Features I. Adjustable driver seat (forward/backward) II. Steering wheel. III. Gear lever with 5 forward + 1 reverse gear IV. Accelerator, brake, and clutch pedals with industrial sensors V. Analog handbrake VI. Instrument cluster with dashboard VII. Ignition system (OFF–ACC–IGN–START) VIII. Seat belt with sensor & warning IX. Combination switch for lights, indicators, and horn. X. Wiper lever with all operating modes 5. Mechanical & Steering System I. Sensor-based gear system with neutral detection II. Force feedback steering with torque values III. Realistic steering resistance and vehicle behaviour. IV. High durability mechanical sub-systems 6. Vehicle Dynamics & Environment Simulation I. Simulation of acceleration, braking, clutch, steering, and gear behaviour II. Indian road environment with: a. Traffic signs and signals b. Traffic density and vehicle behaviour c. Realistic sound effects d. Compliance with Indian traffic rules 7. Software Features 7.1 Visual & Audio I. Interactive 3D graphics II. Indian roads, vehicles, buildings, and signage III. Realistic stereo sound including engine, horn, indicators, rain, braking, and crash sounds 7.2 Scenario Configuration Instructor shall be able to configure scenarios based on: I. Terrain (City, Hill, Highway, Rural) II. Traffic density (Low/Medium/High) III. Weather conditions (Clear, Rain, Fog, Snow, Storm) IV. Time of day (Dawn, Day, Dusk, Night) V. Hazard selection and review options 8. Training Modules	
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	I. Basic Learning (vehicle checks, controls, moving off) II. Intermediate Learning (manoeuvres, parking, intersections) III. Advanced Learning (terrain, weather, traffic complexity) IV. Defensive Driving V. Economic (Eco) Driving VI. RTO Track Simulation (minimum 8 track types) VII. Snow Driving Module 9. Assessment & Reporting I. Automatic evaluation of lane, speed, signal, clutch, brake, and gear errors II. Trainee registration and data storage III. Individual and monthly performance reports IV. System-generated assessment reports 10. Interfacing & Control System I. Microprocessor-based programmable I/O interface card II. Industry-standard embedded controller III. Reliable hardware–software integration & onsite resolution within warranty period.	
<u>1.2</u>	LMV Driving Simulator I. Two- Wheeler Simulator II. Suitable for Indian driving conditions and Indian Motor Vehicle Act compliant. System Configuration & Hardware Specification Required 1. Display System III. Three (3) LED Monitors – minimum 22 inch. IV. Field of View (FOV): Minimum 210 degrees V. Rear-view and left/right side mirrors displayed on screen 2Computing System VI. Desktop PC with minimum configuration: VII. Intel i5 Processor or similar VIII. 8 GB RAM IX. 120 GB SSD X. Dedicated Graphics Card – minimum 8 GB GDDR6 XI. Windows 10 Pro or similar XII. Keyboard & Mouse one each. XIII. HDMI Cables and Power Cables as required 3. Simulator Frame & Body	1 No.

	XIV. Open cabin arrangement with vehicle controls XV. Frame made of MS structure with high-grade powder coating & with CNC and laser cutting used in manufacturing for high precision. XVI. FRP front cover XVII. Use of stainless-steel nuts, bolts, and fasteners 4. Controls & Parts Integrated XXVIII. Two-wheeler chassis frame with riding seat XIX. Front and rear indicators XX. Gear shifting lever (1st to 5th gear) XXI. Handlebar/steering assembly XXII. Front hand brake with throttle XXIII. Clutch lever XXIV. Foot-operated rear brake pedal XXV. Ignition system with key position XXVI. Horn switch XXVII. Headlight and lighting control switch XXVIII. Left and right indicator switch 5. Mechanical & Steering System XXIX. Chassis mounting hardware structure XXX. Gear shifting sub-assembly XXXI. Steering sub-assembly XXXII. Accelerator, brake, and clutch assemblies with realistic resistance and response 6. Vehicle Dynamics & Environment Simulation XXXIII. High-end vehicle dynamics software based on mathematical modelling XXXIV. Simulation of acceleration, braking, clutch, steering, and gear behaviour XXXV. Indian road environment with: ○ Traffic signs and signals ○ Traffic density and vehicle behaviour ○ Realistic sound effects ○ Compliance with Indian traffic rules 7. Software Features 7.1 Visual & Audio XXXVI. Interactive 3D graphics XXXVII. Indian roads, vehicles, buildings, and signage XXXVIII. Realistic stereo sound including engine, horn, indicators, rain, braking, and crash sounds 7.2 Scenario Configuration	
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	Instructor shall be able to configure scenarios based on: XXIX. Terrain (City, Hill, Highway, Rural) - XL. Traffic density (Low/Medium/High) - XLI. Weather conditions (Clear, Rain, Fog, Snow, Storm) - XLII. Time of day (Dawn, Day, Dusk, Night) - XLIII. Hazard selection and review options 8. Training Modules - XLIV. Basic Learning (vehicle checks, controls, moving off) - XLV. Intermediate Learning (manoeuvres, parking, intersections) - XLVI. Advanced Learning (terrain, weather, traffic complexity) - XLVII. Defensive Driving - XLVIII. Economic (Eco) Driving - XLIX. RTO Track Simulation (minimum 8 track types) L. Snow Driving Module 9. Assessment & Reporting - LI. Automatic evaluation of lane, speed, signal, clutch, brake, and gear errors - LII. Trainee registration and data storage - LIII. Individual and monthly performance reports - LIV. System-generated assessment reports 10. Interfacing & Control System - LV. Microprocessor-based programmable I/O interface card - LVI. Industry-standard embedded controller - LVII. Reliable hardware–software integration & onsite resolution within warranty period.	
<u>1.3</u>	Three-Wheeler Driving Simulator 1. Three-wheeler Driving Simulator Requirements • Three-wheeler Driving simulator –designed for driver training applications. • Fully compliant with Indian driving conditions and provisions of the Motor Vehicles Act. 2. System Configuration & Hardware Specifications 2.1. Display System 1. Three (3) LED monitors of a minimum 22-inch size 2. Minimum 210-degree Field of View (FOV) for immersive driving experience 3. On-screen display of rear-view mirror and left/right side mirrors 2.2. Computing System I. Desktop computer with minimum specifications as	1 No.

	below: a. Intel Core i5 processor or higher b. Minimum 8 GB RAM c. Minimum 120 GB SSD d. Dedicated graphics card with minimum 8 GB GDDR6 memory e. Pre-installed Windows 10 Pro operating system II. Standard keyboard and mouse one each III. HDMI and power cables as required for complete system integration. 3. Simulator Frame & Body 1. Open-cabin simulator configuration fitted with vehicle controls 2. Frame constructed from mild steel (MS) structure with high-quality powder-coated finish for durability and corrosion resistance using CNC machining and laser cutting processes for high precision 3. FRP-based front body cover. 4. Use of stainless-steel nuts, bolts, and fasteners throughout the structure. 4. Controls & Integrated Components 1. Adjustable driver seat with forward and backward movement 2. steering wheel with a force feedback mechanism 3. Manual gear lever with five forward gears and one reverse gear 4. Accelerator, brake, and clutch pedals equipped with industrial-grade sensors 5. Analog handbrake system for realistic operation 6. Functional instrument cluster integrated with dashboard 7. Ignition system with standard positions: OFF – ACC – IGN – START 8. Seat belt with sensor-based warning system 9. Combination switch for headlights, indicators, and horn operation 10. Wiper control lever with all operational modes 5. Mechanical & Steering System 1. Sensor-based gear mechanism with accurate neutral position detection 2. Force feedback steering system calibrated to torque specifications 3. Realistic steering resistance and vehicle response behaviour 4. Robust and high-durability mechanical sub-systems	
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	designed for intensive training use 6. Vehicle Dynamics & Environment Simulation 1. High-end vehicle dynamics simulation software based on mathematical modelling 2. Realistic simulation of vehicle acceleration, braking, clutch operation, steering, and gear shifting 3. Indian road traffic environment simulation, including: ○ Traffic signs and signal systems ○ Variable traffic density and realistic vehicle behaviour ○ Authentic sound effects ○ Full compliance with Indian traffic rules and regulations 7. Software Features 7.1 Visual & Audio 1. Interactive 3D graphical environment 2. Indian road layouts with realistic vehicles, buildings, and traffic signage 3. High-quality stereo sound effects including engine noise, horn, indicators, rain, braking, and collision sounds 7.2 Scenario Configuration The instructor shall be able to configure and customize driving scenarios based on the following parameters: 1. Terrain types – City, Hill, Highway, and Rural 2. Traffic density levels – Low, Medium, and High 3. Weather conditions – Clear, Rain, Fog, Snow, and Storm 4. Time-of-day modes – Dawn, Day, Dusk, and Night 5. Hazard selection and scenario review options 8. Training Modules 1. Basic Training Module – vehicle checks, familiarization with controls, and initial driving 2. Intermediate Training Module – manoeuvres, parking techniques, and intersection handling 3. Advanced Training Module – complex terrain, adverse weather, and dense traffic conditions 4. Defensive driving techniques 5. Economic (Eco) driving skill development 6. RTO track simulation with a minimum of eight (8) track configurations 7. Snow driving simulation module 9. Assessment & Reporting 1. Automated evaluation of lane discipline, speed	
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	compliance, signal adherence, clutch usage, braking, and gear shifting errors 2. Trainee registration and secure data storage facility 3. Individual trainee-wise and monthly consolidated performance reports 4. System-generated assessment and evaluation reports 10. Interfacing & Control System 1. Microprocessor-based, fully programmable I/O interface card 2. Industry-standard embedded controller for reliable system operation 3. Seamless and dependable hardware–software integration.	
<u>1.4</u>	Paint Simulator (VR) The Spray Paint & Coating Simulator is required for skill development and industrial training purposes. The system shall enable trainees to practice spray painting and coating operations in a safe, immersive, and controlled virtual environment, thereby reducing material wastage, health risks, and operational costs while improving skill accuracy and consistency. 1. System Description The simulator shall be a Virtual Reality (VR) based spray paint and coating training system, integrated with real paint gun hardware, assessment tools, and performance analytics. The system shall support immersive hands-on training with real-time feedback and evaluation. 2. Hardware Specifications 1. VR Headset ○ Standalone or PC-tethered VR headset (Meta Quest or equivalent) ○ Minimum 128 GB internal storage ○ Hand controllers with straps and batteries 2. Computer System ○ VR-compatible PC suitable for industrial simulation ○ Preconfigured for smooth VR application performance 3. Spray Gun Interface ○ Integration with real spray paint guns for a realistic hand-feel and operation ○ Physical interaction mapped accurately into the VR environment 4. Accessories ● Controllers, charging cables, power adapters, and connectivity accessories as required	1 No.

	5. Software Specifications 1. Spray Paint & Coating VR Application ○ Dedicated VR application for spray painting and coating processes ○ Realistic simulation of spray patterns, overlap, thickness, and movement 2. Assessment & Performance Evaluation ○ Built-in assessment system to evaluate trainee performance ○ Measurement of accuracy, coverage uniformity, spray distance, angle, and speed 3. Performance Reports ○ Automatic generation of trainee performance reports ○ Skill-wise evaluation and improvement tracking 4. Personalized Dashboard ○ Instructor and trainee dashboards for monitoring progress and results ○ Data visualization for training outcomes 5. Scalability ○ Application shall be usable across multiple systems, locations, and users without limitation	
<u>1.5</u>	Welding Simulator (VR) 1. Scope of Work The bidder shall supply, install, commission, and provide training for an Advanced Virtual Reality–based Welding Simulator suitable for skill development, training, and assessment of welding personnel. The system shall simulate real welding conditions using immersive VR technology and sensor-based feedback, enabling safe, cost-effective, and repeatable welding practice. 2. System Description The Virtual Welding Simulator shall be a computer-based, immersive virtual reality training system designed to replicate real welding processes, parameters, and positions. The simulator shall support multiple welding processes and provide real-time performance monitoring, post-weld analysis, and trainee record management. 3. Supported Welding Processes The simulator shall support at a minimum the following welding process: • Gas Metal Arc Welding (GMAW / MIG) • Gas Tungsten Arc Welding (GTAW / TIG) • Shielded Metal Arc Welding (SMAW / Stick)	1 No.

	4. Welding Parameters (Minimum) The simulator shall be capable of simulating and measuring the following welding parameters in real time: • Arc length • Welding speed • Work angle • Travel angle • Filler rod manipulation Deviation from ideal parameters shall be recorded and displayed for training and assessment purposes. 5. Welding Positions The system shall support training in standard plate and pipe welding positions, including but not limited to: • Plate Positions: 1F, 2F, 3F, 4F • Groove Positions: 1G, 2G, 3G, 4G, 5G, 6G 6. Simulation & Tracking Technology • The simulator shall use advanced sensor technology (electromagnetic and/or infrared-based) to track torch and filler rod movement. • Motion capture shall be precise, with minimal latency, ensuring accurate and realistic simulation of welding behaviour. • The virtual arc, weld pool, and bead formation shall dynamically respond to user actions. 7. Post-Weld Analysis & Evaluation The system shall provide comprehensive post-weld analysis, including: • Weld penetration assessment • Spatter level evaluation • Porosity indication • Overall weld quality score 8. Data Management & Reporting • The simulator shall include a database-driven training management system. • Individual trainee records shall be stored and retrievable at any time. • Training history, performance reports, and assessment results shall be exportable for evaluation and certification purposes. 9. Hardware Components Specification The system shall include: 1. Virtual Welding Simulator main unit	
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	2. VR Headset / Helmet suitable for industrial training use 3. Sensor system with mounting stand 4. Welding torches for GMAW, GTAW, and SMAW 5. Physical filler rods (training type) 6. Welding table 7. Practice welding coupons 8. Required computing hardware and interface units 9. Software Requirements • Real-time monitoring software displaying welding parameters during operation • Simulation software supporting multiple welding processes and positions • Post-weld analysis and reporting software • User-friendly interface suitable for instructors and trainees Software licenses shall be perpetual with updates at no extra cost.	
<u>2</u>	Automotive Lab Training Equipment	1 Set
<u>2.1</u>	Alternator Working Trainer This Alternator Working Trainer shall provide a better understanding of the construction and working principle of an alternator. This Trainer shall comprise an alternator, a V-belt pulley system, and a control panel. This Trainer shall provide the real-time fault analysis and testing. This Trainer shall Achieve the following learning objectives: 1. Study Voltage Regulation at different loads. 2. Observe the AC generation in the rectification of DC. 3. Learn the charging system operation. 4. Perform fault diagnosis and testing. Specification ▪ Alternator uses for testing. ▪ Driven by 220VAC electric motor capacity 0.5hp single phase. ▪ Built-in voltmeter range 0- 12volts and ammeter range 0- 45AH ▪ Standard electrical control switches respective indicators. ▪ Drive belt enclosed in safety shield ▪ Test points for diagnosis with banana pins. ▪ External regulation	1 No.
<u>2.2</u>	Abs Braking System Training Board Simulator This Training Simulator shall provide the working of the Anti-Lock Braking System. This Trainer shall allow learners to work on a real model to better understand the ABS. This trainer shall achieve	1 No.

	the following key objectives: 1 Understand ABS Theory and Operation. 2. Study wheel speed sensing and ECU logic 3. Learn how ABS prevents wheel locking during braking. 4. Practical Troubleshooting and fault diagnosis. 5. ABS warning lamp operation. Specification • Electric wiring diagram with built – in banana plug jumpers for measurements and simulation of the system's fault codes • Clearly visible, fully functional braking system and its components • Cross-diagonal hydraulic braking system with front and rear discs with callipers • Functional parking brake • Functional electronic ABS • Functional brake booster • With installed pressure gauges, the pressure in the brake circuit of each wheel. • Brake rigs can be used for mechanical service and repair training • On-board diagnostic capabilities • Diagnosis through the diagnostic connector • Electronic control unit (ECU) identification • Reading/erasing fault codes • Displaying the operating system parameters (live data) • Activating the actuators (Depends on the control unit) • 12 V Battery or 220/12 V power supply unit	
<u>2.3</u>	Air Bag Trainer The Air Bag Trainer shall be a demonstration and training unit designed to explain the working principle, construction, deployment logic, safety system, and diagnostics of automotive air bag systems used in modern vehicles. The trainer shall be suitable for hands-on training, fault simulation, and classroom demonstration. This Trainer shall enable learners to achieve the following aspects: 1. Understand the SRS airbag system architecture. 2. Identify components and wiring. 3. Perform Fault diagnosis and troubleshooting. 4. Understand safety precautions during servicing. Specification • A real and operable air bag system is used to illustrate the structure of the system. • Small vehicles are operated to crash into each other, simulating a traffic accident. In this way, the device	1 No.

	demonstrates the operation of the airbag system. • The training bench is made of mild steel fabrication. • Plastic plate, the colour circuit diagram, and the working principle diagram are painted on the board's surface. • Instead of using accumulators and requiring additional compressed air charging, the training panel connects to a 220V AC voltage, which changes to a 12V DC voltage through the internal circuit. The 12V DC voltage protects the training panel against a short circuit.	
<u>2.4</u>	Car Steering Trainer The Car Steering Trainer shall be a demonstration and practical training unit designed to explain the construction, working alignment, and steering geometry of a modern passenger car steering system. The trainer shall allow learners to understand manual and power steering operation through hands-on practice. This trainer shall achieve the following objectives: 1. Identify steering system components. 2. Understand the working of manual and EPS systems. 3. Observing steering geometry and wheel movement. 4. Perform basic inspection and troubleshooting. Specification • Pin-Out box fitted using 2mm sockets, enabling real-time values to be taken without compromising the wiring harness. • Jacks fitted beneath the road wheels to load the suspension. • diagnostic socket (16 pin) • Ammeter fitted to observe current draw. • Rotating parts covered by mesh guards. • Board mounted in a box section frame with castors • Powder-coated paint finish • Supply voltage: - 12V DC	1 No.
<u>2.5</u>	Lighting Training Board Simulator The Lighting Training Board Simulator shall be a panel-mounted educational trainer designed to demonstrate the working, wiring, control, and fault analysis of automotive lighting systems used in passenger cars. The trainer must be suitable for hands-on practical training. This shall help in achieving the following aspects: 1. Understand automotive lighting circuits. 2. Identify components and symbols 3. Read wiring diagrams 4. Diagnose and rectify lighting faults 5. Follow safety procedures during electrical work	1 No.

	SPECIFICATION • Installation of simulator in a mobile Mild steel frame. • Electric wiring diagram with built – in banana plug jumpers for measurements and connecting or disconnecting the components • Adjustable beam levels with the motors of the front headlights • Possible adjustments training with the headlight tester. • Electronic control unit (ECU) identification. • 12 V battery • 220/12 V Power supply unit	
2.6	Power Door Lock System Trainer The Power Door Lock System Trainer shall be a fully functional training rig incorporating actual automotive door lock components, wiring harnesses, diagnostic testing points, and fault insertion capabilities. It shall allow demonstration and student practice, including lock/unlock via switches, fault simulation, service manual testing procedures, and signal measurement. This trainer shall help students to achieve the following aspects: 1. Lock/Unlock operations via switches and remote key fob simulation. 2. Allow the diagnosis of common faults using built-in fault insertion. 3. Allow voltage /resistance / current tests at diagnostic points to teach troubleshooting. SPECIFICATION ▪ Power door lock actuators. ▪ Door lock relay. ▪ Fault box with 4 faults. ▪ Test points for diagnosis.	1 No.
2.7	Power Window System Trainer The Power Window System Trainer shall be a complete educational rig that represents an automotive power window assembly, including motor, regulator mechanism, control switches, wiring harness, and protection devices. It shall simulate real vehicle power window operation for training, testing, and troubleshooting. It shall provide the following outcomes: 1. Understanding the working of the automotive power window assembly. 2. Identify components and wiring layout. 3. Perform Voltage and continuity testing. 4. Diagnose common power window faults. 5. Understand safety and protection circuits. SPECIFICATION	1 No.

	• Power window motors (1ea). • Master and slave switches. • Fault box with 4 faults. • Test points for diagnosis	
<u>2.8</u>	Working Model of Abs Braking System The ABS working model shall demonstrate the complete working principle of an automotive Anti-Lock Braking System, including wheel speed sensing, electronic control, and brake pressure modulation to prevent wheel locking during braking. This model shall be designed for safe, repeated student operation and practical understanding. Students shall be able to perform the following: 1. Identify ABS components and layout. 2. Understand the ABS working principle. 3. Observe wheel speed variation during braking. 4. Study pressure modulation in ABS. 5. Perform basic fault diagnosis. SPECIFICATION • Cross-diagonal, hydraulic braking system with ABS system need to be installed in a mobile solid MS frame. • Trainer Shall be used for full mechanical service and repair operations of: ○ Front disc brakes ○ Rear drum brakes ○ Master Cylinder & Hydraulic system ○ ABS Electrical System ○ ABS Hydraulic Control unit ○ Parking Brake system ▪ Power requirements: 220V @ 10 amps	1 No.
<u>2.9</u>	MPFI Fuel Injection System Trainer The MPFI Demonstration Trainer shall be suitably designed to demonstrate the working principle, components, sensor inputs, actuator outputs, and electronic control of a modern automotive Multi-Point Fuel Injection (MPFI) system. The system shall operate in a safe, low fuel/ simulated mode, suitable for repeated student experimentation. The trainer shall achieve the following outcomes: 1. Identify MPFI components and their functions. 2. Understand electronic fuel injection principles. 3. Analyse sensor inputs and ECU control logic. 4. Observe injector operation. 5. Perform basic MPFI fault diagnosis.	1 No.

	SPECIFICATION - Fuel pump 12volts dc - Fuel tank 6ltr - Common rail injector manifold - Fuel pressure gauge - Fuel injector cutoff switch - Distributor coil - Battery 12volts - Fault box with 4 faults - Standard electrical switches	
2.10	Learning Facilitation Board Interactive Flat Panel Display with Built-in Android OS (or similar) for Educational / Training Use. 1. Display Specifications - Screen Size: 75 Inch - Display Technology: DLED / LED Backlit Panel - Native Resolution: 3840 × 2160 (4K UHD) - Aspect Ratio: 16:9 - Brightness: Minimum 450 nits - Contrast Ratio: Minimum 5000:1 - Viewing Angle: 178° Horizontal / Vertical - Refresh Rate: Minimum 60 Hz - Protective Glass: Toughened, Anti-Glare Glass (Minimum 3.2 mm) 2. Touch Technology - Touch Type: Infrared (IR) Multi-Touch - Touch Points: Minimum 40 Touch Points - Simultaneous Writing: Minimum 20 Points - Touch Accuracy: ≤ 1 mm - Touch Response Time: ≤ 8 ms - Input Methods: Finger, Stylus, Passive Pen 3. Operating System & Hardware - Built-in Operating System: Android 14 or Latest Available or similar - Processor: Octa-Core or Higher or similar - RAM: Minimum 8 GB - Internal Storage: Minimum 128 GB - GPU: Integrated High-Performance Graphics 4. Google & App Ecosystem - Google EDLA Certified: Yes - Google Play Services Support: Yes - Compatibility with Google Classroom, Drive, Meet: Yes	1 No.

	5. Whiteboarding & Teaching Software The panel shall include built-in interactive whiteboard software with: • Infinite canvas whiteboard • Handwriting recognition • Shape & geometric tools • Annotation on any source • Subject-specific teaching tools • Text-to-Speech feature • Multi-language translation support • Cloud save & export (PDF/Image) • Support for 2D & 3D educational content • Curriculum content support 6. AI-Based Features • AI-enabled content assistance • Circle-to-Search / Object recognition • AI Smart Mapping for concept visualization • AI Topic structuring for lessons • Doodle-to-Content conversion • AI-assisted video learning tools • Live subtitles with real-time multilingual translation • 7. Audio System • Built-in Speakers: Dual Speakers • Output Power: Minimum 2 × 20W • Audio Clarity suitable for a classroom environment 8. Connectivity & Ports Minimum Required Ports: • HDMI IN: 3 Nos. or more • HDMI OUT: 1 No. • USB Type-A: 3 Nos. or more • USB Type-C: 1 No. (with data & display support) • Audio IN / OUT: Yes • LAN (RJ-45): 1 No. • RS-232: 1 No. Wireless Connectivity: • Wi-Fi: Built-in • Bluetooth: Built-in 9. Wireless Screen Sharing • Built-in wireless screen sharing (No external dongle required) • Support for Android, iOS, Windows & macOS devices or similar platforms. • Multiple device casting support	
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	10. Device Management System - Centralized Device Management System (DMS) - Remote monitoring & control - OTA firmware/software updates with no extra cost. 11. OPS / PC Compatibility - OPS Slot - Support for Intel-based OPS PC or similar - Seamless switching between Android & OPS is required. 12. Accessories Supplied - Wall Mount Bracket / Mobile Stand (As per requirement and space availability) - Stylus / Writing Pens: Minimum 2 Nos. - Power Cable & Required Connectors as required.	
<u>3</u>	CIVIL, ELECTRICAL & IT WORKS	
<u>3.1</u>	Simulator & Equipment Cabins Cabin size: - 595 sq. ft. 555 sq. ft. 340 sq. ft. 580 sq. ft. 560 sq. ft. 444 sq. ft. (Approx as per preliminary measurements)	Can be modified as per requirement with consent of HOO .
<u>3.2</u>	Electrical Works	As per requirement. Only high quality parts & wires to be used.
<u>3.3</u>	Air Conditioners 3-star 1.5-ton inverter split ac	5 Nos.
<u>3.4</u>	Internet connectivity (3 Years period)	As per requirement.
<u>3.5</u>	UPS / Inverter System (online) as per combined wattage of above equipment.	As per requirement