****

**REPUBLIC OF KENYA**

**COMPETENCY BASED MODULAR CURRICULUM**

**FOR**

**MOTOR VEHICLE ELECTRICS**

**KNQF LEVEL 3**

**PROGRAMME CODE: 0716 254A**

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# FOREWORD

The provision of quality education and training is fundamental to the Government’s overall strategy for social and economic development. Quality education and training contribute to the achievement of Kenya’s development blueprint and sustainable development goals.

Reforms in the education sector are necessary to achieve Kenya Vision 2030 and meet the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution, and this resulted in the formulation of the Policy Framework for Reforming Education and Training in Kenya (Sessional Paper No. 14 of 2012). A key feature of this policy is the radical change in the design and delivery of TVET training. This policy document requires that training in TVET be competency-based, curriculum development be industry-led, certification be based on demonstration of competence, and the mode of delivery allow for multiple entry and exit in TVET programmes.

These reforms demand that Industry takes a leading role in curriculum development to ensure the curriculum addresses its competence needs. It is against this background that this curriculum has been developed. For trainees to build their skills on foundational hands-on activities of the occupation, units of learning are grouped in modules. This has eliminated duplication of content and streamlined exemptions based on skills acquired as a trainee progresses in the up-skilling process, while at the same time allowing trainees to be employable in the shortest time possible through the acquisition of part qualifications.

It is my conviction that this curriculum will play a great role in developing competent human resources for the Automotive Engineering Sector’s growth and development.

**PRINCIPAL SECRETARY**

**STATE DEPARTMENT FOR TVET**

**MINISTR OF EDUCATION**

# PREFACE

Kenya Vision 2030 aims to transform Kenya into a newly industrializing middle-income country, providing high-quality life to all its citizens by the year 2030. Kenya intends to create globally competitive and adaptive human resource base to meet the requirements of a rapidly industrializing economy through lifelong education and training. TVET has a responsibility to facilitate the process of inculcating knowledge, skills, and worker behaviour necessary for catapulting the nation to a globally competitive country, hence the paradigm shift to embrace Competency-Based Education and Training (CBET).

TVET Act, CAP 210A and Sessional Paper No. 1 of 2019 on Reforming Education and Training in Kenya for Sustainable Development emphasized the need to reform curriculum development, assessment, and certification. This called for a shift to CBET to address the mismatch between skills acquired through training and skills needed by industry, as well as increase the global competitiveness of the Kenyan labour force.

This curriculum has been developed in adherence to the Kenya National Qualifications Framework and CBETA standards and guidelines. The curriculum is designed and organized into Units of Learning with Learning Outcomes, suggested delivery methods, learning resources, and methods of assessing the trainee’s achievement. In addition, the units of learning have been grouped in modules to concretize the skills acquisition process and streamline upskilling.

I am grateful to all expert trainers and everyone who played a role in translating the Occupational Standards into this competency-based modular curriculum.

**CHAIRMAN**

# ACKNOWLEDGMENT

This curriculum has been designed for competency-based training and has independent units of learning that allow the trainee flexibility in entry and exit. In developing the curriculum, significant involvement and support were received from expert trainers, institutions and organizations.

I recognize with appreciation the role of the Automotive Engineering National Sector Skills Committee (NSSC) in ensuring that competencies required by the industry are addressed in the curriculum. I also thank all stakeholders in the Automotive sector for their valuable input and everyone who participated in developing this curriculum.

I am convinced that this curriculum will go a long way in ensuring that individuals aspiring to work in the Automotive Sector acquire competencies to perform their work more efficiently and effectively.

**COUNCIL SECRETARY/CEO/PRINCIPAL**

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# ABREVIATIONS AND ACRONYMS

**KCSE** Kenya Certificate of Secondary Education

**KNQF** Kenya National Qualifications Framework

**TVETA** Technical, Vocational Education and Training Authority

**ISCED**  International Standard Classification of Education

# KEY TO ISCED UNIT CODE



# COURSE OVERVIEW

Motor Vehicle Electrics 3 Qualification consists of competencies that an individual must have to carry out servicing of motor vehicle electrical systems. It entails vehicle starting system maintenance, vehicle charging system maintenance and vehicle lighting system maintenance.

The units of learning comprising Motor Vehicle Electrics Level 3 qualification include the following:

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit Code** | **Unit Title** | **Duration in Hours** | **Credit Factor** |
| 0716 251 01A | Vehicle Starting Systems Servicing | 130 | 12.0 |
| 0716 251 02A | Vehicle Charging System Maintenance | 110 | 11.0 |
| 0716 251 03A | Vehicle Lighting System Maintenance | 110 | 11.0 |
|  | Industrial Attachment | 240 | 24.0 |
| **Grand Total** | | **590** | **59.0** |

**Entry Requirements**

An individual entering this course should have any of the following minimum requirements:

1. Kenya Certificate of Primary Education (KCPE) or Junior Secondary Education

**Or**

1. Any other qualification equivalent to KNQF level 2 qualification as determined by TVETA

**Trainer qualifications**

A trainer for any of the units of competency in this course must:

1. Have a minimum of KNQF Level 5 Certificate in Automotive Technology or its equivalent.
2. Licensed by TVETA
3. Registered by Engineer Board of Kenya (E.B.K) or Kenya Engineering Technology Registration Board (KETRB).

**Industry Placement/Training**

An individual enrolled in this course will be required to undergo Industry training for a minimum period of 240 hours in Automotive sector. The industrial training may be taken after completion of all units for those pursuing the full qualification or be distributed equally in each unit for those pursuing part qualification. In the case of dual training model, industrial training shall be as guided by the dual training policy.

**Assessment**

The course shall be assessed formatively and summatively:

1. During formative assessment all performance criteria shall be assessed based on performance criteria weighting.
2. Number of formative assessments shall minimally be equal to the number of elements in a unit of competency
3. Assessment of basic and common competencies shall be integrated in the core units
4. Theoretical assessment shall be integrated in practical assessment and conducted orally in both formative and summative assessments.
5. Theoretical and practical weight shall be 10:90 respectively for each unit of learning.
6. Formative and summative assessments shall be weighted at 60% and 40% respectively in the overall unit of learning score
7. Assessment performance rating for each unit of competency shall be as follows:

|  |  |
| --- | --- |
| **MARKS** | **COMPETENCE RATING** |
| 80 -100 | Attained Mastery |
| 65 - 79 | Proficient |
| 50 - 64 | Competent |
| 49 and below | Not Yet Competent |
| Y | Assessment Malpractice/irregularities |

1. Assessment for Recognition of Prior Learning (RPL) may lead to award of part and/or full qualification.

**Certification**

A candidate will be issued with a Certificate of Competency upon demonstration of competence in a core Unit of Competency. To be issued with KenyaNational TVET Certificate in Motor Vehicle Electrician Level 3 the candidate must demonstrate competence in all the Units of Competency as given in the qualification pack. A Statement of Attainment certificate may be issued upon demonstration of competence in a certifiable element within a unit.

The certificates will be issued by the Qualification Awarding Institution

# VEHICLE STARTING SYSTEMS SERVICING

**UNIT CODE: 0716 251 01A**

**UNIT DURATION: 130** Hours

**Unit Description**

This unit specifies competencies required to service vehicle starting system. It involves repairing starting system, servicing ignition system, testing ignition system and performing housekeeping.

**Summary of Learning Outcomes**

|  |  |  |
| --- | --- | --- |
| **S/No.** | **Learning Outcomes** | **Duration (Hours)** |
|  | Apply Basic Concepts of Electrical Quantities | 20 |
|  | Motor Vehicle Battery Service | 40 |
|  | Starting System Repair | 60 |
|  | Perform Housekeeping | 10 |

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| * 1. Apply Basic Concepts of Electrical Quantities | 1. SI units    * 1. Voltage      2. Current      3. Resistance      4. Power      5. Capacitance      6. Inductance 2. Electrical quantities 3. Voltage 4. Current 5. Resistance 6. Power 7. Capacitance 8. Inductance 9. Ohms law    * 1. Definition and application 10. Power 11. Resistivity 12. Measuring instruments for electrical quantities 13. Multimeter 14. Ammeter 15. Voltmeter |  |
| * + - 1. Motor Vehicle Battery Service | * 1. Workshop safety and organization      1. Workshop safety      2. Waste disposal      3. Use of PPE’s   2. Tools and equipment      1. Screw driver      2. Ratchet and socket set      3. Wrench      4. Multi-meters      5. Hydrometer      6. High-rate discharge tester      7. Battery charger      8. Test lamp   3. Battery types      1. Lead acid batteries      2. Maintenance-free      3. Electric Vehicle batteries   4. Battery construction   5. Battery charging and discharging   6. Battery testing      1. Hydrometer test      2. High-rate discharge test   7. Battery maintenance      1. Battery terminals      2. Cell topping up | * Oral questioning * Practical tests * Supervised exercises * Written tests * Projects * Learner portfolio of evidence. |
| * + - 1. Starting System Repair | * 1. Workshop safety and organization      1. Workshop safety      2. Waste disposal      3. Use of PPE’s   2. Tools and equipment      1. Screw driver      2. Ratchet and socket set      3. Wrench      4. Multi-meters      5. Hydrometer      6. High-rate discharge tester      7. Battery charger      8. Growler      9. Test lamp   3. Types of starter motors      1. Pre-engaged      2. Inertia engaged      3. Axial starter motors      4. Co axial motor      5. Gear reduction-single   4. Starting system components      1. Starter motor      2. Solenoid      3. Ignition switch   5. Starter motor electrical checks      1. Battery Terminals      2. Battery Cables      3. Starter Motor      4. Ignition switch   6. Wiring connections | * Oral questioning * Practical tests * Supervised exercises * Written tests * Projects * Learner portfolio of evidence. |
| * + - 1. Perform House Keeping | * 1. Waste disposal      1. Old ignition coil      2. Old spark plugs      3. Re-use old cables      4. Recycle old batteries   2. Tools and equipment cleaning   3. Tools and equipment storage   4. General work area organization | * Assignments * Oral questioning * Practical tests * Written tests * Projects * Learner portfolio of evidence. |

**Suggested Methods of Instruction**

* Practical
* Projects
* Demonstrations
* Group discussions
* Direct instructions

The delivery may also be supplimented and ehanced by the following , if the opportunity allows;

* + Visiting trainer from the motor vehicle service and repair sector
  + Industrial visits

**Recommended Resources for 25 Trainees**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/No.** | **Category/Item** | **Description/Specifications** | **Quantity** | **Recommended Ratio** (Item: Trainee) |
| **A** | **Learning Materials** |  |  |  |
| 1 | Textbooks | -Comprehensive texts on automotive electrical service.  -Manuals | 5 pcs | 1:5 |
| 2 | Charts | Visual aids covering braking and safety protocols | 10 pcs | 1:2.5 |
| 3 | Power Point Presentations | For trainer’s use, covering course content and practical applications | 1 | 1:25 |
| **B** | **Learning Facilities & Infrastructure** |  |  |  |
| 1 | Lecture/Theory Room | Equipped with projectors and seating for 25 trainees, ~60 sqm | 1 | 1:25 |
| 2 | Workshop | Hands-on training area with workbenches, tools, and safety equipment, ~80 sqm | 1 | 1:25 |
| 3 | Computer Laboratory | Equipped with internet access | 5 | 1:5 |
| **C** | **Consumable Materials** |  |  |  |
|  | First aid kit |  | 5 pieces | 1:5 |
|  | Battery sulphuric acid | For replacing during service | 10 litres | 2:5 |
|  | Distilled water | For replacing during service | 10 litres | 2:5 |
|  | Insulating tape | For repairing components | enough |  |
|  | Soldering wire | For repairing components |  |  |
|  | Paraffin | For cleaning components during services | 10 litres | 2:5 |
|  | Cable ties | For cables harnessing | enough |  |
|  | Switches | For replacing during service | 5 pcs | 1:5 |
|  | Cotton waste | For cleaning components | 1 bag |  |
|  |  |  |  |  |
| **D** | **Tools and Equipment** |  |  |  |
|  | Complete vehicle | For servicing electrical components | 1 | 1:25 |
|  | Vehicle starting system model | For demonstrations | 1 | 1:25 |
|  | Test lamp/Multimeter | For testing | 5 | 1:5 |
|  | Battery charger | For charging battery | 2 | 1:13 |
|  | Complete combination cabinet toolbox | Assorted sets for various applications | 5 cabinets | 1:5 |
|  | Trolley jacks | For lifting the vehicle | 2 | 1:12.5 |
| **E** | **PPE (Personal Protective Equipment)** |  |  |  |
| 1 | PPE Sets | Includes gloves, safety boot, and overall/ dust bin | 25 sets | 1:1 |
| 2 | Safety Signs and Barriers | For simulating safety zones and hazards | 10 sets | 1:2.5 |
| 3 | Wheel chokes | For choking wheels while servicing | 8 pieces | 1:3 |
|  |  |  |  |  |
| **F** | **Reference Materials** |  |  |  |
| 1 | Vehicle manuals | Covering principles and practices in vehicle electrical system | 25 pcs | 1:1 |
| 3 | Technical Handbooks | On vehicle fuel service | 25 pcs | 1:1 |
| 4 | Training Presentations/Slides | Digital format for shared access among trainees | 1 | 1:25 |
| 5 | Multimedia Learning Modules | Digital licenses for videos and tutorials | 25 pcs | 1:1 |
| 6 | Practical Assessment Guides | Worksheets for practical assessments | 25 pcs | 1:1 |

# VEHICLE CHARGING SYSTEM MAINTENANCE

**UNIT CODE: 0716 251 02A**

**UNIT DURATION: 110** Hours

**UNIT DESCRIPTION**

This unit specifies competences required to maintain vehicle charging system. It involves inspecting charging system, servicing charging system, testing vehicle charging system and performing workshop housekeeping.

**Summary of Learning Outcomes**

|  |  |  |
| --- | --- | --- |
| **S/No.** | **Learning Outcomes** | **Duration (Hours)** |
|  | Apply Workshop Safety | 10 |
|  | Inspect Vehicle Charging System | 20 |
|  | Service vehicle charging system | 40 |
|  | Test vehicle charging system | 30 |
|  | Perform house keeping | 10 |

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Workshop Safety | * 1. Workshop safety      1. Definition      2. Types and uses of PPE’s   2. Emergence responses steps      1. Common emergencies         1. Fire         2. Chemical spills         3. Injury response   3. Fire safety      1. Fire extinguishers types and uses      2. Flammable materials identification      3. Fire prevention   4. Safe handling and disposal of chemicals and materials      1. Chemical hazard identification      2. Safe handling procedure      3. Storage and labelling of chemicals      4. Chemical disposal procedures      5. Emergency response for chemical exposure   5. Identifying and marking hazardous zones      1. Common hazardous zones         1. Flammable zones         2. High traffic zones         3. Electrical hazard zones         4. Chemical storage areas   6. Work area organization and maintenance      1. Setting up      2. Proper storage and labelling of tools and equipment   7. Workplace hazards      1. Physical hazards         1. Noises         2. Vibration         3. Heat         4. Sharp object      2. Chemical hazards         1. Fuels         2. Oils         3. Cleaning agents      3. Electric hazards         1. Live wires         2. Batteries         3. Electrical systems   8. Workshop accidents, causes and responses      1. Slip, strips and falls      2. Cuts and abrasion      3. Burns      4. Electrical shocks | * Written tests. * Practical * Project * Portfolio of evidence   Third party report |
| 1. Vehicle Charging System Inspection | 1.1 Safety precautions in the vehicle charging system  1.1.1 Use of PPE’s  1.2 Tools and equipment  1.2.1 Multimeter  1.2.4. Wire stripper  1.3 Charging system inspection  1.3.1 Alternator  1.3.2 Battery  1.3.3 Electrical Cables  1.3.4 Fuses  1.3.5 Drive Belt  1.3.6 Wiring  1.3.7 Brushes  1.3.8 Relay | * Oral questioning * Practical tests * Supervised exercises * Written tests * projects * Learner portfolio of evidence. |
| 1. Vehicle Charging System Servicing | 2.1 Charging system service  2.1.2 Ignition Switch  2.2.3 Warning light circuit  2.2.4 Rectifier-9 diode type  2.2.5 Voltage Regulator  2.2.5.1. Mechanical  2.2.5.2. Electronic  2.3 Alternator service  2.3.1 Dismantling  2.3.2 Parts identification  2.3.3 Alternator tests  2.3.3.1 Continuity test  2.3.3.2 Ground test  2.3.4 Brush replacement  2.3.5 Alternator assembly | * Oral questioning * Practical tests * Supervised exercises * Written tests * Projects * Learner portfolio of evidence. |
| 1. Vehicle Charging System Testing | * 1. Charging system test  1. Voltage Output Test 2. Regulator Tests 3. AC Leakage Test 4. Current Output Test 5. Diode Checks | * Written test * Observation * Oral questioning * Learner portfolio of evidence. |
| 1. Housekeeping | 4 1. Waste disposal   * + 1. Waste battery acid     2. Waste alternator belt   4.2 Tools and equipment cleaning  4.3 Tools and equipment storage  4.4 Workplace area organization | * Oral questioning * Practical tests * Written tests * Projects * Learner portfolio of evidence. |

**Recommended Resources for 25 Trainees**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/No.** | **Category/Item** | **Description/Specifications** | **Quantity** | **Recommended Ratio** (Item: Trainee) |
| **A** | **Learning Materials** |  |  |  |
| 1 | Textbooks | -Comprehensive texts on automotive electrical service.  -Manuals | 5 pcs | 1:5 |
| 2 | Charts | Visual aids covering braking and safety protocols | 10 pcs | 1:2.5 |
| 3 | Power Point Presentations | For trainer’s use, covering course content and practical applications | 1 | 1:25 |
| **B** | **Learning Facilities & Infrastructure** |  |  |  |
|  | Lecture/Theory Room | Equipped with projectors and seating for 25 trainees, ~60 sqm | 1 | 1:25 |
|  | Workshop | Hands-on training area with workbenches, tools, and safety equipment, ~80 sqm | 1 | 1:25 |
|  | Computer Laboratory | Equipped with internet access | 5 | 1:5 |
|  |  |  |  |  |
| **C** | **Consumable Materials** |  |  |  |
|  | First aid kit |  | 5 pieces | 1:5 |
|  | Battery sulphuric acid | For replacing during service | 10 litres | 2:5 |
|  | Distilled water | For replacing during service | 10 litres | 2:5 |
|  | Insulating tape | For repairing components |  |  |
|  | Soldering wire | For repairing components |  |  |
|  | Paraffin | For cleaning components during services | 10 litres | 2:5 |
|  | Cable ties |  |  |  |
|  | Switches | For replacing during service | 5 pcs | 1:5 |
|  | Cotton waste | For cleaning components | 1 bag |  |
|  |  |  |  |  |
| **D** | **Tools and Equipment** |  |  |  |
|  | Complete vehicle | For servicing electrical components | 1 | 1:25 |
|  | Vehicle starting system model | For demonstrations | 1 | 1:25 |
|  | Vehicle ignition system model | For demonstrations | 1 | 1:25 |
|  | Test lamp/Multimeter | For testing | 5 | 1:5 |
|  | Battery charger | For charging battery | 2 | 1:13 |
|  | Spark plug testing machine | For testing spark plug functionality | 2 | 1:13 |
|  | OBD II scanner | For diagnosis | 5 | 1:5 |
|  | Oscilloscope | For diagnosis | 5 | 1:5 |
|  | Complete combination cabinet toolbox | Assorted sets for various applications | 5 cabinets | 1:5 |
|  | Trolley jacks | For lifting the vehicle | 2 | 1:13 |
| **E** | **PPE (Personal Protective Equipment)** |  |  |  |
|  | PPE Sets | Includes gloves, safety boot, and overall/ dust bin | 25 sets | 1:1 |
|  | Safety Signs and Barriers | For simulating safety zones and hazards | 10 sets | 1:2.5 |
|  | Wheel chokes | For choking wheels while servicing | 8 pieces | 1:3 |
|  |  |  |  |  |
| **F** | **Reference Materials** |  |  |  |
|  | Vehicle manuals | Covering principles and practices in vehicle electrical system | 25 pcs | 1:1 |
|  | Technical Handbooks | On vehicle fuel service | 25 pcs | 1:1 |
|  | Training Presentations/Slides | Digital format for shared access among trainees | 1 | 1:25 |
|  | Multimedia Learning Modules | Digital licenses for videos and tutorials | 25 pcs | 1:1 |
|  | Practical Assessment Guides | Worksheets for practical assessments | 25 pcs | 1:1 |

# VEHICLE LIGHTING SYSTEM MAINTENANCE

**UNIT CODE: 0716 251 03A**

**UNIT DURATION:** 110Hours

**UNIT DESCRIPTION**

This unit specifies competences required to maintain vehicle lighting system. It involves inspecting lighting system, servicing lighting system, testing vehicle lighting system and performing workshop housekeeping.

**Summary of Learning Outcomes**

|  |  |  |
| --- | --- | --- |
| **S/No.** | **Learning Outcomes** | **Duration (Hours)** |
|  | Inspect lighting system | 20 |
|  | Service vehicle lighting system | 40 |
|  | Test vehicle lighting system | 40 |
|  | Perform house keeping | 10 |
| **TOTAL** | | **110** |

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Inspect lighting system | 1.1. PPEs for lighting system  1.2. Lighting system inspection Tools and equipment  1.2.1. Multimeter  1.2.2. Test lamp  1.2.3. Battery charger  1.2.4. Beam setter  1.2.5. Assorted workshop tools  1.3. Lighting system physical checks   1. Cracks, damage or moisture 2. Bulbs 3. Wiring 4. Terminals 5. Connectors | * Oral questioning * Practical tests * Supervised exercises * Written tests * projects * Learner portfolio of evidence. |
| 1. Service vehicle lighting system | 2.1 Lighting system components  2.1.1 Head Lamps  2.1.2 Lamp types  2.1.3 Light fixtures  2.1.4 Switches  2.1.5 Flasher unit  2.1.6 Relays  2.1.7 Fuses  2.2 Lighting circuits  2.2.1 Main/dip beam  2.2.2 Reverse  2.2.3 Direction indicators  2.2.4 Hazard  2.2.5 Fog light  2.2.6 Day running light  2.3 Beam setting  2.3.1 Beam setting equipment  2.3.2 Beam setting  2.4 Lighting system diagnose  2.4.1 Connectors  2.4.2 Switches  2.4.2 Fuses  2.4.3 Relays | * Oral questioning * Practical tests * Supervised exercises * Written tests * Projects * Learner portfolio of evidence. |
| 1. Test vehicle lighting system | * 1. Lighting system assessment   3.1.1 Circuit continuity  3.1.3 Bulb functionality  3.1.4 Switches and controls  3.1.5 Voltage drop | * Written test * Observation * Oral questioning * Learner portfolio of evidence. |
| 1. Perform house keeping | 4. 1 Waste disposal  4.1.1 Waste bulbs  4.1.2 Re-use cables  4.2 Tools and equipment cleaning  4.3 Tools and equipment storage  4.4 Workplace area organization | * Assignments * Oral questioning * Practical tests * Written tests * Projects * Learner portfolio of evidence. |

**Recommended Resources for 25 Trainees**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/No.** | **Category/Item** | **Description/Specifications** | **Quantity** | **Recommended Ratio** (Item:Trainee) |
| **A** | **Learning Materials** |  |  |  |
| 1 | Textbooks | -Comprehensive texts on automotive electrical service.  -Manuals | 5 pcs | 1:5 |
| 2 | Charts | Visual aids covering braking and safety protocols | 10 pcs | 1:2.5 |
| 3 | Power Point Presentations | For trainer’s use, covering course content and practical applications | 1 | 1:25 |
| **B** | **Learning Facilities & Infrastructure** |  |  |  |
| 1 | Lecture/Theory Room | Equipped with projectors and seating for 25 trainees, ~60 sqm | 1 | 1:25 |
| 2 | Workshop | Hands-on training area with workbenches, tools, and safety equipment, ~80 sqm | 1 | 1:25 |
| 3 | Computer Laboratory | Equipped with internet access | 5 | 1:5 |
|  |  |  |  |  |
| **C** | **Consumable Materials** |  |  |  |
|  | First aid kit |  | 5 pieces | 1:5 |
|  | Insulating tape | For repairing components |  |  |
|  | Soldering wire | For repairing components |  |  |
|  | Paraffin | For cleaning components during services | 10 litres | 2:5 |
|  | Cable ties | Fow wire harnessing | enough |  |
|  | Switches | For replacing during service | 5 pcs | 1:5 |
|  | Cotton waste | For cleaning components | 1 bag |  |
|  | Vehicle lighting system bulbs | For making of the lighting circuits | enough |  |
|  | Assorted vehicle lighting system wires | For making of the lighting circuits | enough |  |
|  | Assorted vehicle lighting system bulb holders | For making of the lighting circuits | enough |  |
|  | Assorted vehicle lighting system relays | For making of the lighting circuits | enough |  |
|  | Assorted vehicle lighting system fuses | For making of the lighting circuits | enough |  |
| **D** | **Tools and Equipment** |  |  |  |
|  | Complete vehicle | For servicing electrical components | 1 | 1:25 |
|  | Motor vehicle fuse carrier | For fuse holding | 25 | 1:1 |
|  | Assorted lighting circuits boards | For making of the lighting circuits | 25 | 1:1 |
|  | Vehicle starting system model | For demonstrations | 1 | 1:25 |
|  | Vehicle ignition system model | For demonstrations | 1 | 1:25 |
|  | Test lamp/Multimeter | For testing | 5 | 1:5 |
|  | Battery charger | For charging battery | 2 | 1:12.5 |
|  | Complete combination cabinet toolbox | Assorted sets for various applications | 5 cabinets | 1:5 |
|  | Trolley jacks | For lifting the vehicle | 2 | 1:12.5 |
| **E** | **PPE (Personal Protective Equipment)** |  |  |  |
| 1 | PPE Sets | Includes gloves, safety boot, and overall/ dust bin | 25 sets | 1:1 |
| 2 | Safety Signs and Barriers | For simulating safety zones and hazards | 10 sets | 1:2.5 |
| 3 | Wheel chokes | For choking wheels while servicing | 8 pieces | 1:3 |
|  |  |  |  |  |
| **F** | **Reference Materials** |  |  |  |
| 1 | Vehicle manuals | Covering principles and practices in vehicle electrical system | 25 pcs | 1:1 |
| 3 | Technical Handbooks | On vehicle fuel service | 25 pcs | 1:1 |
| 4 | Training Presentations/Slides | Digital format for shared access among trainees | 1 | 1:25 |
| 5 | Multimedia Learning Modules | Digital licenses for videos and tutorials | 25 pcs | 1:1 |
| 6 | Practical Assessment Guides | Worksheets for practical assessments | 25 pcs | 1:1 |