



# **Tertiary and Vocational Education Commission**

## **National Competency Standards and Curriculum For Electrician (Domestic) -NVQ Level 3**

### Course synopsis

This course is designed to introduce the competencies required to perform electrical wiring of houses. Different types of electrical circuit are used by electrician to balance the load considering the type of appliances used. Electrician has to give due attention for the safety of self, others and properties because he/she is working with high voltage. Unsafe usage of high voltage electricity can cause for electrocution and fire. This course covers all the safety aspects.

Course Title	Course Duration
<b>Electrician</b>	<b>540 hrs. Institutional Training + 3 months OJT</b>
<p><b>Job outlook, objectives of the course and career paths available following completion of the course</b></p> <p>An <b>electrician</b> is a skilled person specializing in electrical wiring of buildings, stationary machines, and related equipment. Electricians may be employed in the installation of new electrical components or the maintenance and repair of existing electrical infrastructure. Electrician has to follow the regulations imposed by professional bodies such as IEE, IEEE.</p> <p>Today there is a high demand for electrician both locally and overseas. This course covers the nine (9) competency areas mentioned below which is essential for domestic electrician. Course duration is 540hours institutional training followed by three (3) months On the Job Training(OJT)</p> <p>After completion of the training student can work as an Electrician in private or public organization or he or she can be an entrepreneur.</p>	
<p><b>Competence-based modules to be covered:</b></p> <p><b>1. Basics of Electricity</b> This module covers the basic principles of electricity, electrical measuring instruments and calculation of voltage, current, resistance, power and energy in a given electrical circuit.</p> <p><b>2. Safety at work</b> This module covers the competencies required to ensure safe work practices to protect self, others and environment while working with electricity.</p> <p><b>3. Use electrical wiring diagrams</b> This module covers the competencies required to draw, read and interpret electrical wiring diagram to for a house as per the customer requirement and compliance with rules and regulations.</p> <p><b>4. Joint electrical cables for temporary installation</b> This module covers the competencies required to make different joints for temporary wire connections.</p> <p><b>5. Prepare for electrical wire installation</b> This module covers the competencies required to prepare walls and slabs for wiring according to the wiring and conduit diagrams.</p> <p><b>6. Install lighting circuits</b> This module covers the competencies required to install lighting circuits, in accordance with the electrical layout plan/wiring diagrams etc., conforming to standards and regulations, while ensuring safety of self, others and property including safety of the electrical installation.</p>	

**7. Install power circuits**

This module covers the competencies required to install power circuits, in accordance with the electrical layout plan/wiring diagrams etc., conforming to standards and regulations, while ensuring safety of self, others and property including safety of the electrical installation.

**8. Test and commissioning of electrical installation**

This module covers the competencies required to inspect and test domestic electrical installations, locate faults in the systems and rectify such faults, using specified tools, testing & measuring instruments and material. Carry out periodical tests conforming to standards & regulations, for safe performance of the installation, while ensuring safety of self, others and property.

**9. Repair and maintain domestic electrical equipment**

This module covers the competencies required to check, fault finding, service and repair domestic electrical equipment commonly used for domestic purposes.

**10. Prepare cost estimate for wiring**

This module covers the competencies required to estimate the total cost for single phase electrical wiring of a house.

**11. Career Skills including English Communication**

This module is compulsory in all NVQ Level 3 courses. It develops oral communication skills in English and helps students to prioritize their work and develop routines that contribute to efficiency.

<b>Module Title and Code:</b>	<b>Module 01: Basic Electricity.</b>
	<b>Time Frame: 30 hrs</b>
<b>Reference to NCS:</b>	
<p><b>Competencies (job functions and soft skills) and descriptions:</b></p> <p><b>At the end of this module trainee will be able to</b></p> <ol style="list-style-type: none"> <li>1. Measure voltage(V) , current(I) and resistance(R) in an electrical circuit</li> <li>2. Measure insulation resistance / conductivity in an electrical circuit</li> <li>3. Calculate the values of V, I, and R using Ohm's law</li> <li>4. Calculate Power (P) and Energy (E) consumption</li> </ol>	
<p><b>Typical related work situations to master:</b></p> <ul style="list-style-type: none"> <li>• Trainee has to measure V, I, and R in an actual circuit using multi-meter and clip-on meter</li> <li>• Trainee has to calculate equivalent resistance of series and parallel circuit, power and energy consumption in given circuit.</li> </ul>	
<p><b>Important pertinent Content (knowledge):</b></p>	<ul style="list-style-type: none"> <li>• Alternative Current (AC) / Direct Current (DC)</li> <li>• Generation and distribution of AC current</li> <li>• Definition and unit of measurement – V,I ,R, P and E</li> <li>• Measuring instruments</li> </ul>
<p><b>Potentially useful teaching methods (optional):</b></p>	<ul style="list-style-type: none"> <li>• Lecture/presentation</li> <li>• Demonstrations</li> <li>• Independent practice</li> <li>• Self-directed learning via tutorials and manuals</li> </ul>

<b>Module Title and Code:</b>	<b>Module 02: Safety at work</b>
	<b>Time Frame: 30 hrs</b>
<b>Reference to NCS:</b>	
<p><b>Competencies (job functions and soft skills) and descriptions:</b></p> <p><b>At the end of this module trainee will be able to</b></p> <ol style="list-style-type: none"> <li>1. Make aware of safety rules and regulations</li> <li>2. Select and use appropriate Personnel Protective Equipment (PPE)</li> <li>3. Identify and use different types of fire extinguishers</li> <li>4. Apply safety measures while working with electricity to protect self and others</li> <li>5. Provide First aid in an electric shock</li> <li>6. Identify hazards places where electricity leakage or fire can be occurred</li> </ol>	
<p><b>Typical related work situations to master:</b></p> <ul style="list-style-type: none"> <li>• Trainees must use PPE and safety sign boards at work place.</li> <li>• Trainees should have through knowledge on safety rules and regulation</li> </ul>	
<p><b>Important pertinent Content (knowledge):</b></p>	<ul style="list-style-type: none"> <li>• Safety rules and regulations</li> <li>• Personnel Protective Equipment</li> <li>• Safety symbols and colour codes</li> <li>• Types of fires and fire extinguishers</li> <li>• Basic first aid</li> </ul>
<p><b>Potentially useful teaching methods (optional):</b></p>	<ul style="list-style-type: none"> <li>• Presentations</li> <li>• Demonstrations</li> <li>• Project work</li> <li>• Self-directed learning via tutorials and manuals</li> </ul>

<b>Module Title and Code:</b>	<b>Module 03: Use wiring circuit Diagrams</b>
	<b>Time Frame: 60 hrs</b>
<b>Reference to NCS:</b>	
<p><b>Competencies (job functions and soft skills) and descriptions:</b></p> <p><b>At the end of this module trainee will be able to</b></p> <ol style="list-style-type: none"> <li>1. Read and interpret electric circuit diagrams</li> <li>2. Draw electrical circuit diagrams for a house according to customer requirement and rules and regulations of local authority</li> </ol>	
<p><b>Typical related work situations to master:</b></p> <ul style="list-style-type: none"> <li>• Read and interpret building electric circuit diagram</li> <li>• Prepare circuit diagram for a small house</li> <li>•</li> </ul>	
<p><b>Important pertinent Content (knowledge):</b></p>	<ul style="list-style-type: none"> <li>• Regulations (IEE regulations) used in preparing electric circuits</li> <li>• Local authorities regulations</li> <li>• Different symbols used in electric circuits</li> <li>• Symbols used for electric equipment</li> </ul>
<p><b>Potentially useful teaching methods (optional):</b></p>	<ul style="list-style-type: none"> <li>• Presentations</li> <li>• Self-directed learning via tutorials and manuals</li> <li>• Demonstrations</li> <li>• Project work</li> </ul>

<b>Module Title and Code:</b>	<b>Module 04: Joints electrical cable for temporary installation</b>
	<b>Time Frame: 30 hrs</b>
<b>Reference to NCS:</b>	
<p><b>Competencies (job functions and soft skills) and descriptions:</b></p> <p><b>At the end of this module trainee will be able to</b></p> <ol style="list-style-type: none"> <li>1. Identify wire classifications, colour code, wire size and ampere rating</li> <li>2. Identify insulators and conductors</li> <li>3. Make straight joint</li> <li>4. Make T-joint</li> <li>5. Make married joint</li> <li>6. Make straight lug joint</li> <li>7. Make T-lug joint</li> <li>8. Make straight joint using a ferrule</li> <li>9. Solder wire joint</li> <li>10. Insulate wire joints</li> </ol>	
<p><b>Typical related work situations to master:</b></p> <ul style="list-style-type: none"> <li>• Make joints without loose connection</li> <li>• Solder the joints firmly</li> </ul>	
<b>Important pertinent Content (knowledge):</b>	<ul style="list-style-type: none"> <li>• Regulations (IEE regulations) used for selecting wires for different purposes</li> <li>• Types of wire joints and the their uses</li> </ul>
<b>Potentially useful teaching methods (optional):</b>	<ul style="list-style-type: none"> <li>• Presentations</li> <li>• Self-directed learning via tutorials and manuals</li> <li>• Demonstrations</li> <li>• Individual practice</li> </ul>

<b>Module Title and Code:</b>	<b>Module 05: Prepare for electrical wire installation</b>
	<b>Time Frame: 30 hrs</b>
<b>Reference to NCS:</b>	
<p><b>Competencies (job functions and soft skills) and descriptions:</b></p> <p><b>At the end of this module trainee will be able to</b></p> <ol style="list-style-type: none"> <li>1. Read and Interpret wiring diagram for installation plan</li> <li>2. Mark electrical points on building</li> <li>3. Prepare conduit, material and accessories</li> <li>4. Lay P.V.C. conduits on walls and ceiling</li> <li>5. Lay P.V.C. conduits on slab</li> <li>6. Lay P.V.C. casing and capping</li> <li>7. Bend steel conduits</li> <li>8. Cut thread in steel conduits</li> <li>9. Cut holes using hole cutter set</li> <li>10. Lay steel conduits</li> <li>11. Install cable metal trunk</li> </ol>	
<p><b>Typical related work situations to master:</b></p> <ul style="list-style-type: none"> <li>• Read and interpret building electric circuit diagram</li> <li>• Prepare wall surface to lay conduit</li> <li>• Lay conduits on slab before concreting</li> </ul>	
<p><b>Important pertinent Content (knowledge):</b></p>	<ul style="list-style-type: none"> <li>• Regulations (IEE regulations) used in preparing electric circuits</li> <li>• Local authorities regulations</li> <li>• Different sizes of conduit and their applications</li> <li>• Hole cutters</li> <li>• Methods of thread cutting</li> </ul>
<p><b>Potentially useful teaching methods (optional):</b></p>	<ul style="list-style-type: none"> <li>• Presentations</li> <li>• Self-directed learning via tutorials and manuals</li> <li>• Demonstrations</li> <li>• Project work</li> </ul>



<b>Module Title and Code:</b>	<b>Module 06: Install lighting circuits</b>
	<b>Time Frame: 120 hrs</b>
<b>Reference to NCS:</b>	
<p><b>Competencies (job functions and soft skills) and descriptions:</b></p> <p><b>At the end of this module trainee will be able to</b></p> <ol style="list-style-type: none"> <li>1. Draw wiring circuit diagrams for lighting circuits</li> <li>2. Install single pole one-way switch circuit</li> <li>3. Install two-way switch circuit</li> <li>4. Install intermediate switch circuit</li> <li>5. Install impulse relay circuit</li> <li>6. Install stair case lighting timer switch circuit</li> <li>7. Install calling bell circuit</li> <li>8. Fix wall mounted lamp</li> <li>9. Fix chandelier lamp</li> <li>10. Fix pendent lamp</li> <li>11. Install security lamp circuit</li> <li>12. Install door opening circuit</li> <li>13. Install dimmer switch</li> </ol>	
<p><b>Typical related work situations to master:</b></p> <ul style="list-style-type: none"> <li>• Trainees must practice combination of different circuits</li> </ul>	
<p><b>Important pertinent Content (knowledge):</b></p>	<ul style="list-style-type: none"> <li>• Regulations (IEE regulations) used in preparing electric circuits</li> <li>• Local authorities regulations</li> <li>• Different sizes of wires and colour codes</li> <li>• Different circuits diagram</li> </ul>
<p><b>Potentially useful teaching methods (optional):</b></p>	<ul style="list-style-type: none"> <li>• Presentations</li> <li>• Self-directed learning via tutorials and manuals</li> <li>• Demonstrations</li> <li>• Project work</li> </ul>

<b>Module Title and Code:</b>	<b>Module 07: Install power circuits</b>
	<b>Time Frame: 90 hrs</b>
<b>Reference to NCS:</b>	
<b>Competencies (job functions and soft skills) and descriptions:</b>	
<p><b>At the end of this module trainee will be able to</b></p> <ol style="list-style-type: none"> <li>1. Draw wiring circuit diagrams for power circuits</li> <li>2. Install socket outlet circuit</li> <li>3. Install ring socket outlet circuit</li> <li>4. Install single phase distribution board</li> <li>5. Install exhaust fan</li> <li>6. Install wall fan</li> <li>7. Install ceiling fan</li> <li>8. Install domestic water pump</li> <li>9. Install automatic water level control system</li> <li>10. Install shaver sockets</li> <li>11. Install earth electrodes</li> </ol>	
<b>Typical related work situations to master:</b>	
<ul style="list-style-type: none"> <li>• Trainees must practice different power circuits in a building</li> </ul>	
<b>Important pertinent Content (knowledge):</b>	<ul style="list-style-type: none"> <li>• Regulations (IEE regulations) used in preparing electric circuits</li> <li>• Local authorities regulations</li> <li>• Different sizes of wires and colour codes</li> <li>• Different circuits diagram</li> </ul>
<b>Potentially useful teaching methods (optional):</b>	<ul style="list-style-type: none"> <li>• Presentations</li> <li>• Self-directed learning via tutorials and manuals</li> <li>• Demonstrations</li> <li>• Project work</li> </ul>

<b>Module Title and Code:</b>	<b>Module 8:</b>  <b>Test and commissioning of electrical installations.</b>  <b>Time Frame: 30 hrs</b>
<b>Reference to NCS:</b>	See Competency Profile of DTET (2016)
<b>Competencies (job functions and soft skills) and descriptions:</b>  <b>At the end of this module trainee will be able to</b> <ol style="list-style-type: none"> <li>1. Carryout visual inspection</li> <li>2. Carryout continuity and polarity testing</li> <li>3. Carryout insulation resistance testing</li> <li>4. Carryout phase sequence test</li> <li>5. Carryout earth resistance test</li> <li>6. Carryout RCD/RCCB test</li> <li>7. Prepare a test report.</li> </ol>	
<b>Typical related work situations to master:</b> <ul style="list-style-type: none"> <li>• Entire electrical installation of the house is to be tested in a newly constructed house.</li> <li>• An old house has been rewired or new part has been added to an existing house and new installation or part has to be tested.</li> </ul>	
<b>Important pertinent Content (knowledge):</b>	<ul style="list-style-type: none"> <li>• Visual inspection</li> <li>• Continuity tests including Ring circuits</li> <li>• Polarity test</li> <li>• Insulation tests</li> <li>• Earth electrode test</li> <li>• Phase sequence test</li> <li>• Test report</li> </ul>
<b>Potentially useful teaching methods (optional):</b>	<ul style="list-style-type: none"> <li>• Project work</li> <li>• Task- based Learning</li> <li>• Self-directed learning via tutorials and manuals</li> <li>• Demonstrations</li> <li>• Diary based presentations</li> </ul>

<b>Module Title and Code:</b>	<b>Module 09: Repair and Maintain Domestic Electrical Equipment</b>
	<b>Time Frame: 30 hrs</b>
<b>Reference to NCS:</b>	
<p><b>Competencies (job functions and soft skills) and descriptions:</b></p> <p><b>At the end of this module trainee will be able to</b></p> <ol style="list-style-type: none"> <li>1. Service ceiling fan</li> <li>2. Service exhaust fan</li> <li>3. Repair fluorescent lamp</li> <li>4. Repair emergency lamp</li> </ol>	
<p><b>Typical related work situations to master:</b></p> <ul style="list-style-type: none"> <li>• Trainee should be able to understand faults in the equipment</li> </ul>	
<b>Important pertinent Content (knowledge):</b>	<ul style="list-style-type: none"> <li>• Construction of ceiling fan and exhaust fan</li> <li>• Construction of fluorescent lamp and emergency lamp</li> </ul>
<b>Potentially useful teaching methods (optional):</b>	<ul style="list-style-type: none"> <li>• Presentations</li> <li>• Self-directed learning via tutorials and manuals</li> <li>• Demonstrations</li> <li>• Project work</li> </ul>

<b>Module Title and Code:</b>	<b>Module 10: Prepare cost estimate for wiring</b>
	<b>Time Frame: 30 hrs</b>
<b>Reference to NCS:</b>	
<p><b>Competencies (job functions and soft skills) and descriptions:</b></p> <p><b>At the end of this module trainee will be able to</b></p> <ol style="list-style-type: none"> <li>1. Prepare layout diagram for wiring</li> <li>2. Prepare layout diagram for conduit laying</li> <li>3. Prepare material list with specification</li> <li>4. Prepare accessories list with specification</li> <li>5. Calculate total cost for installation</li> </ol>	
<p><b>Typical related work situations to master:</b></p> <ul style="list-style-type: none"> <li>• Read and interpret different types of building electric circuit diagram</li> <li>• Prepare material list and accessories list</li> </ul>	
<p><b>Important pertinent Content (knowledge):</b></p>	<ul style="list-style-type: none"> <li>• Lay out diagram</li> <li>• Market prices of electrical wires and accessories</li> </ul>
<p><b>Potentially useful teaching methods (optional):</b></p>	<ul style="list-style-type: none"> <li>• Presentations</li> <li>• Self-directed learning via tutorials and manuals</li> <li>• Demonstrations</li> <li>• Project work</li> </ul>

Module Title	Course Duration
<b>11. Career Skills including English Communication</b>	At least 60 hours in 3 month course
<p><b>Objectives of the module</b> This module is compulsory in all NVQ Level 2 courses. It develops oral communication skills in English and helps students to prioritize their work and develop routines that contribute to efficiency.</p>	
<p><b>Competencies to be covered</b></p> <ol style="list-style-type: none"> <li data-bbox="240 510 1435 642"> <p><b>1. Understand and use simple expressions to communication</b> This subject provides the necessary communication skills so that students can introduce themselves and interact with others, and can respond to simple questions and follow simple instructions, describe people, places, and tools.</p> </li> <li data-bbox="240 678 1435 810"> <p><b>2. Read and write effectively</b> This subject provides the necessary skills to find and understand the information given in a text, to understand notices, instructions and information, to take down short messages and write simple descriptions.</p> </li> <li data-bbox="240 846 1435 978"> <p><b>3. Use English correctly</b> This subject is not taught separately but is included in the development of the productive and receptive skills above; since awareness of the structure of the language is necessary for these The development of appropriate vocabulary is also targeted to deploy the above skills.</p> </li> <li data-bbox="240 1014 1435 1146"> <p><b>4. Develop the capacity to think and plan productively</b> This subject develops cognitive abilities and skills with regard to effective work, with strengthening of thinking skills, recognition of systems, making deductions etc.</p> </li> <li data-bbox="240 1182 1435 1314"> <p><b>5. Develop effective working capacity</b> This subject develops the capacity to work effectively individually and in collaboration with others through building the sense of individual responsibility, and accountability within a working group.</p> </li> </ol>	