





# **Model Curriculum**

NOS Name: Installation, Troubleshooting and Repairing of IoT - Home Automation Systems

NOS Code:

NOS Version: 1.0

Model Curriculum Version: 1.0

State Council for Technical Education & Vocational Training Unit-8, Near Raj Bhawan, Bhubaneswar, Odisha - 751012





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# **Training Parameters**

Sector	Electronics
Sub-Sector	Consumer Electronics
Occupation	Installation and Servicing
Country	India
Aligned to NCO/ISCO/ISIC Code	NCO-2015/NIL
Minimum Educational Qualification and Experience	12th grade pass Or Completed 2nd year of 3-year diploma (after 10th) and pursuing regular diploma Or 10th grade pass plus 2-year NTC Or 8th pass plus 2-year NTC plus 1-Year NAC plus CITS Or 10th grade pass and pursuing continuous schooling Or 10th Grade Pass with 2 years of relevant experience
Pre-Requisite License or Training	NA
Minimum Job Entry Age	15 years
Last Reviewed On	
Next Review Date	
NSQC Approval Date	
NOS Version	1.0
Model Curriculum Creation Date	
Model Curriculum Valid Up to Date	
Model Curriculum Version	1.0
Minimum Duration of the Course	120 Hours 00 Minutes
Maximum Duration of the Course	120 Hours 00 Minutes





## **Program Overview**

This section summarizes the end objectives of the program along with its duration.

#### **Training Outcomes**

At the end of the program, the learner should have acquired the listed knowledge and skills.

- Installation of smart devices and sensors at home
- Troubleshooting and repairing of defects in the smart devices
- Installation of IoT home automation systems.
- Troubleshooting and repairing of IoT home automation systems.

#### **Compulsory Modules**

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
SCTVET/N – IoT - Home Automation Systems Version No. – 1.0	40:00	80:00			120:00
Module 1: Introduction to the IoT - Home Automation Systems	01:00	0:00			01:00
Module 2: Installation, Troubleshooting and Repairing of IoT - Home Automation Systems	39:00	80:00			119:00
Total Duration	40:00	80:00			120:00





# **Module Details**

### Module 1: Introduction to the IoT - Home Automation Systems

### Bridge module

#### **Terminal Outcomes:**

• Discuss about IoT - Home Automation Systems.

Duration: <01:00>	Duration: <0:00>
Theory – Key Learning	Practical – Key Learning
<ul> <li>List various IoT - Home Automation Systems available.</li> <li>Describe the use and benefit of each IoT - Home Automation Systems.</li> <li>Explain installation and testing standards and procedures followed in industry.</li> </ul>	
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	





# Module 2: Installation, Troubleshooting and Repairing of IoT - Home Automation Systems

#### Mapped to SCTVET/N, v1.0

#### **Terminal Outcomes:**

- Demonstrate procedure of installation of IoT home automation systems.
- Demonstrate procedure of troubleshooting and repairing of IoT home automation systems.

Duration: <39:00>	Duration: <80:00>
Theory – Key Learning	Practical – Key Learning
<ul> <li>Theory - Key Learning</li> <li>Explain fundamentals of electricity such as ohms law, difference between ac and dc</li> <li>Explain basic electronics (knowledge of components such as diode, transformer, LED, photo transistor, capacitor, resistor, inductor, thermistor, ICs etc.)</li> <li>Describe working technology of IoT devices</li> <li>List various components of IoT systems</li> <li>Describe IoT protocols for smart home</li> <li>List benefits of smart home systems</li> <li>Describe application of smart devices in different areas of a home</li> <li>List various devices for home e.g. smart lighting, smart security system for doors, smart plugs, smart entertainment system, smart thermostat, smart sensors for garden, smart sensors for toilet etc.</li> <li>Describe functioning, use and feature of each system.</li> <li>List necessary material, systems, sensors, tools and equipment required for installation and repairing work.</li> <li>Describe selection criteria of wires, cables, sensors, lighting system and automated systems for installation</li> <li>Discuss the need of wi-fi connection at the customer premises</li> <li>List steps for setup and installation of various automated devices and sensors at home</li> <li>List records and documents need to prepare related to installation work done</li> <li>List common problems/unusual conditions noticed on the smart devices</li> </ul>	<ul> <li>Practical - Key Learning</li> <li>Demonstrate how to assess the customer requirements for automated systems at home.</li> <li>Show how to collect the necessary tools and equipment required for installation and repairing work</li> <li>Apply appropriate ways to check the functionality of tools and equipment before use.</li> <li>Show how to select the center hub or controller such as customer Smartphone to control the smart devices as per the customer preference</li> <li>Show how to select and arrange the required wires, cables, sensors, lighting system and automated systems need to install</li> <li>Apply appropriate ways to check the smart devices specifications and ensure that all supporting accessories purchased are available in the pack</li> <li>Demonstrate process of planning the installation process by considering factors such as device placement, wiring requirements, and network connectivity</li> <li>Apply appropriate ways to take measurements and fix or route the wires in customer premises</li> <li>Apply appropriate ways to fix lighting systems in the customer premises on the marked places in customer premises by following the SOP and manufacturer manual</li> </ul>
activities for various automated devices	bell, video camera and door lock at the



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and sensors	<ul> <li>door by following the SOP and manufacturer manual</li> <li>Apply appropriate ways to fix CCTV cameras and other surveillance systems for home by following the SOP and manufacturer manual</li> <li>Apply appropriate ways to fix smart systems and sensors in kitchen, bathroom, garden etc. as per the customer requirement by following the SOP and manufacturer manual</li> <li>Apply appropriate ways to connect all systems and sensors in the power plug and switch on the power</li> <li>Apply appropriate ways to install the smart devices applications in the center hub or customer smartphone and connect the smart devices with customer's phone</li> <li>Show how to configure the settings, preferences, and automation routines according to customer requirements in the smart application</li> <li>Apply appropriate ways to test each device and system to ensure proper functionality and verify that all devices respond correctly to commands, test automation scenarios, and troubleshoot issues after the installation</li> <li>Demonstrate the various functions, features and settings of smart devices through application</li> <li>Show how to guide the customer</li> <li>Demonstrate the various functions, features and settings of smart devices through application</li> <li>Show how to guide the customer on day-to-day care activities and precautions while using the smart devices</li> <li>Demonstrate troubleshooting activities to identify the faults and faulty component in the smart devices</li> <li>Demonstrate basic tests such as power supply inspection, volt ampere test and earth test power supply etc.</li> <li>Show how to remove the faulty</li> </ul>
	<ul> <li>component for carrying out repair or replacement after disconnecting it from power supply</li> <li>Apply appropriate ways to repair the fault</li> </ul>

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 Apply appropriate ways to test the functionality of device and system and verify that it is now responding correctly to commands and test automation scenarios after repairing

#### Classroom Aids:

Whiteboard, marker pen, projector

#### **Tools, Equipment and Other Requirements**

Smart phone, Smart lighting system, Smart camera, Smart door lock, Video camera, Assembly tools

Sensors, Smart kitchen systems, Smart bathroom systems, Wi-fi connectivity





## Annexure

### **Trainer Requirements**

Trainer Prerequisites						
Minimum Educational	Specialization	Relevant Industry Experience		Training Experience		Remarks
Qualification		Years	Specialization	Years	Specialization	
B.E/B.Tech	Electrical/Electronics	1	IoT system installation	1	IoT system installation	NA
Diploma	Electrical/Electronics	2	IoT system installation	1	IoT system installation	NA

Trainer Certification				
Domain Certification	Platform Certification			
"Installation, Troubleshooting and Repairing of	"Trainer, MEP/Q2601 v2.0" Minimum accepted			
IoT - Home Automation Systems, SCTVET/N,	score is 80%.			
version 1.0". Minimum accepted score is 80%.				





#### Assessor Requirements

Assessor Prerequisites						
Minimum Educational	Specialization	Relevant Industry Experience		Training Experience		Remarks
Qualification		Years	Specialization	Years	Specialization	
B.E/B.Tech	Electrical/Electronics	2	IoT system installation	1	IoT system installation	NA
Diploma	Electrical/Electronics	4	loT system installation	1	loT system installation	NA

Assessor Certification				
Domain Certification	Platform Certification			
"Installation, Troubleshooting and Repairing of IoT -	"Assessor; MEP/Q2701 v2.0"			
Home Automation Systems, SCTVET/N, version 1.0".	Minimum accepted score is 80%.			
Minimum accepted score is 80%.				



#### Assessment Strategy

- 1. Assessment System Overview:
  - Batches assigned to the assessment agencies for conducting the assessment on SDMS/SIP or email
  - Assessment agencies send the assessment confirmation to VTP/TC looping Training agency
  - Assessment agency deploys the ToA certified Assessor for executing the assessment
  - Training agency monitors the assessment process & records
- 2. Testing Environment:
  - Confirm that the centre is available at the same address as mentioned on SDMS or SIP
  - Check the duration of the training.
  - Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
  - If the batch size is more than 30, then there should be 2 Assessors.
  - Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
  - Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
  - Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
  - Check the availability of the Lab Equipment for the particular Job Role.
- 3. Assessment Quality Assurance levels / Framework:
  - Question papers created by the Subject Matter Experts (SME)
  - Question papers created by the SME verified by the other subject Matter Experts
  - Questions are mapped with NOS and PC
  - Question papers are prepared considering that level 1 to 3 are for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management
  - Assessor must be ToA certified & trainer must be ToT Certified
  - Assessment agency must follow the assessment guidelines to conduct the assessment
- 4. Types of evidence or evidence-gathering protocol:
  - Time-stamped & geotagged reporting of the assessor from assessment location
  - Centre photographs with signboards and scheme specific branding
  - Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period
  - Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos
- 5. Method of verification or validation:
  - Surprise visit to the assessment location
  - Random audit of the batch
  - Random audit of any candidate
- 6. Method for assessment documentation, archiving, and access
  - Hard copies of the documents are stored
  - Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage
  - Soft copies of the documents & photographs of the assessment are stored in the Hard Drives





### Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
(M) TLO	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module. A set of terminal outcomes help to achieve the training outcome.





### Acronyms and Abbreviations

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training
SOP	Standard Operating Procedure
wi	Work Instructions
PPE	Personal Protective equipment