NATIONAL SKILLS QUALIFICATION

LEVEL 4

TITLE:

HOME AUTOMATION AND IoT TECHNOLOGIES

YEAR:

2024

NATIONAL SKILLS QUALIFICATION

NSQ LEVEL 4- HOME AUTOMATION AND IoT TECHNOLOGIES

GENERAL INFORMATION

QUALIFICATION PURPOSE

The purpose of this qualification is to equip individuals with the advanced technical knowledge and project management skills required to design, implement, supervise, and maintain comprehensive IoT and home automation systems, with a focus on energy management, environmental monitoring, smart entertainment, and hands-free control technologies, ensuring efficient and sustainable solutions for modern smart homes.

QUALIFICATION OBJECTIVES

The learner should be able to: -

i. Learn to design, configure, and troubleshoot networks for secure, reliable IoT device connectivity in home automation systems.
ii. Acquire project management skills for effective resource allocation, budgeting, and execution of IoT home automation projects.
iii. Gain expertise in implementing energy-efficient systems and integrating renewable energy for sustainable smart homes.
iv. Learn to install, integrate, and maintain smart entertainment technologies, including home theaters and multi-room audio/video systems.
v. Master the installation and maintenance of IoT systems for monitoring environmental factors and promoting health in smart homes.
vi. Develop skills to integrate voice-activated and gesture control technologies for intuitive, hands-free home automation.
vii. Learn to automate smart kitchen appliances for enhanced convenience, energy efficiency, and streamlined household management.

Mandatory Units

Unit No	Reference Number	NOS Title	Credit Value	Guided Learning Hours	Remark
Unit 001	ICT/HAIT/001/L4	Health and Safety Standards and Regulatory Compliance.	1	10	Mandatory
Unit 002	ICT/HAIT/002/L4	Teamwork in Home Automation Projects	1	10	Mandatory
Unit 003	ICT/HAIT/003/L4	Communication in Home Automation and IoT	1	10	Mandatory
Unit 004	ICT/HAIT/004/L4	Advanced Networking for IoT Systems	2	20	Mandatory
Unit 005	ICT/HAIT/005/L4	Home Automation Project Management	2	20	Mandatory
Unit 006	ICT/HAIT/006/L4	Energy Management in Smart Homes	2	20	Mandatory
Unit 007	ICT/HAIT/007/L4	Smart Entertainment Systems	2	20	Mandatory
Unit 008	ICT/HAIT/008/L4	Environmental and Health Monitoring Systems	2	20	Mandatory
Unit 009	ICT/HAIT/009/L4	Voice-Activated and Gesture Control Systems	2	20	Mandatory
Unit 010	ICT/HAIT/010/L4	Automation for Smart Kitchens and Appliances	2	20	Mandatory
		TOTAL	**17**	**170**	Mandatory

Mandatory Units

Learners must complete all mandatory units to gain a solid knowledge in home automation and IoT technologies. These units are designed to provide advanced knowledge and skills that are critical for supervisory work in this field. The credit hours for mandatory units are non-negotiable and must be fulfilled to obtain the qualification.
Total Credit Learning Hours from Mandatory Units: ***170***

NATIONAL SKILLS QUALIFICATION

LEVEL 3: *HOME AUTOMATION AND IoT TECHNOLOGIES*

UNIT 1: HEALTH AND SAFETY STANDARDS AND REGULATORY COMPLIANCE.

Unit Reference Number: ICT/HAIT/001/L4

NSQ Level: 4

Credit Value: 1

Guided Learning Hours: 10

Unit Purpose:

The purpose of this unit is to equip learners with the knowledge and skills necessary to ensure adherence to safety standards, regulatory requirements, and best practices in the installation, operation, and maintenance of home automation and IoT systems, safeguarding both users and property.

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 01: HEALTH AND SAFETY STANDARDS AND REGULATORY COMPLIANCE.

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.				
LO 1: **Understand Occupational Health and Safety Regulations**	1.1	Describe the key OHS principles governing home automation and IoT installations.										
	1.2	Identify specific national and international OHS regulations applicable to electrical and smart device installations.										
	1.3	Explain the legal responsibilities of employers and workers under occupational safety laws in the home automation industry.										
LO 2: **Apply Safety Practices in the Workplace**	2.1	Demonstrate the proper use of personal protective equipment (PPE) such as gloves, goggles, and insulated tools during installations.										
	2.2	Implement safe working procedures for handling and installing electrical components in home automation systems.										
	2.3	Inspect the work area for potential hazards, ensuring compliance with safety protocols before starting any installation.										
LO 3: **Identify and Assess Workplace Hazards**	3.1	Conduct a risk assessment for a home automation installation site, identifying potential electrical, fire, and ergonomic hazards.										
	3.2	Evaluate the severity and likelihood of hazards identified during risk assessments to prioritize corrective actions.										
	3.3	Apply control measures such as grounding, insulation, and safety barriers to mitigate risks identified in the work environment.										
LO 4:	4.1	Follow safety guidelines when installing IoT devices to ensure proper										

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.				
Ensure Safe Installation of Home Automation and IoT Devices		insulation and protection against electrical surges.										
	4.2	Position and mount home automation equipment, such as hubs and smart sensors, in safe, non-hazardous locations.										
	4.3	Test the installed equipment to ensure that all safety mechanisms (e.g., circuit breakers, surge protectors) are functional and compliant with OHS standards.										
LO 5: **Respond to Workplace Incidents and Emergencies**	5.1	Prepare an emergency response plan specific to the installation site, including evacuation routes and emergency contacts.										
	5.2	Demonstrate basic first aid procedures, such as treating burns or electrical shock, in a simulated emergency scenario.										
	5.3	Use firefighting equipment such as fire extinguishers effectively to control small electrical fires during IoT device installations.										
LO 6: **Comply with Legal and Ethical Obligations**	6.1	Verify that all installed devices and systems comply with local and international health and safety regulations.										
	6.2	Ensure adherence to electrical codes, such as wiring standards and safe installation practices, during the setup of home automation systems.										
	6.3	Demonstrate ethical responsibility by maintaining a safe working environment that protects the health and safety of all individuals on-site.										
LO 7: **Maintain Documentation and Records**	7.1	Document safety checks and inspection results for all home automation and IoT installations to maintain compliance records.										
	7.2	Prepare a report detailing the risk										

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
		assessments conducted, including the control measures implemented to mitigate identified risks.									
	7.3	Record and report incidents or near-miss events in the workplace, ensuring they are logged for future safety audits and improvements.									

Learner's Signature	Date:
Assessor's Signature	Date:
IQA's Signature	Date:
EQA's Signature	Date:

NATIONAL SKILLS QUALIFICATION

LEVEL 3: *HOME AUTOMATION AND IoT TECHNOLOGIES*

UNIT 2: TEAMWORK IN HOME AUTOMATION PROJECTS

Unit Reference Number: ICT/HAIT/002/L4

NSQ Level: 4

Credit Value: 1

Guided Learning Hours: 10

Unit Purpose:

The purpose of this unit is to equip learners with the skills and strategies needed to collaborate effectively in team environments, ensuring the successful execution of home automation projects by leveraging the strengths of diverse team members and optimizing project outcomes.

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 02: TEAMWORK IN HOME AUTOMATION PROJECTS

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: **Understand the Importance of Teamwork in Home Automation Projects**	1.1	Explain the role of teamwork in successfully completing home automation installations and ensuring system integration.									
	1.2	Identify the benefits of collaborative work, such as efficiency, innovation, and problem-solving in-home automation projects.									
	1.3	Describe how different team members' roles (e.g., network technicians, electricians, project managers) contribute to the overall success of a project.									
LO 2: **Contribute Effectively to a Team**	2.1	Participate actively in team meetings, providing constructive input and listening to the ideas of others.									
	2.2	Offer support and assistance to team members when needed, such as helping with equipment setup or problem-solving during installations.									
	2.3	Complete assigned tasks within the agreed-upon timeframe, contributing to the overall project timeline and success.									
LO 3: **Solve Problems Collaboratively**	3.1	Discuss potential challenges encountered during a home automation project with the team and suggest possible solutions.									
	3.2	Work together with team members to troubleshoot issues, such as system integration problems or installation delays, and develop a plan of action.									
	3.3	Brainstorm with the team to identify innovative solutions for optimizing the installation or configuration of home automation systems.									
LO 4:	4.1	Recognize the causes of conflict in team environments and their potential									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.				
Manage Conflict and Resolve Disagreements in a Team		impact on home automation project outcomes.										
	4.2	Address conflicts directly and professionally, facilitating open discussions to resolve misunderstandings or disagreements.										
	4.3	Apply conflict resolution strategies, such as mediation or negotiation, to help team members reach a consensus and continue working productively.										
Learner's Signature			Date:									
Assessor's Signature			Date:									
IQA's Signature			Date:									
EQA's Signature			Date:									

NATIONAL SKILLS QUALIFICATION

LEVEL 3: *HOME AUTOMATION AND IoT TECHNOLOGIES*

UNIT 3: COMMUNICATION IN HOME AUTOMATION AND IOT

Unit Reference Number: ICT/HAIT/003/L4

NSQ Level: 4

Credit Value: 1

Guided Learning Hours: 10

Unit Purpose:

The purpose of this unit is to equip learners with effective communication skills for conveying technical information, collaborating with team members, and interacting with clients in home automation and IoT projects, ensuring clear, concise, and professional exchanges in both technical and non-technical contexts.

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 03: COMMUNICATION IN HOME AUTOMATION AND IoT

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Communicate Technical Information Effectively	1.1	Explain the functionality of home automation devices and IoT systems to clients in non-technical language to ensure clear understanding.									
	1.2	Prepare technical documentation, such as installation guides and system specifications, which is concise and easy to follow for both technical and non-technical users.									
	1.3	Demonstrate how to troubleshoot common technical issues using clear, step-by-step verbal or written instructions to guide clients or colleagues.									
LO 2: Collaborate Effectively with Team Members	2.1	Use appropriate communication platforms (e.g., email, project management tools) to share updates, instructions, and progress reports with team members in real-time.									
	2.2	Listen actively during team discussions to fully understand and address the concerns or input of other team members.									
	2.3	Clarify technical instructions given by colleagues, asking follow-up questions to ensure accurate understanding and execution of tasks.									
LO 3: Interact Professionally with Clients and Stakeholders	3.1	Conduct client consultations to gather project requirements and communicate possible solutions using a professional tone and clear, accessible language.									
	3.2	Present project updates, timelines, and system performance reports to clients or stakeholders, ensuring all critical information is communicated clearly and accurately.									
	3.3	Respond to client inquiries promptly and courteously, addressing their concerns or questions regarding system									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.				
		installations or maintenance.										
Learner's Signature			Date:									
Assessor's Signature			Date:									
IQA's Signature			Date:									
EQA's Signature			Date:									

NATIONAL SKILLS QUALIFICATION

LEVEL 3: *HOME AUTOMATION AND IoT TECHNOLOGIES*

UNIT 4: ADVANCED NETWORKING FOR IOT SYSTEMS

Unit Reference Number: ICT/HAIT/004/L4

NSQ Level: 4

Credit Value: 2

Guided Learning Hours: 20

Unit Purpose:

The purpose of this unit is to equip learners with advanced knowledge and practical skills in designing, configuring, and managing complex IoT networks, ensuring optimal performance, security, and scalability in smart home and IoT environments.

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 04: ADVANCED NETWORKING FOR IOT SYSTEMS

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Design IoT Network Architectures	1.1	Analyze the requirements of an IoT system and determine the appropriate network architecture based on scalability, device type, and communication protocols.									
	1.2	Create a network diagram that illustrates the placement of devices, hubs, routers, and gateways within an IoT environment.									
	1.3	Identify the most suitable communication protocols (e.g., Zigbee, Z-Wave, LoRaWAN, Wi-Fi) for different IoT devices in the system.									
	1.4	Calculate the bandwidth and data throughput requirements of the network based on device communication and system demands.									
	1.5	Justify the selection of network hardware (e.g., routers, switches, repeaters) to ensure optimal performance for IoT systems.									
LO 2: Configure and Secure IoT Networks	2.1	Set up a secure network for IoT devices, including routers, hubs, and devices, following best practices for encryption and authentication.									
	2.2	Configure Quality of Service (QoS) settings to prioritize IoT device traffic, ensuring critical data is processed with minimal latency.									
	2.3	Enable network security features such as firewalls, encryption protocols (e.g., WPA3), and Virtual Private Networks (VPN) to protect IoT devices.									
	2.4	Monitor network traffic and identify potential vulnerabilities using intrusion detection systems (IDS) or monitoring software.									
	2.5	Update network devices with the latest									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
		firmware to address security vulnerabilities and improve performance.									
LO 3: Implement IoT Network Troubleshooting and Optimization Techniques	3.1	Diagnose network issues by checking connectivity, signal strength, and interference sources in an IoT system.									
	3.2	Resolve device communication problems by reconfiguring network settings, repositioning devices, or adjusting signal strength.									
	3.3	Apply network optimization techniques such as load balancing, signal boosting, and reducing interference to enhance system performance.									
	3.4	Test the functionality of IoT devices after troubleshooting, ensuring seamless communication and system performance.									
	3.5	Document the steps taken during troubleshooting and optimization, creating a reference for future maintenance.									
LO 4: Manage IoT Network Scalability and Performance	4.1	Evaluate the performance of the IoT network under different conditions, such as increasing the number of devices or adding new protocols.									
	4.2	Scale the IoT network by adding new devices or gateways while maintaining performance and ensuring seamless integration.									
	4.3	Optimize network performance by reallocating bandwidth, adjusting device priorities, or deploying mesh network solutions.									
	4.4	Monitor the IoT network for performance bottlenecks and recommend strategies for improving throughput and response times.									
	4.5	Implement cloud-based network									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
		management solutions to handle large-scale IoT deployments and ensure real-time system monitoring.									

Learner's Signature	Date:
Assessor's Signature	Date:
IQA's Signature	Date:
EQA's Signature	Date:

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LEVEL 3: *HOME AUTOMATION AND IoT TECHNOLOGIES*

UNIT 05: HOME AUTOMATION PROJECT MANAGEMENT

Unit Reference Number: ICT/HAIT/005/L4

NSQ Level: 4

Credit Value: 2

Guided Learning Hours: 20

Unit Purpose:

The purpose of this unit is to equip learners with the skills and knowledge required to effectively plan, execute, and manage home automation projects, ensuring timely delivery, resource management, and successful implementation of smart home systems.

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 05: HOME AUTOMATION PROJECT MANAGEMENT

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Plan Home Automation Projects	1.1	Define the project scope by identifying key objectives, deliverables, and system requirements for the home automation project.									
	1.2	Develop a detailed project plan, including timelines, tasks, and milestones for each phase of the installation and configuration process.									
	1.3	Identify the resources required for the project, such as labor, tools, and equipment, and allocate them based on project needs.									
	1.4	Establish a project budget by estimating the costs of materials, devices, and labor, ensuring it aligns with client expectations.									
	1.5	Create a risk management plan that identifies potential risks, mitigation strategies, and contingency plans.									
LO 2: Manage Resources and Teams in Home Automation Projects	2.1	Assign specific roles and responsibilities to team members, ensuring each person understands their tasks in the project.									
	2.2	Coordinate with suppliers and subcontractors to ensure timely delivery of devices, materials, and services for the home automation system.									
	2.3	Monitor the performance of the project team, addressing any issues or delays in task completion and providing support where necessary.									
	2.4	Ensure that all team members have access to the tools and equipment they need to complete their assigned tasks efficiently.									
	2.5	Resolve conflicts or challenges within the team by facilitating communication and addressing concerns in a timely									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
		manner.									
LO 3: Oversee Project Execution and Quality Control	3.1	Supervise the installation and configuration of home automation devices, ensuring adherence to project specifications and standards.									
	3.2	Inspect the quality of work throughout the project lifecycle, conducting regular checks to ensure compliance with safety and industry regulations.									
	3.3	Address technical issues or delays by adjusting schedules, reallocating resources, or troubleshooting installation problems.									
	3.4	Ensure that all devices are properly tested and that system integrations work as required before moving to the next phase of the project.									
	3.5	Document the progress of the project, including any changes or challenges encountered, to ensure transparent reporting to stakeholders.									
LO 4: Close and Review Home Automation Projects	4.1	Conduct a final inspection of the installed home automation system, verifying that all components function correctly and meet the client's expectations.									
	4.2	Organize project documentation, including blueprints, device manuals, and system configurations, for handover to the client.									
	4.3	Prepare a project completion report that outlines the project's outcomes, timelines, and any deviations from the initial plan.									
	4.4	**Explain how to ensure projects deliverables and signoff are in line with clients requirements**									
	4.5	Facilitate a project debrief with the team, identifying lessons learned and areas for improvement for future									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
		projects.									
	4.5	Provide post-installation support to the client by offering training on system use and responding to any technical inquiries.									
Learner's Signature			Date:								
Assessor's Signature			Date:								
IQA's Signature			Date:								
EQA's Signature			Date:								

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LEVEL 3: *HOME AUTOMATION AND IoT TECHNOLOGIES*

UNIT 06: ENERGY MANAGEMENT IN SMART HOMES

Unit Reference Number: ICT/HAIT/006/L4

NSQ Level: 4

Credit Value: 2

Guided Learning Hours: 20

Unit Purpose:

The purpose of this unit is to equip learners with the knowledge and skills to implement and manage energy-efficient systems in smart homes, optimizing energy usage through automation, monitoring, and sustainable practices for cost savings and environmental benefits.

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 06: ENERGY MANAGEMENT IN SMART HOMES

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: Know Energy Consumption in Smart Homes	1.1	Identify the key energy-consuming devices and systems in a smart home, including HVAC, lighting, and appliances.									
	1.2	Analyze the patterns of energy usage in different areas of the home, determining peak consumption times.									
	1.3	Compare the energy efficiency of various smart home devices, such as LED lighting versus traditional bulbs or smart thermostats versus standard models.									
	1.4	Explain how home automation systems contribute to energy savings by optimizing device usage and reducing standby consumption.									
	1.5	Evaluate the impact of energy management systems on overall household energy costs and carbon footprint.									
LO 2: Implement Smart Energy Management Systems	2.1	Install smart energy monitoring devices such as smart meters, energy sensors, or sub-meters to track real-time consumption.									
	2.2	Configure smart thermostats and HVAC systems to automatically adjust temperatures based on occupancy or external weather conditions.									
	2.3	Integrate lighting and appliance control systems with smart hubs, enabling energy-efficient automation schedules based on user habits.									
	2.4	Set up automation rules for controlling high-energy devices, ensuring they operate during off-peak hours to reduce energy costs.									
	2.5	Program smart devices to enter energy-saving modes when not in use or during periods of low occupancy.									

LO 3: Optimize Renewable Energy Integration in Smart Homes	3.1	Assess the feasibility of integrating renewable energy sources such as solar panels or wind turbines into a smart home system.									
	3.2	Install energy storage solutions, such as batteries, to store excess energy generated by renewable sources for later use.									
	3.3	Connect renewable energy systems to the home automation platform, allowing users to monitor energy generation and consumption.									
	3.4	Optimize the usage of renewable energy by programming devices to operate when energy generation is at its peak.									
	3.5	Evaluate the benefits of grid-tied systems, which allow excess energy to be sold back to the grid, reducing energy bills.									
LO 4: Monitor and Maintain Energy Management Systems	4.1	Monitor real-time energy data using smart home dashboards or mobile apps to track energy consumption and savings.									
	4.2	Analyse energy usage reports generated by the system to identify areas where energy savings can be improved.									
	4.3	Test the functionality of energy management systems to ensure accurate monitoring and proper operation of connected devices.									
	4.4	Update smart energy devices and software regularly to ensure optimal performance and security of the energy management system.									
	4.5	Maintain energy management systems by conducting routine checks on device configurations, ensuring they adhere to energy-saving parameters.									

Learner's Signature	Date:
Assessor's Signature	Date:

IQA's Signature	Date:
EQA's Signature	Date:

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UNIT 07: SMART ENTERTAINMENT SYSTEMS

Unit Reference Number: ICT/HAIT/007/L4

NSQ Level: 4

Credit Value: 2

Guided Learning Hours: 20

Unit Purpose:

The purpose of this unit is to equip learners with the knowledge and skills to design, install, configure, and manage smart entertainment systems, providing seamless integration of audio, video, and media devices for enhanced user experience in smart homes.

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 07: SMART ENTERTAINMENT SYSTEMS

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.				
LO 1: **Know Components of Smart Entertainment Systems**	1.1	Identify the key components of a smart entertainment system, such as smart TVs, streaming devices, speakers, and media servers.										
	1.2	Explain the functions of audio-visual control hubs and how they manage different entertainment devices.										
	1.3	Compare various communication protocols (e.g., HDMI-CEC, Bluetooth, Wi-Fi) used for device connectivity and control.										
	1.4	Describe the process of integrating entertainment systems with other smart home devices, such as lighting and security systems.										
	1.5	Evaluate different smart media platforms (e.g., Netflix, Spotify) for compatibility with various smart entertainment devices.										
LO 2: **Design and Plan Smart Entertainment Systems**	2.1	Create a layout plan for the placement of audio and visual devices to optimize sound distribution and viewing angles.										
	2.2	Select appropriate devices, such as smart speakers and projectors, based on the client's requirements for a home entertainment setup.										
	2.3	Determine network bandwidth requirements to support multiple streaming devices and ensure smooth media playback.										
	2.4	Incorporate automation features into the entertainment system design, enabling voice control and smart device integration.										
	2.5	Prepare a wiring and connectivity plan to integrate the entertainment system with the home’s existing network infrastructure.										
LO 3:	3.1	Set up smart TVs, projectors, and										

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
Install and Configure Smart Entertainment Devices		media devices, ensuring proper connection to the home network and internet services.									
	3.2	Configure smart speakers and sound systems for optimal sound quality, adjusting settings for room size and layout.									
	3.3	Integrate streaming platforms with the entertainment system, allowing access to online media content.									
	3.4	Program automation features such as voice commands, mobile app control, or scheduled media playback for user convenience.									
	3.5	Test all devices to ensure they are properly connected, functional, and responsive to user commands.									
LO 4: Maintain and Troubleshoot Smart Entertainment Systems	4.1	Monitor the performance of the entertainment system, including network connectivity and device responsiveness.									
	4.2	Diagnose issues related to audio, video, or connectivity problems, such as poor sound quality or buffering.									
	4.3	Update firmware and software on smart entertainment devices to ensure compatibility with new media platforms and services.									
	4.4	Repair or replace faulty components, such as damaged cables or unresponsive devices, to maintain system functionality.									
	4.5	Document common issues and solutions in a system maintenance log, providing a reference for future troubleshooting.									
Learner's Signature			Date:								
Assessor's Signature			Date:								

IQA’s Signature	Date:
EQA’s Signature	Date:

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LEVEL 3: *HOME AUTOMATION AND IoT TECHNOLOGIES*

UNIT 08: ENVIRONMENTAL AND HEALTH MONITORING SYSTEMS

Unit Reference Number: ICT/HAIT/008/L4

NSQ Level: 4

Credit Value: 2

Guided Learning Hours: 20

Unit Purpose:

The purpose of this unit is to equip learners with the knowledge and skills to design, implement, and manage smart environmental and health monitoring systems in homes, enhancing safety, well-being, and sustainability through real-time data collection and automation.

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 08: ENVIRONMENTAL AND HEALTH MONITORING SYSTEMS

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: **Know the Components of Environmental and Health Monitoring Systems**	1.1	Identify key sensors used in environmental monitoring systems, such as air quality sensors, temperature sensors, and humidity sensors.									
	1.2	Describe the role of health monitoring devices like smart wearables, heart rate monitors, and sleep trackers in smart homes.									
	1.3	Explain the functions of data collection hubs that aggregate environmental and health data from various devices.									
	1.4	Compare different communication protocols (e.g., Zigbee, Wi-Fi, Bluetooth) used for transmitting data from monitoring devices.									
	1.5	Analyze how real-time data from these systems can be used to improve personal health and home environment safety.									
LO 2: **Design and Plan Environmental and Health Monitoring Systems**	2.1	Assess the specific environmental and health monitoring needs of a home, including air quality, temperature control, and health tracking.									
	2.2	Select appropriate monitoring devices based on home size, specific health concerns, and environmental factors.									
	2.3	Plan the placement of sensors and monitoring devices to ensure accurate data collection and effective coverage throughout the home.									
	2.4	Determine the power and network connectivity requirements for the devices, ensuring seamless communication with the smart hub.									
	2.5	Integrate automation triggers that respond to environmental and health data, such as turning on air purifiers when poor air quality is detected.									
LO 3:	3.1	Install environmental sensors and									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
Install and Configure Environmental and Health Monitoring Systems		health monitoring devices, ensuring they are properly positioned for accurate data collection.									
	3.2	Configure devices to connect with a central smart home system, enabling real-time monitoring through mobile apps or control panels.									
	3.3	Set up automation rules based on environmental data, such as activating HVAC systems when temperature or humidity reaches preset levels.									
	3.4	Calibrate monitoring devices to ensure accurate readings and proper functioning.									
	3.5	Test the system to ensure that all devices are correctly integrated, and data is transmitted without interruptions.									
LO 4: Monitor and Maintain Environmental and Health Monitoring Systems	4.1	Monitor real-time data from sensors and health devices through dashboards or apps, identifying trends in environmental and personal health data.									
	4.2	Analyse reports generated by the system to make informed decisions on improving the home environment or personal health practices.									
	4.3	Update the firmware of sensors and health monitoring devices regularly to ensure compatibility with the latest smart home technology.									
	4.4	Troubleshoot connectivity or performance issues in the monitoring system by checking device status, power, and network configurations.									
	4.5	Maintain the system by cleaning sensors, replacing worn-out components, and ensuring devices are functioning optimally for long-term use.									

Learner's Signature	Date:
Assessor's Signature	Date:
IQA's Signature	Date:
EQA's Signature	Date:

NATIONAL SKILLS QUALIFICATION

LEVEL 3: *HOME AUTOMATION AND IoT TECHNOLOGIES*

UNIT 09: VOICE-ACTIVATED AND GESTURE CONTROL SYSTEMS

Unit Reference Number: ICT/HAIT/009/L4

NSQ Level: 4

Credit Value: 2

Guided Learning Hours: 20

Unit Purpose:

The purpose of this unit is to equip learners with the knowledge and skills to design, implement, and manage voice-activated and gesture control systems in smart homes, enabling hands-free control of devices and enhancing user convenience and accessibility.

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 09: VOICE-ACTIVATED AND GESTURE CONTROL SYSTEMS

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: **Know the Components and Technologies of Voice-Activated and Gesture Control Systems**	1.1	Identify the key components of voice-activated systems, such as smart speakers, microphones, and voice recognition software.									
	1.2	Describe how gesture recognition technologies, such as cameras and motion sensors, are integrated into smart home systems.									
	1.3	Compare different voice control platforms (e.g., Amazon Alexa, Google Assistant, Apple Siri) based on features and compatibility.									
	1.4	Explain the various communication protocols (e.g., Wi-Fi, Bluetooth, Zigbee) used for voice and gesture control systems.									
	1.5	Analyze how natural language processing (NLP) and machine learning enhance the accuracy and functionality of voice commands.									
LO 2: **Design and Plan Voice-Activated and Gesture Control Systems**	2.1	Assess the specific voice and gesture control needs of a home, including device compatibility and user accessibility requirements.									
	2.2	Select appropriate devices and platforms for voice and gesture control based on user preferences, system capabilities, and home layout.									
	2.3	Design the placement of smart speakers, microphones, and motion sensors to ensure accurate voice recognition and gesture detection.									
	2.4	Determine the necessary network and power requirements to support the voice and gesture control systems across multiple devices.									
	2.5	Incorporate automation routines and commands into the design, enabling users to control lighting, HVAC, and									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
		security systems hands-free.									
LO 3: **Install and Configure Voice-Activated and Gesture Control Systems**	3.1	Install smart speakers, microphones, and gesture control sensors in strategic locations for optimal user interaction and device control.									
	3.2	Configure voice control platforms to recognize user commands, including setting up personalized profiles and language options.									
	3.3	Integrate the voice-activated and gesture control systems with the home's existing smart devices, enabling seamless operation across the network.									
	3.4	Test voice and gesture recognition to ensure accuracy and responsiveness when controlling smart devices, adjusting sensitivity if necessary.									
	3.5	Program custom voice commands and gesture controls to trigger specific actions, such as activating scenes or adjusting room settings.									
LO 4: **Maintain and Troubleshoot Voice-Activated and Gesture Control Systems**	4.1	Monitor system performance by tracking response times, command accuracy, and user feedback on voice and gesture controls.									
	4.2	Diagnose issues related to voice command misinterpretation or gesture detection errors by checking device settings and sensor placement.									
	4.3	Update software and firmware for voice control devices and gesture sensors to improve functionality and ensure compatibility with new smart devices.									
	4.4	Repair or replace faulty components, such as microphones or motion sensors, to restore optimal system performance.									
	4.5	Document system configurations and									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.				
		troubleshooting steps, providing a reference for ongoing maintenance and user support.										
Learner's Signature							Date:					
Assessor's Signature							Date:					
IQA's Signature							Date:					
EQA's Signature							Date:					

NATIONAL SKILLS QUALIFICATION

LEVEL 3: *HOME AUTOMATION AND IoT TECHNOLOGIES*

UNIT 10: AUTOMATION FOR SMART KITCHENS AND APPLIANCES

Unit Reference Number: ICT/HAIT/010/L4

NSQ Level: 4

Credit Value: 2

Guided Learning Hours: 20

Unit Purpose:

The purpose of this unit is to equip learners with the skills and knowledge to design, implement, and manage automation systems for smart kitchens and appliances, enhancing efficiency, convenience, and energy management in daily kitchen operations.

Unit assessment requirements/ evidence requirements:

Assessment must be carried out in real workplace environment in which learning and human development is carried out.

Assessment methods to be used include:

1. Direct Observation/oral questions (DO)
2. Question and Answer (QA)
3. Witness Testimony (WT)
4. Assignment (ASS), etc.

UNIT 010: AUTOMATION FOR SMART KITCHENS AND APPLIANCES

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 1: **Know the Components of Smart Kitchens and Appliances**	1.1	Identify the key smart appliances commonly used in smart kitchens, such as smart refrigerators, ovens, dishwashers, and coffee machines.									
	1.2	Describe how smart kitchen hubs integrate with various appliances to provide centralized control and automation.									
	1.3	Compare different communication protocols (e.g., Wi-Fi, Bluetooth, Zigbee) used for controlling smart kitchen appliances.									
	1.4	Explain the energy-saving benefits of smart appliances, such as energy-efficient cooking modes and smart refrigeration management.									
	1.5	Analyze how sensors and automation can be used to monitor food storage, cooking progress, and kitchen safety.									
LO 2: **Design and Plan Smart Kitchen Automation Systems**	2.1	Assess the specific automation needs of a smart kitchen, including appliance control, energy management, and food safety monitoring.									
	2.2	Select appropriate smart appliances and kitchen automation systems based on user preferences, space layout, and compatibility.									
	2.3	Create a floor plan that strategically positions smart appliances for efficient use, connecting them to a centralized control system.									
	2.4	Determine the network and power requirements to support seamless communication and automation among the smart kitchen devices.									
	2.5	Integrate automation features such as voice commands, remote control, and scheduled operation for enhanced user convenience and energy efficiency.									

LEARNING OBJECTIVE (LO) The learner will:		PERFORMANCE CRITERIA The learner can:	Evidence Type					Evidence Ref. Page No.			
LO 3: **Install and Configure Smart Kitchen Appliances**	3.1	Install smart kitchen appliances, ensuring proper connection to the home network and synchronization with control hubs or apps.									
	3.2	Configure the smart refrigerator to manage food inventory, set temperature zones, and send expiration notifications.									
	3.3	Set up automation routines for the smart oven and stove, including pre-programmed cooking schedules and safety shutoff features.									
	3.4	Program smart dishwashers and coffee machines to operate at optimal times, based on user schedules or off-peak energy hours.									
	3.5	Test the functionality of all smart kitchen appliances, ensuring seamless integration with the control hub and proper response to user inputs.									
LO 4: Monitor and Maintain Smart Kitchen Automation Systems	4.1	Monitor the performance of smart kitchen appliances using apps or control dashboards, tracking energy usage and appliance health.									
	4.2	Diagnose issues such as connectivity problems or appliance malfunctions by checking network connections and running diagnostic tests.									
	4.3	Update the firmware and software of smart kitchen appliances regularly to ensure optimal performance and the latest features.									
	4.4	Maintain smart kitchen systems by cleaning sensors, updating automation routines, and ensuring appliances function within optimal parameters.									
	4.5	Document appliance usage patterns, energy savings, and any troubleshooting steps taken for future maintenance and user reference.									

Learner's Signature	Date:
Assessor's Signature	Date:
IQA's Signature	Date:
EQA's Signature	Date:

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