Model Curriculum

QP Name: Automotive Cyber Security Engineer

QP Code: ASC/Q8312

QP Version: 1.0

NSQF Level: 5.5

Model Curriculum Version: 1.0

Automotive Skills Development Council | 153, Gr Floor, Okhla Industrial Area, Phase – III, Leela Building, New Delhi – 110020

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Training Parameters

Sector	Automotive
Sub-Sector	Research & Development
Occupation	Automotive Product Development
Country	India
NSQF Level	5.5
Aligned to NCO/ISCO/ISIC Code	NCO-2015/2523.9900
Minimum Educational Qualification and Experience	3 years Diploma (Mechanical/Automobile/ Electrical / Electronics) after class 10th from recognized regulatory body with 3 years of relevant experience OR Pursuing 4th year of B.E./B.Tech in the relevant field and continuous education OR Certificate-NSQF (Electric Vehicle Product Design Engineer/ Automotive Prototype Manufacturing Lead Technician Level 5) with 2 Years of relevant experience ** Should have done basic Level 4 course on Cybersecurity and also on IOT
Pre-Requisite License or Training	NA
Minimum Job Entry Age	22 years
Last Reviewed On	28/02/2023
Next Review Date	28/02/2026
NSQC Approval Date	28/02/2023
QP Version	1.0
Model Curriculum Creation Date	28/02/2023
Model Curriculum Valid Up to Date	28/02/2026
Model Curriculum Version	1.0
Minimum Duration of the Course	630 Hours
Maximum Duration of the Course	630 Hours

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.

- Demonstrate organisational procedure of integrating system by using industrial networking protocols, IIOT Sensors and I/O Link
- Demonstrate organisational procedure of designing of Network Security design
- Perform network monitoring & threat assessment
- Demonstrate organisational procedure of restoration & recovery plan on affected manufacturing entities
- Implement safety practices.
- Use resources optimally to ensure less wastage and maximum conservation.

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
Bridge Module					
Module 1: Introduction to the role of an Automotive Cyber Security Engineer	5:00	0:00			5:00
ASC/N9810: Manage work and resources (Research & Development) NOS Version No. – 1.0 NSQF Level – 5	**15:00**	**40:00**			**55:00**
Module 2: Manage work and resources according to safety and conservation standards	15:00	40:00			55:00
DGT/VSQ/N0103- Employability Skills (90 hours) NOS Version No. – 1.0 NSQF Level – 6	**36:00**	**54:00**			**90:00**
Module 3: Introduction to Employability Skills	1:00	2:00			3:00
Module 4: Constitutional values - Citizenship	0.5:00	1:00			1.5:00
Module 5: Becoming a Professional in the 21st Century	2:00	3:00			5:00
Module 6: Basic English Skills	4:00	6:00			10:00
Module 7: Career Development & Goal Setting	1.5:00	2.5:00			4:00
Module 8: Communication Skills	4:00	6:00			10:00

Module 9: Diversity & Inclusion	1:00	1.5:00			2.5:00
Module 10: Financial and Legal Literacy	4:00	6:00			10:00
Module 11: Essential Digital Skills	8:00	12:00			20:00
Module 12: Entrepreneurship	3:00	4:00			7:00
Module 13: Customer Service	4:00	5:00			9:00
Module 14: Getting ready for apprenticeship & Jobs	3:00	5:00			8:00
ASC/N8321 – Manage integration of IIoT sensors, edge devices and machines with robots and industrial automated systems NOS Version No. –1.0 NSQF Level – 5.5	**45:00**	**55:00**	**50:00**		**150:00**
Module 15: Installation of IIOT elements	15:00	20:00	20:00		55:00
Module 16: Integration and establishment of communication	15:00	20:00	20:00		55:00
Module 17: Post-installation activities	15:00	15:00	10:00		40:00
ASC/N8328 – Design security layers to manage security threats across the communication networks NOS Version No. –1.0 NSQF Level – 5.5	**60:00**	**64:00**	**56:00**		**180:00**
Module 18: Designing of network security architecture	20:00	24:00	20:00		64:00
Module 19: Installation of application layer as per network security design	20:00	20:00	18:00		58:00
Module 20: Network monitoring & threat assessment	20:00	20:00	18:00		58:00
ASC/N8329 – Detect & respond to security incidents NOS Version No. –1.0 NSQF Level – 5.5	**50:00**	**50:00**	**50:00**		**150:00**
Module 21: Detect the security incidents	15:00	15:00	15:00		45:00
Module 22: Classify, prioritize & respond to the security incidents based on threat levels	15:00	15:00	15:00		45:00
Module 23: Restoration & recovery of communication on affected manufacturing entities	20:00	20:00	20:00		60:00
Total Duration	**216:00**	**258:00**	**156:00**		**630:00**

Module Details

Module 1: Introduction to the role of an Automotive Cyber Security Engineer

Bridge module

Terminal Outcomes:

- Discuss the role and responsibilities of an Automotive Cyber Security Engineer.

Duration: *<05:00>*	**Duration**: *<00:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the role and responsibilities of an Automotive Cyber Security Engineer. • Discuss the job opportunities for an Automotive Cyber Security Engineer in the automobile industry. • Explain about Indian automobile manufacturing market. • List various automobile Original Equipment Manufacturers (OEMs) and different products/ models manufactured by them. • Discuss cyber security standards and procedures followed in the company.	
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 2: Manage work and resources according to safety and conservation standards

Mapped to ASC/N9818, v1.0

Terminal Outcomes:

- Employ appropriate ways to maintain safe and secure working environment
- Apply material and energy conservation practices at the workplace.

Duration: *<15:00>*	**Duration**: *<40:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss organisational procedures for health, safety and security and individual role and responsibilities related to the same. • List the potential workplace related risks, threats and hazards, their causes and preventions. • List personal protective equipment like safety gloves, glasses, shoes and mask used at the workplace. • List various types of fire extinguisher. • Identify various safety boards/ signs placed on the shop floor. • Explain 5S standards, procedures and policies followed at workplace. • Discuss organisational procedures to deal with emergencies and accidents at the workplace and importance of following them. • State the importance of conducting safety drills or training sessions. • Explain the process of filling daily check sheet for reporting to the concerned authorities about improvements done and risks identified. • Discuss how and when to report about potential hazards identified in the workplace and limits of responsibility for dealing with them. • Outline the importance of keeping workplace, equipment, restrooms etc. clean and sanitised. • Explain the importance of following hygiene and sanitation regulations developed by organisation at the workplace. • Discuss the importance of maintaining the availability of running water, hand wash and alcohol-based sanitizers at the	• Apply appropriate ways to implement safety practices to ensure safety of people at the workplace. • Display the correct way of wearing and disposing PPE. • Demonstrate the use of fire extinguisher. • Demonstrate how to provide first aid procedure in case of emergencies. • Demonstrate how to evacuate the workplace in case of an emergency. • Employ various techniques for checking malfunctions in the machines with the support of maintenance team and as per Standard Operating Procedures (SOP). • Demonstrate to arrange tools/ equipment/ fasteners/ spare parts into proper trays, cabinets, lockers as mentioned in the 5S guidelines/work instructions. • Apply appropriate ways to organise safety drills or training sessions for others on the identified risks and safety practices. • Prepare a report about the health, safety and security breaches. • Apply appropriate ways to check that workplace, equipment, restrooms etc. are cleaned and sanitised. • Role play a situation to brief the team about the hygiene and sanitation regulations developed by organisation. • Demonstrate the correct way of washing hands using soap and water and alcohol-based hand rubs. • Apply appropriate methods to support the employees to cope with stress, anxiety etc. • Demonstrate proper waste collection and disposal mechanism depending upon types of waste.

workplace. • Discuss the significance of conforming to basic hygiene practices such as washing hands, using alcohol based hand sanitizers or soap. • Recall ways of reporting advanced hygiene and sanitation issues to the concerned authorities. • Elucidate various stress and anxiety management techniques. • Discuss the significance of greening. • Classify different categories of waste for the purpose of segregation. • Differentiate between recyclable and non-recyclable waste. • Discuss various methods of waste collection and disposal. • List the various materials used at the workplace. • Explain organisational recommended norms for storage of tools, equipment and material. • Discuss the importance of efficient utilisation of material and water. • Explain basics of electricity and prevalent energy efficient devices. • Explain the processes to optimize usage of material and energy/electricity. • Enlist common practices for conserving electricity at workplace.	• Perform the steps involved in storage of tools, equipment and material after completion of work. • Employ appropriate ways to resolve malfunctioning (fumes/ sparks/ emission/ vibration/ noise) and lapse in maintenance of equipment as per requirements. • Perform the steps to prepare a sample material and energy audit reports. • Employ practices for efficient utilization of material and energy/electricity.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
• Housekeeping material: Cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel, fire extinguisher • Safety gears: Safety shoes, ear plug, goggles, gloves, helmet, first-aid kit	

Module 3: Introduction to Employability Skills

Mapped to DGT/VSQ/N0103

Terminal Outcomes:

- Discuss about Employability Skills in meeting the job requirements

Duration: *<1:00>*	**Duration**: *<2:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Outline the importance of Employability Skills for the current job market and future of work	• List different learning and employability related GOI and private portals and their usage • Research and prepare a note on different industries, trends, required skills and the available opportunities
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 4: Constitutional values - Citizenship

Mapped to DGT/VSQ/N0103

Terminal Outcomes:

- Discuss about constitutional values to be followed to become a responsible citizen

Duration: *<0.5:00>*	**Duration**: *<1:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain constitutional values, civic rights, duties, citizenship, responsibility towards society etc. that are required to be followed to become a responsible citizen.	• Practice different environmentally sustainable practices
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 5: Becoming a Professional in the 21st Century

Mapped to DGT/VSQ/N0103

Terminal Outcomes:

- Demonstrate professional skills required in 21st century

Duration: *<2:00>*	**Duration**: *<3:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss 21st century skills required for employment	• Highlight the importance of practicing 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life • Create a pathway for adopting a continuous learning mindset for personal and professional development
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 6: Basic English Skills

Mapped to DGT/VSQ/N0103

Terminal Outcomes:

- Practice basic English speaking.

Duration: *<4:00>*	**Duration**: *<6:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe basic communication skills • Discuss ways to read and interpret text written in basic English	• Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone • Read and understand text written in basic English • Write a short note/paragraph / letter/e - mail using correct basic English
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 7: Career Development & Goal Setting

Mapped to DGT/VSQ/N0103

Terminal Outcomes:

- Demonstrate Career Development & Goal Setting skills.

Duration: *<1.5:00>*	**Duration**: *<2.5:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Identify well-defined short- and long-term goals	• Create a career development plan
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 8: Communication Skills

Mapped to DGT/VSQ/N0103

Terminal Outcomes:

- Practice basic communication skills.

Duration: *<4:00>*	**Duration**: *<6:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the importance of communication etiquette including active listening for effective communication	• Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette • Write a brief note/paragraph on a familiar topic • Role play a situation on how to work collaboratively with others in a team
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 9: Diversity & Inclusion

Mapped to DGT/VSQ/N0103

Terminal Outcomes:

- Describe PwD and gender sensitisation.

Duration: *<1:00>*	**Duration**: *<1.5:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the significance of reporting sexual harassment issues in time	• Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 10: Financial and Legal Literacy

Mapped to DGT/VSQ/N0103

Terminal Outcomes:

- Describe ways of managing expenses, income, and savings.

Duration: *<4:00>*	**Duration**: *<6:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss various financial institutions, products, and services • Explain the common components of salary such as Basic, PF, Allowances (HRA, TA, DA, etc.), tax deductions • Discuss the legal rights, laws, and aids	• Demonstrate how to conduct offline and online financial transactions, safely and securely and check passbook/statement • Calculate income and expenditure for budgeting
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 11: Essential Digital Skills

Mapped to DGT/VSQ/N0103

Terminal Outcomes:

- Demonstrate procedure of operating digital devices and associated applications safely.

Duration: *<8:00>*	**Duration**: *<12:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the role of digital technology in day-to-day life and the workplace • Discuss the significance of displaying responsible online behavior while using various social media platforms	• Demonstrate how to operate digital devices and use the associated applications and features, safely and securely • Demonstrate how to connect devices securely to internet using different means • Follow the dos and don'ts of cyber security to protect against cyber crimes • Create an e-mail id and follow e- mail etiquette to exchange e -mails • Show how to create documents, spreadsheets and presentations using appropriate applications • Utilize virtual collaboration tools to work effectively
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 12: Entrepreneurship

Mapped to DGT/VSQ/N0103

Terminal Outcomes:

- Describe opportunities as an entrepreneur.

Duration: *<3:00>*	**Duration**: *<4:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the types of entrepreneurship and enterprises • Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan • Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement	• Create a sample business plan, for the selected business opportunity
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 13: Customer Service

Mapped to DGT/VSQ/N0103

Terminal Outcomes:

- Describe ways of maintaining customer.

Duration: *<4:00>*	**Duration**: *<5:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Classify different types of customers • Discuss various tools used to collect customer feedback • Discuss the significance of maintaining hygiene and dressing appropriately	• Demonstrate how to identify customer needs and respond to them in a professional manner
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 14: Getting ready for apprenticeship & Jobs

Mapped to DGT/VSQ/N0103

Terminal Outcomes:

- Describe ways of preparing for apprenticeship & jobs appropriately.

Duration: *<3:00>*	**Duration**: *<5:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the significance of maintaining hygiene and dressing appropriately for an interview • List the steps for searching and registering for apprenticeship opportunities	• Draft a professional Curriculum Vitae (CV) • Use various offline and online job search sources to find and apply for jobs • Role play a mock interview
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 15: Installation of IIOT elements

Mapped to ASC/N8321, v1.0

Terminal Outcomes:

- Perform the steps of preparing for IIOT network development.
- Demonstrate organisational procedure of installing IIOT elements.

Duration: *<15:00>*	**Duration**: *<20:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe different layers of network architecture. • Describe functioning of various network devices like routers, network switch, repeaters. • Illustrate design of industrial network between devices based on protocols, topology and device parameters. • Elaborate ways to analyse the installed Machines, automation elements, system and robots into different layers of network architecture like field devices, control devices, network. • Describe types of network protocols, topology and its significance. • Discuss device manufacturer software for network parameter settings and device communication. • Discuss the selection criteria of suitable network protocols like MODBUS, CC-LINK, Profinet, Profibus, OPC UA, MQTT etc. based on control system requirements. • List the steps to be performed for installing network protocols in the system. • Describe network topology like STAR, LINE, RING.	• Employ appropriate ways to design / interpret the network consists of devices, automation system and robots. • Demonstrate Standard operation procedures recommended by manufacturer for using equipment / machinery. • Show how to select the suitable network protocols like MODBUS, CC-LINK, Profinet, Profibus, OPC UA, MQTT etc. based on control system requirements. • Employ appropriate ways to verify the network that consists of devices, automation system and robots. • Demonstrate organisational procedure installing the network protocols and connecting the intelligent devices in the system.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
PCs/Laptops, Internet with Wi-Fi (Min2 Mbps Dedicated) 18 documents of PPAP, Design records, Design Records, Authorized Engineering Change Documents, Customer Engineering Approval, Design Failure Modes and Effects Analysis (DFMEA), applied in special situations, Process Flow Diagram, Process Failure Modes and Effects Analysis (PFMEA) Control Plan, Part Submission Warrant (PSW), Engineering Change Documents Dimensional Results, PLC Simulator, Hydraulic, Pneumatic, Electronic Control Systems Simulator, Internet of Things study material and IOT communication devices, Manufacturing Execution system, manufacturing operation management system. Hydraulics and pneumatics systems simulator, PLC Simulator with required software, Air Cylinders, valves, connector/tubing simulators, Pick and place robots assembly Electronics sensor like proximity, optical, magnetic sensors.	

Module 16: Integration and establishment of communication

Mapped to ASC/N8321, v1.0

Terminal Outcomes:

- Perform the steps of integration and establishment of communication.

Duration: *<15:00>*	**Duration**: *<20:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the steps to be performed for connecting the intelligent devices and system by using suitable network topology like STAR, LINE, RING as per network design document. • Discuss working and integration of different elements using I/O link master to the controller. • Describe data types like machine, process and control data from robot and automation system in the network. • Discuss the need of automation elements like sensors, control devices in the system. • Describe signaling parameters like bend radius, signal ground, terminal resistor, cable length etc. and their impact on system functioning. • Describe parameter like baud rate, distance, station ID and station type and how to set them in the system. • Describe ways to provide physical security of the network contains IIOT Edge Devices, IIOT Sensors, Machines, Robots and Automation System.	• Show how to connect the automation elements like sensors, control devices to I/O link master. • Apply appropriate ways to install the cable between devices in align with signaling parameters. • Employ appropriate ways to establish the communication between automation system, intelligent devices and robots • Show how to turn on the power of automation devices, system in the network and observe their functioning. • Apply appropriate ways to protect the network from unauthorized access or malicious internet and allow only authorized devices to connect to the network.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
PCs/Laptops, Internet with Wi-Fi (Min2 Mbps Dedicated) 18 documents of PPAP, Design records, Design Records, Authorized Engineering Change Documents, Customer Engineering Approval, Design Failure Modes and Effects Analysis (DFMEA), applied in special situations, Process Flow Diagram, Process Failure Modes and Effects Analysis (PFMEA) Control Plan, Part Submission Warrant (PSW), Engineering Change Documents Dimensional Results, PLC Simulator, Hydraulic, Pneumatic, Electronic Control Systems Simulator, Internet of Things study material and IOT communication devices, Manufacturing Execution system, manufacturing operation management system. Hydraulics and pneumatics systems simulator, PLC Simulator with required software, Air Cylinders, valves, connector/tubing simulators, Pick and place robots assembly Electronics sensor like proximity, optical, magnetic sensors.	

Module 17: Post-installation activities

Mapped to ASC/N8321, v1.0

Terminal Outcomes:

- Perform various post-installation activities.

Duration: *<15:00>*	**Duration**: *<15:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the organisational specified policies and procedures for conducting trial run of the system/ • List the documents needed to be prepared related to procurement, trial run and modifications done on the system. • Discuss the records and documents needed to be prepared and maintained such as experience under development, TGW /TGR faced during process trials etc. as a reference for future development.	• Employ appropriate ways for conducting trial run of the systems as per the e-plan to align it with existing or new manufacturing process. • Show how to handover the system to production team & train them on it as per SOP.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
PCs/Laptops, Internet with Wi-Fi (Min2 Mbps Dedicated) 18 documents of PPAP, Design records, Design Records, Authorized Engineering Change Documents, Customer Engineering Approval, Design Failure Modes and Effects Analysis (DFMEA), applied in special situations, Process Flow Diagram, Process Failure Modes and Effects Analysis (PFMEA) Control Plan, Part Submission Warrant (PSW), Engineering Change Documents Dimensional Results, PLC Simulator, Hydraulic, Pneumatic, Electronic Control Systems Simulator, Internet of Things study material and IOT communication devices, Manufacturing Execution system, manufacturing operation management system. Hydraulics and pneumatics systems simulator, PLC Simulator with required software, Air Cylinders, valves, connector/tubing simulators, Pick and place robots assembly Electronics sensor like proximity, optical, magnetic sensors.	

Module 18: Designing of network security architecture

Mapped to ASC/N8328, v1.0

Terminal Outcomes:

- Perform steps for designing of network security architecture.

Duration: *<20:00>*	**Duration**: *<24:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe different layers of cyber security system architecture • Describe types of network protocols, topology and its significance • Illustrate design of industrial network between devices based on protocols, topology and device parameters • Discuss the information obtain from e-plan or project document. • Describe security parameters for designing the cyber security system. • Discuss criticality and security threat levels in network security architecture. • List the steps of designing a network security system.	• Show how to select appropriate industrial software (networking window) as per the project requirements. • Show how to select appropriate core and auxiliary support process as per the project document. • Show how to select appropriate security parameters for data present in edge computing devices, cloud platforms, open-source databases. • Apply appropriate ways to define the manufacturing entities based on criticality and security threat levels in network security architecture. • Apply appropriate ways to ensure that only authorized devices/systems should be able to connect to the network. • Demonstrate steps of designing the network security system to ensure sufficient security levels are in place from device manufacturer, standard device installation & software requirement.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
PCs/Laptops, Internet with Wi-Fi (Min2 Mbps Dedicated) 18 documents of PPAP, Design records, Design Records, Authorized Engineering Change Documents, IOT communication devices, Manufacturing Execution system, manufacturing operation management system	

Module 19: Installation of application layer as per network security design

Mapped to ASC/N8328, v1.0

Terminal Outcomes:

- Perform steps for installation of application layer as per network security design.

Duration: *<20:00>*	**Duration**: *<20:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe data types like machine, process and control data from robot and automation system in the network. • Describe ways to maintenance and troubleshooting procedures like hardware, self-loop back, link test etc. • Describe functioning of various network devices like routers, network switch, repeaters • Discuss ways to manage the Malware software. • Describe firewalls and data encryption protocols. • List the steps of installing the suitable network protocols on the communication networking system.	• Demonstrate steps of installing the suitable network protocols like MODBUS, CC-LINK, PROFINET, PROFIBUS, OPC UA, MQTT etc. based on the communication networking system. • Show how to install firewalls and data encryption protocols. • Show how to set the security parameters of system on the networking window as per SOP and organizational guidelines. • Apply appropriate ways to configure and troubleshoot network security hardware like switches, routers, firewalls, WLAN, and Virtual Private Networks. • Show how to select the devices/system mapped into application layer based on their functions & sensitivity of data. • Apply appropriate ways to ensure that solution architecture (application layer) of the software performs day-to-day security processes such as threat and vulnerability management.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
PCs/Laptops, Internet with Wi-Fi (Min2 Mbps Dedicated) 18 documents of PPAP, Design records, Design Records, Authorized Engineering Change Documents, IOT communication devices, Manufacturing Execution system, manufacturing operation management system	

Module 20: Network monitoring & threat assessment

Mapped to ASC/N8328, v1.0

Terminal Outcomes:

- Perform steps for network monitoring & threat assessment.

Duration: *<20:00>*	**Duration**: *<20:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe ways to maintenance and troubleshooting procedures like hardware, self-loop back, link test etc. • Describe functioning of various network devices like routers, network switch, repeaters • Discuss ways to manage the Malware software. • Elaborate ways to evaluate criticality and security of threat levels of manufacturing entities.	• Apply appropriate ways to evaluate criticality and security of threat levels of manufacturing entities. • Apply appropriate ways to analyze data security performance metrics to highlight the threats in comparison with network security parameters. • Apply appropriate ways to maintain and update the communication status of physical systems in the manufacturing process. • Apply appropriate ways to implement regular threat assessment across devices to strengthen resistance against attack.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
PCs/Laptops, Internet with Wi-Fi (Min2 Mbps Dedicated) 18 documents of PPAP, Design records, Design Records, Authorized Engineering Change Documents, IOT communication devices, Manufacturing Execution system, manufacturing operation management system	

Module 21: Detect the security incidents

Mapped to ASC/N8329, v1.0

Terminal Outcomes:

- Perform steps to detect the security incidents.

Duration: *<15:00>*	**Duration**: *<15:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss connectivity protocols for device-cloud communications (this may include protocols such as 5g, wi-fi, gsm, gprs, and satellite. • Discuss wired/wireless connectivity protocols for device-device or device-gateway communications (this may include protocols such as nfc, nb-iot, bluetooth/ble, zigbee, mesh, and lora). • Describe network management dashboards and applications (such as hp open view). • Describe network topologies, wired and wireless technologies, fiber optics, etc. • List updated internal and external network regulations. • Discuss ways to perform network assessments.	• Apply appropriate ways to monitor the communication status & behavior of edge & cloud computing devices. • Apply appropriate ways to monitor the status of field and control device in the IIOT network. • Show how to interpret the field & control device status with edge computing device data on the dashboard. • Apply appropriate ways to check for third party network interference sources and take precautionary measures so that it should not affect the communications. • Show how to ensure readiness of software protocol & threat assessment processes to reliable detect incidents.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
PCs/Laptops, Internet with Wi-Fi (Min2 Mbps Dedicated) 18 documents of PPAP, Design records, Design Records, Authorized Engineering Change Documents, IOT communication devices, Manufacturing Execution system, manufacturing operation management system	

Module 22: Classify, prioritize & respond to the security incidents based on threat levels

Mapped to ASC/N8329, v1.0

Terminal Outcomes:

- Perform steps to classify, prioritize & respond to the security incidents based on threat levels.

Duration: *<15:00>*	**Duration**: *<15:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss ways to perform network assessments. • Describe ways to diagnose and resolve network issues. • Describe network blind spots. • Describe ways to identify and resolve vulnerabilities in systems.	• Apply appropriate ways to record, classify and prioritize information on security incidents using standard templates and tools. • Show how to generate report from the affected manufacturing entities on threat level and submit it to manager. • Apply appropriate ways to review the reports and consult with the manager for taking appropriate actions. • Apply appropriate ways to respond to threat assessments on edge computing devices using automated security assessment tools after getting permission from manger. • Show how to execute post-incident processes and procedures in line with security policies, procedures, and guidelines.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
PCs/Laptops, Internet with Wi-Fi (Min2 Mbps Dedicated) 18 documents of PPAP, Design records, Design Records, Authorized Engineering Change Documents, IOT communication devices, Manufacturing Execution system, manufacturing operation management system	

Module 23: Restoration & recovery of communication on affected manufacturing entities

Mapped to ASC/N8329, v1.0

Terminal Outcomes:

- Perform steps to restore & recover communication on affected manufacturing entities.

Duration: *<20:00>*	**Duration**: *<20:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Illustrate restoration & recovery plan. • Describe ways to store and retrieve information. • Describe ways to restore and recover systems after a security incident.	• Apply appropriate ways to implement restoration & recovery plan given by manager. • Show how to ensure timely restoration of devices and systems affected by security incident • Apply appropriate ways to evaluate the impact of security incidents in the manufacturing entities • Show how to assign information security incidents promptly to appropriate people for investigation/ action.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
PCs/Laptops, Internet with Wi-Fi (Min2 Mbps Dedicated) 18 documents of PPAP, Design records, Design Records, Authorized Engineering Change Documents, IOT communication devices, Manufacturing Execution system, manufacturing operation management system	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
B.E/B.Tech	Mechanical/Automobile/ Electrical/ Electronics	4	Mechanical/ Automobile/ Electronics/ Instrumentation	1	Mechanical/ Automobile/ Electronics/ Instrumentation	NA
B.E/B.Tech	Mechanical/Automobile/ Electrical/ Electronics	5	Mechanical/ Automobile/ Electronics/ Instrumentation	0	Mechanical/ Automobile/ Electronics/ Instrumentation	NA
Diploma	Mechanical/Automobile/ Electrical/ Electronics	3	Mechanical/ Automobile/ Electronics	1	Mechanical/ Automobile/ Electronics	NA
Diploma	Mechanical/Automobile/ Electrical/ Electronics	4	Mechanical/ Automobile/ Electronics	0	Mechanical/ Automobile/ Electronics	NA
M.E/M.Tech	Mechanical/Automobile/ Electrical/ Electronics	2	Mechanical/Automobile/ Electrical/ Electronics	1	Mechanical/Automobile/ Electrical/ Electronics	NA
M.E/M.Tech	Mechanical/Automobile/ Electrical/ Electronics	3	Mechanical/Automobile/ Electrical/ Electronics	0	Mechanical/Automobile/ Electrical/ Electronics	NA

Trainer Certification	
Domain Certification	**Platform Certification**
"Automotive Cyber Security Engineer, ASC/Q8312, version 1.0". Minimum accepted score is 80%.	Trainer is certified for the job role "Trainer" (VET and Skills); mapped to QP: "MEP/Q2601, V2.0" with minimum score of 80%

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
B.E/B.Tech	Mechanical/Automobile/ Electrical/ Electronics	5	Mechanical/ Automobile/ Electronics/ Instrumentation	1	Mechanical/ Automobile/ Electronics/ Instrumentation	NA
B.E/B.Tech	Mechanical/Automobile/ Electrical/ Electronics	6	Mechanical/ Automobile/ Electronics/ Instrumentation	0	Mechanical/ Automobile/ Electronics/ Instrumentation	NA
Diploma	Mechanical/Automobile/ Electrical/ Electronics	4	Mechanical/ Automobile/ Electronics	1	Mechanical/ Automobile/ Electronics	NA
Diploma	Mechanical/Automobile/ Electrical/ Electronics	5	Mechanical/ Automobile/ Electronics	0	Mechanical/ Automobile/ Electronics	NA
M.E/M.Tech	Mechanical/Automobile/ Electrical/ Electronics	3	Mechanical/Automobile/ Electrical/ Electronics	1	Mechanical/Automobile/ Electrical/ Electronics	NA
M.E/M.Tech	Mechanical/Automobile/ Electrical/ Electronics	4	Mechanical/Automobile/ Electrical/ Electronics	0	Mechanical/Automobile/ Electrical/ Electronics	NA

Assessor Certification	
Domain Certification	**Platform Certification**
"Automotive Cyber Security Engineer, ASC/Q8312, version 1.0". Minimum accepted score is 80%.	Assessor is certified for the job role "Assessor" (VET and Skills); mapped to QP: "MEP/Q2701, V2.0" with minimum score of 80%

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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 SSC
    - Assessment agency deploys the ToA certified Assessor for executing the assessment
    - SSC 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

References

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).
OJT (M)	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