



Automotive IIOT Application Specialist

QP Code: ASC/Q6415

NSQF Level: 6

Version: 1.0

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

New Delhi – 110020

Job Role: Automotive IIOT Application Specialist

Brief Job Description:

The individual at this job is responsible for managing and monitoring activities of integration of machines, robots, and Automation Systems in Healthy Communication, establish healthy communication using network protocols, remote monitoring and fetch vital machine data using IIOT edge devices within an organization for all its processes, the new development, production and application phases.

Personal Attributes:

This job requires the individual to work at a desk-based job for long hours. The individual should be result oriented and should also be able to demonstrate skills for information ordering, analytical reasoning, problem solving, time management, oral expression, and comprehension.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. Manage work and resources (Manufacturing)
2. Employability NOS (120 Hours)
3. Plan and design a Network Architecture using IIOT Solutions
4. Manage integration of machineries / Automation Systems in Healthy Communication via IIOT Sensor
5. Use Analytics, Edge & Cloud Computing Technologies to make Predictions on Production & Machineries
6. Liason with vendors and other departments

ASC/N6441: Plan and design a Network Architecture using IIOT Solutions

This unit is about designing a network having machines, robot, automation systems, and network dashboards while taking various considerations, regulations, and Pertinent requirements into account.

Scope

The Scope Covers the following: -

- Prepare for building architecture
- Interpret the various network parameters required as per design
- Develop the network as per design requirements
- Monitor the systems and devices mapping in network

Elements and Performance Criteria (PC)

Prepare for building architecture

To be competent, the user/individual on the job must be able to:

- PC1.** Obtain the design document and project develop requirements from the organization/OEM
- PC2.** Identify and select appropriate development tools, coding language, development platform, OS etc. as per the project requirements
- PC3.** Evaluate the IIOT network requirement like node allotment, station setting
- PC4.** Identify and select the machines, automation system to be connected in the IIOT network
- PC5.** Identify the suitable communication model, topology to connect the machines & automation system

Interpret the various network parameters required as per design

To be competent, the user/individual on the job must be able to:

- PC6.** Support in designing of wireless/wired network nodes while taking into consideration the varieties of IIOT sensors, I/O link, edge devices, cloud service, and other networking devices
- PC7.** Ensure appropriate wired/wireless connectivity protocols are applied for Machine-to-Machine communications
- PC8.** Ensure appropriate wired/wireless connectivity protocols are applied for edge device-cloud communications
- PC9.** Verify the network parameters like communication speed, network topology, node address of different devices in the IIOT network

Develop the network as per design requirements

To be competent, the user/individual on the job must be able to:

- PC10.** Support team in building code and configure software, its components and their oriented design
- PC11.** Support team in configuring ports and interfaces, Sender-Receiver communication and Client-Server communication as per the requirement
- PC12.** Guide the team during assigning nodes to every device in the system
- PC13.** Monitor that the nodes are optimized appropriately as per design document
- PC14.** Validate codes of all the components of architecture to ensure required output
- PC15.** Approve network design based on industrial requirement

- PC16.** Evaluate regulatory aspects of shopfloor network such as permitted frequency bands, possible interference due to high voltage line
- PC17.** Design and develop networking dashboards used for network monitoring with help from edge computing devices
- PC18.** Monitor timelines/deadlines and host review meetings
- PC19.** Ensure that the team is documenting the final network architecture plan appropriately

Monitor the systems and devices mapping in network

To be competent, the user/individual on the job must be able to:

- PC20.** Support the team during selection of the devices & checking their compatibility with the network and system
- PC21.** Monitor the IIOT network parameters like node address, communication speed and their effect on the network
- PC22.** Monitor that the team is mapping the node address of devices connected in the IIOT network appropriately and as per the design document and organizational standards
- PC23.** Verify that defined security standards and encryptions are followed in the EDGE boards and DATA links and as per the design document
- PC24.** Support the team in conducting communication test across all devices in the IIOT Network
- PC25.** Record the healthy status of all devices & report to organizational project review committee

Knowledge and Understandings (KU)

The individual on the job needs to know and understand:

- KU1.** Organisation procedures for health, safety and security, individual role and responsibilities in this context
- KU2.** Use of robots in different manufacturing and assembly operations
- KU3.** Safe operation of electronic equipment like computers, robotic systems etc
- KU4.** Relevant standards, procedures and policies related to robotic operations followed in the company
- KU5.** Data safety and Non-Discloser's Norms.
- KU6.** Designing and developing networks for the solution
- KU7.** Cyber safety and Work Confidentiality good practices
- KU8.** Data and folder standards
- KU9.** Different check sheets and technical documents
- KU10.** IIOT sensors, I/O link, edge devices, cloud service, and other networking devices required
- KU11.** Automation Systems Like PLC, Pneumatics, Hydraulics, HMI, Industrial Sensors
- KU12.** Wired/wireless connectivity protocols for Machine-to-Machine communications
- KU13.** Wired/wireless connectivity protocols for edge device-cloud communications
- KU14.** Network parameters like communication speed, network topology, node address of different devices
- KU15.** Impacts of network on the environment and human health

Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** Write basic level notes and observations
- GS2.** Modify work practices to improve them

- GS3. Note down observations related to the process
- GS4. Write information documents to internal departments and internal teams
- GS5. Monitoring of tasks completion efficiently and accurately within stipulated time
- GS6. Persuade team members to follow all guidelines and improvement procedures
- GS7. Make timely decisions for efficient utilization of resources
- GS8. Be punctual and utilize time efficiently
- GS9. Follow shop floor rules and avoid deviations
- GS10. Encourage self and other to take greater responsibilities in the task
- GS11. Question the process head in order to understand the activity
- GS12. Do what is right, not what is a popular practice
- GS13. Lead by example in plant premises and work area
- GS14. Ensure self-discipline and cleanliness on daily basis
- GS15. Use common sense and knowledge in day-to-day decision making
- GS16. Accept additional responsibilities to provide more flexibility to the team
- GS17. Use reasoning skills in identifying and resolving problems in industrial automation

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Prepare for building architecture</i>	9	9	-	8
PC1. Obtain the design document and project develop requirements from the organization/OEM	1	1	-	1
PC2. Identify and select appropriate development tools, coding language, development platform, OS etc. as per the project requirements	3	2	-	1
PC3. Evaluate the IIOT network requirement like node allotment, station setting	2	2	-	1
PC4. Identify and select the machines, automation system to be connected in the IIOT network	2	2	-	1
PC5. Identify the suitable communication model, topology to connect the machines & automation system	1	2	-	1
<i>Interpret the various network parameters required as per design</i>	6	6	-	4
PC6. Support in designing of wireless/wired network nodes while taking into consideration the varieties of IIOT sensors, I/O link, edge devices, cloud service, and other networking devices	2	2	-	1
PC7. Ensure appropriate wired/wireless connectivity protocols are applied for Machine-to-Machine communications	1	1	-	1
PC8. Ensure appropriate wired/wireless connectivity protocols are applied for edge device-cloud communications	1	1	-	1
PC9. Verify the network parameters like communication speed, network topology, node address of different devices in the IIOT network	2	2	-	1
<i>Develop the network as per design requirements</i>	17	19	-	6
PC10. Support team in building code and configure software, its components and their oriented design	2	2	-	1
PC11. Support team in configuring ports and interfaces, Sender-Receiver communication and Client-Server communication as per the requirement	2	2	-	1

PC12. Guide the team during assigning nodes to every device in the system	1	2	-	1
PC13. Monitor that the nodes are optimized appropriately as per design document	2	2	-	-
PC14. Validate codes of all the components of architecture to ensure required output	2	2	-	1
PC15. Approve network design based on industrial requirement	1	1	-	-
PC16. Evaluate regulatory aspects of shopfloor network such as permitted frequency bands, possible interference due to high voltage line	2	2	-	1
PC17. Design and develop networking dashboards used for network monitoring with help from edge computing devices	3	3	-	1
PC18. Monitor timelines/deadlines and host review meetings	1	2	-	-
PC19. Ensure that the team is documenting the final network architecture plan appropriately	1	1	-	
<i>Monitor the systems and devices mapping in network</i>	8	6	-	2
PC20. Support the team during selection of the devices & checking their compatibility with the network and system	1	1	-	1
PC21. Monitor the IIOT network parameters like node address, communication speed and their effect on the network	2	1	-	-
PC22. Monitor that the team is mapping the node address of devices connected in the IIOT network appropriately and as per the design document and organizational standards	1	1	-	-
PC23. Verify that defined security standards and encryptions are followed in the EDGE boards and DATA links and as per the design document	2	1	-	1
PC24. Support the team in conducting communication test across all devices in the IIOT Network	1	1	-	
PC25. Record the healthy status of all devices & report to organizational project review committee	1	1	-	
NOS Total	40	40	-	20

ASC/N6442: Manage integration of machineries / Automation Systems in Healthy Communication via IIOT Sensor

Description

This NOS unit is about performing task related to integration of machines and automation systems using industrial networking protocols, IIOT devices used in manufacturing processes to meet the specification set by the organization.

Scope

The Scope Covers the following:

- Support in installation of the elements in different layers of industrial network architecture & protocols
- Establish communication between systems using IIOT Sensors, I/O link master and IIOT EDGE Computing Devices
- Ensure IIOT Network security among machineries & automation systems

Elements and Performance Criteria (PC)

Support in installation of the elements in different layers of industrial network architecture & protocols

To be competent, the user/individual on the job must be able to:

- PC1.** Prepare an integration plan to map devices and systems as per network design document
- PC2.** Interpret the installed machines, automation elements, system, and robots into different layers of network architecture like field devices, control devices as per network design
- PC3.** Verify the network consists of devices, automation system and robots
- PC4.** Guide the team to select suitable network protocols like MODBUS, CC-LINK, Profinet, Profibus, OPC UA, MQTT etc. based on control system requirements
- PC5.** Ensure that team has connected the intelligent devices and system using suitable network topology like STAR, LINE, RING as per network design document
- PC6.** Monitor the activities related to installation of the systems on the pre-planned locations to distribute the network for max connectivity and reach
- PC7.** Verify the systems & devices integrated as per design documents
- PC8.** Guide the team during verification of the connections of IIoT Sensors, I/O-Links to the machines, robots Automation systems with the appropriate Network Protocol Like OPC UA, Mod Bus

Establish communication between systems using IIOT Sensors, I/O Link Master & IIOT EDGE Computing Devices

To be competent, the user/individual on the job must be able to:

- PC9.** Ensure that the automation elements like sensors, control devices to I/O link master are connected as per SOP
- PC10.** Establish the communication between automation system, machines, and robots by doing parameter setting like baud rate, distance, node ID and node type
- PC11.** Support the team in setting of the network parameters of automation system on the device manufacturers software as per SOP and organizational guidelines
- PC12.** Verify the Node-wise Communication having IIOT sensors, edge computing devices

- PC13.** Initiate the communication between Nodes in the IIOT Network like Machine-to-Machine Communication and ensure healthy communication between them
- PC14.** Configure the EDGE devices as per the IIOT network configuration
- PC15.** Guide the team to establish healthy communication between machines/devices and check for device duplicate
- PC16.** Support the team during testing of the functioning of backup systems, power connectivity and security access to the EDGE devices from both online and offline mode
- PC17.** Manage the activities related to server allotment and database for cloud computing

Ensure IIOT Network security among machineries & automation systems

To be competent, the user/individual on the job must be able to:

- PC18.** Ensure physical security of the network contains IIOT Edge Devices, IIOT Sensors, Machines, Robots and Automation System
- PC19.** Guide the team to verify the physical security and environment for the hardware for hassle-free operations
- PC20.** Monitor that the network is protected from unauthorized access or malicious internet
- PC21.** Ensure only authorized devices should be able to connect to the network

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** Organisation procedures for health, safety and security, individual role and responsibilities in this context
- KU2.** Software and 3D tools used in organisation.
- KU3.** Network Security Protocols
- KU4.** Safe operation of electronic equipment like computers, robotic systems etc.
- KU5.** Relevant standards, procedures and policies related to robotic operations followed in the company.
- KU6.** Data safety and Non-Discloser's Norms.
- KU7.** Cyber safety and Work Confidentiality good practices.
- KU8.** E-Plan as per Customer Requirement.
- KU9.** Team cohesion and collaborative working.
- KU10.** IIOT Sensors Connection Details

Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** Write basic level notes and observations.
- GS2.** Modify work practices to improve them.
- GS3.** Note down observations related to the process.
- GS4.** Write information documents to internal departments and internal teams.
- GS5.** Monitoring of tasks completion efficiently and accurately within stipulated time.
- GS6.** Persuade team members to follow all guidelines and improvement procedures.
- GS7.** Make timely decisions for efficient utilization of resources.
- GS8.** Be punctual and utilize time efficiently.
- GS9.** Follow shop floor rules and avoid deviations.

- GS10. Encourage self and other to take greater responsibilities in the task.
- GS11. Question the process head in order to understand the activity.
- GS12. Do what is right, not what is a popular practice.
- GS13. Lead by example in plant premises and work area.
- GS14. Ensure self-discipline and cleanliness on daily basis.
- GS14. Use common sense and knowledge in day-to-day decision making.
- GS15. Accept additional responsibilities to provide more flexibility to the team.
- GS16. Use reasoning skills in identifying and resolving problems in industrial automation.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Support in installation of the elements in different layers of industrial network architecture & protocols</i>	20	16	-	8
PC1. Prepare an integration plan to map devices and systems as per network design document	2	1	-	1
PC2. Interpret the installed machines, automation elements, system, and robots into different layers of network architecture like field devices, control devices as per network design	3	1	-	1
PC3. Verify the network consists of devices, automation system and robots	3	2	-	1
PC4. Guide the team to select suitable network protocols like MODBUS, CC-LINK, Profinet, Profibus, OPC UA, MQTT etc. based on control system requirements	3	1	-	1
PC5. Ensure that team has connected the intelligent devices and system using suitable network topology like STAR, LINE, RING as per network design document	2	3	-	1
PC6. Monitor the activities related to installation of the systems on the pre-planned locations to distribute the network for max connectivity and reach	3	3	-	1
PC7. Verify the systems & devices integrated as per design documents	2	3	-	1
PC8. Guide the team during verification of the connections of IIoT Sensors, I/O-Links to the machines, robots Automation systems with the appropriate Network Protocol Like OPC UA, Mod Bus	2	2	-	1
<i>Establish communication between systems using IIOT Sensors, I/O Link Master & IIOT EDGE Computing Devices</i>	15	17	-	8
PC9. Ensure that the automation elements like sensors, control devices to I/O link master are connected as per SOP	2	2	-	1

PC10. Establish the communication between automation system, machines, and robots by doing parameter setting like baud rate, distance, node ID and node type	2	2	-	1
PC11. Support the team in setting of the network parameters of automation system on the device manufacturers software as per SOP and organizational guidelines	2	2	-	1
PC12. Verify the Node-wise Communication having IIOT sensors, edge computing devices	2	2	-	1
PC13. Initiate the communication between Nodes in the IIOT Network like Machine-to-Machine Communication and ensure healthy communication between them	3	2	-	1
PC14. Configure the EDGE devices as per the IIOT network configuration	1	1	-	1
PC15. Guide the team to establish healthy communication between machines/devices and check for device duplicate	1	2	-	-
PC16. Support the team during testing of the functioning of backup systems, power connectivity and security access to the EDGE devices from both online and offline mode	1	2	-	1
PC17. Manage the activities related to server allotment and database for cloud computing	1	2	-	1
<i>Ensure IIOT Network security among machineries & automation systems</i>	5	7	-	4
PC18. Ensure physical security of the network contains IIOT Edge Devices, IIOT Sensors, Machines, Robots and Automation System	1	2	-	1
PC19. Guide the team to verify the physical security and environment for the hardware for hassle-free operations	2	2	-	1
PC20. Monitor that the network is protected from unauthorized access or malicious internet	1	2	-	1
PC21. Ensure only authorized devices should be able to connect to the network	1	1	-	1
NOS Total	40	40	-	20

ASC/N6443: Use analytics, edge & cloud computing technologies to make predictions on production & machineries.

Description

This NOS unit is about to perform prediction of Production Process, Machineries Using Analytics, Edge & Cloud Computing Technologies.

Scope

The Scope Covers the following: -

- Fetch the process and machine data using edge computing devices
- Use of statistical tools to organize and analyze the data
- Apply algorithm to make predictions using cloud computing technologies

Elements and Performance Criteria (PC)

Fetch the process and machine data using edge computing devices

To be competent, the user/individual on the job must be able to:

- PC1.** Identify the relevant source of data from machines and process
- PC2.** Select the machine communication protocol as per design document
- PC3.** Check for duplicate data & validate it
- PC4.** Monitor the process using edge computing devices like production or machine status
- PC5.** Customize the edge computing device dashboard as per customer requirement

Use of statistical tools to organize and analyse the data

To be competent, the user/individual on the job must be able to:

- PC6.** Select appropriate statistical tools for data analysis
- PC7.** Apply the statistical tools like regression, standard deviation on the data to analyse the trend and patterns
- PC8.** Perform inferential or descriptive analysis on the data to extrapolate
- PC9.** Find correlation amongst the selected attributes of the data and statistical proposition

Apply algorithm to make predictions using cloud computing technologies

To be competent, the user/individual on the job must be able to:

- PC10.** Analyse the data and trends, then create a model on that using algorithm
- PC11.** Fetch the model into the cloud servers
- PC12.** Enable the client services to access data from cloud domain
- PC13.** Make predictions on production process, machine status by access the model from cloud domain

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** Safe operation of electronic equipment like computers, robotic systems etc.
- KU2.** Relevant standards, procedures and policies related to robotic operations followed in the company.
- KU3.** Data safety and Non-Discloser's Norms.
- KU4.** Cyber safety and Work Confidentiality good practices.

- KU5.** Data and folder standards.
- KU6.** Statistical Tools to organize and analyze the data
- KU7.** Algorithm to make predictions using cloud computing technologies
- KU8.** Team cohesion and collaborative working.
- KU9.** Types of Data Algorithm, Statistical Tools
- KU10.** Cloud Services-Servers, Clients, Network Protocols, Remote Servers

Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1. Modify work practices to improve them.
- GS2. Note down observations related to the process.
- GS3. Write information documents to internal departments and internal teams.
- GS4. Monitoring of tasks completion efficiently and accurately within stipulated time.
- GS5. Persuade team members to follow all guidelines and improvement procedures.
- GS6. Make timely decisions for efficient utilization of resources.
- GS7. Be punctual and utilize time efficiently.
- GS8. Follow shop floor rules and avoid deviations.
- GS9. Encourage self and other to take greater responsibilities in the task.
- GS10. Question the process head in order to understand the activity.
- GS11. Do what is right, not what is a popular practice.
- GS12. Lead by example in plant premises and work area.
- GS13. Ensure self-discipline and cleanliness on daily basis.
- GS14. Use common sense and knowledge in day-to-day decision making.
- GS15. Accept additional responsibilities in order to provide more flexibility to the team.
- GS16. Use reasoning skills in identifying and resolving problems in industrial automation.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Fetch the process and machine data using edge computing devices</i>	13	13		7
PC1. Identify the relevant source of data from machines and process	2	2		2
PC2. Select the machine communication protocol as per design document	3	3		2
PC3. Check for duplicate data & validate it	3	3		1
PC4. Monitor the process using edge computing devices like production or machine status	2	2		1
PC5. Customize the edge computing device dashboard as per customer requirement	3	3		1
<i>Use statistical tools to organize and analyse the data</i>	14	14		7
PC6. Select appropriate statistical tools for data analysis	3	3		2
PC7. Apply the statistical tools like regression, standard deviation on the data to analyse the trend and patterns	4	4		2
PC8. Perform inferential or descriptive analysis on the data to extrapolate	4	4		2
PC9. Find correlation amongst the selected attributes of the data and statistical proposition	3	3		1
<i>Apply algorithm to make predictions using cloud computing technologies</i>	13	13		6
PC10. Analyse the data and trends, then create a model on that using algorithm	4	4		2
PC11. Fetch the model into the cloud servers	3	3		1
PC12. Enable the client services to access data from cloud domain	3	3		1
PC13. Make predictions on production process, machine status by access the model from cloud domain	3	3		2
NOS Total	40	40	-	20

ASC/N6444: Liaison with vendors and other departments

Description

This NOS unit is about coordination with vendor organizations/departments and to run and improve the processes successfully.

Scope

The scope covers the following:

- Collaboration with system developers
- Pre and post support
- Process and technology study and scope of development

Elements and Performance Criteria

Collaboration with system developers

To be competent, the user/individual on the job must be able to:

- PC1.** interact with different vendors for developing the robotic automation system to meet all the information integration and information flow starting from conception of the idea till implementation of the robotic system
- PC2.** ensure that integrators/developers incorporate all the necessary requirement such what level of information access will be different department and different level of people as per requirement/hierarchy system
- PC3.** carry out the techno-commercial feasibility analysis with system developer to ensure it fall under budgeted plan
- PC4.** estimate total cost of ownership (Operating labour, software and hardware) for the implementation of robotic system in the organization on the basis of results of techno-commercial feasibility analysis

Pre and post support activities

To be competent, the user/individual on the job must be able to:

- PC5.** ensure the concerned department and system engineers are trained about usage and application before the system installation
- PC6.** arrange training for the users by system developers for easy access of automation system
- PC7.** ensure users get appropriate level of information access as per their usage requirement-based sensitivity of the information

Process and scope of development

To be competent, the user/individual on the job must be able to:

- PC8.** analyze the ratio of automation implementation and study the process thoroughly

- PC9.** define the scope of development for the team in current process
- PC10.** define information flow among the team members related to the new technology of robotic automation

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** organizational policies, procedures, and guidelines that relate to designing and maintaining network
- KU2.** relevant standards, procedures and policies related to robotic operations followed in the company
- KU3.** organizational procedure of interacting with vendors and others
- KU4.** Pre and post support activities need to perform
- KU5.** data safety and non-discloser's norms
- KU6.** cyber safety and work confidentiality good practices
- KU7.** data and folder standards
- KU8.** various check sheets and technical documents related to work
- KU9.** how to read visual controls, graphs etc.
- KU10.** robot anatomy and robot applications
- KU11.** various methods of information flow in the organization

Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** follow instructions, guidelines, procedures, rules, and service level agreements
- GS2.** listen effectively and communicate information accurately
- GS3.** follow rule-based decision-making processes
- GS4.** make decisions on suitable courses
- GS5.** plan and organize the work to achieve targets and meet deadlines
- GS6.** apply problem-solving approaches to different situations
- GS7.** analyse the business impact and disseminate relevant information to others
- GS8.** apply balanced judgments to different situations
- GS9.** check the work is complete and free from error

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Collaboration with system developers</i>	15	15		8
PC1. interact with different vendors for developing the robotic automation system to meet all the information integration and information flow starting from conception of the idea till implementation of the robotic system	3	3		2
PC2. ensure that integrators/developers incorporate all the necessary requirement such what level of information access will be different department and different level of people as per requirement/hierarchy system	4	4		1
PC3. carry out the techno-commercial feasibility analysis with system developer to ensure it fall under budgeted plan	4	4		2
PC4. estimate total cost of ownership (Operating labour, software and hardware) for the implementation of robotic system in the organization on the basis of results of techno-commercial feasibility analysis	4	4		1
<i>Pre and post support activities</i>	15	15		6
PC5. ensure the concerned department and system engineers are trained about usage and application before the system installation	5	5		2
PC6. arrange training for the users by system developers for easy access of automation system	5	5		2
PC7. ensure users get appropriate level of information access as per their usage requirement-based sensitivity of the information	5	5		2
<i>Process and scope of development</i>	10	10		6
PC8. analyse the ratio of automation implementation and study the process thoroughly	3	3		2
PC9. define the scope of development for the team in current process	3	3		2
PC10. define information flow among the team members related to the new technology of robotic automation	4	4		2

NOS Total	40	40	-	20
-----------	----	----	---	----