Automotive Manufacturing Data Science Specialist

QP Code: ASC/Q6417

Version: 1.0

NSQF Level: 6

Automotive Skills Development Council || 153, GF, Okhla Industrial Area, Phase 3
New Delhi 110020 || email:paras@asdc.org.in

Contents

ASC/Q6417: Automotive Manufacturing Data Science Specialist

Brief Job Description

The individual at this job is responsible for designing and developing the visualization platforms for end-to-end visibility, after-sales analytics solutions and services, and determining repair cost estimates and allocating repair timelines, recording and creating daily maintenance logs and progress reports. He/She leads the development activities and guide the team on the technical front in analytics solutions and reviewing of code and supports a range of analytical, visualization, and predictive modelling projects along with project management.

Personal Attributes

The person should have good technical and analytical skills, should have excellent interpersonal skills, communication, and presentation skills, and a good team leader. The person should have project management skills, and also carry out prioritization of work and mentoring the budding engineers

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. ASC/N9810: Manage work and resources (Manufacturing)
2. ASC/N6443: Develop solutions for complex business problems
3. ASC/N6449: Manage data extraction and collection in automotive manufacturing entities
4. ASC/N6450: Prepare and analyse data by using analytical tools
5. ASC/N6451: Analyse assembly line data in automotive manufacturing entity
6. DGT/VSQ/N0104: Employability Skills (120 Hours)

Qualification Pack (QP) Parameters

Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Production Engineering
Country	India
NSQF Level	6

Credits	22
Aligned to NCO/ISCO/ISIC Code	NCO-2015/2120.0300
Minimum Educational Qualification & Experience	B.E./B.Tech with 1 Year of experience in relevant field OR M.E. (Pursuing 2nd year) OR M.Tech (Pursuing 2nd year) OR Certificate-NSQF (Electric Vehicle Product Design Engineer/ Automotive Prototype Manufacturing Lead Technician Level 5) with 3 Years of experience in relevant field
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	NA
Minimum Job Entry Age	22 Years
Last Reviewed On	NA
Next Review Date	NA
NSQC Approval Date	
Version	1.0

ASC/N9810: Manage work and resources (Manufacturing)

Description

This NOS unit is about implementing safety, planning work, adopting sustainable practices for optimising the use of resources.

Scope

The scope covers the following :

- Maintain safe and secure working environment
- Maintain Health and Hygiene
- Effective waste management practices
- Material/energy conservation practices

Elements and Performance Criteria

Maintain safe and secure working environment

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

PC1. identify hazardous activities and the possible causes of risks or accidents in the workplace

PC2. implement safe working practices for dealing with hazards to ensure safety of self and others

PC3. conduct regular checks of the machines with support of the maintenance team to identify potential hazards

PC4. ensure that all the tools/equipment/fasteners/spare parts are arranged as per specifications/utility into proper trays, cabinets, lockers as mentioned in the 5S guidelines/work instructions

PC5. organise safety drills or training sessions to create awareness amongst others on the identified risks and safety practices

PC6. fill daily check sheet to report improvements done and risks identified

PC7. ensure that relevant safety boards/signs are placed on the shop floor for the safety of self and others

PC8. report any identified breaches in health, safety and security policies and procedures to the designated person

Maintain Health and Hygiene

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

PC9. ensure workplace, equipment, restrooms etc. are sanitized regularly

PC10. ensure team is aware about hygiene and sanitation regulations and following them on the shop floor

PC11. ensure availability of running water, hand wash and alcohol-based sanitizers at the workplace

PC12. report advanced hygiene and sanitation issues to appropriate authority

PC13. follow stress and anxiety management techniques and support employees to cope with stress, anxiety etc

PC14. wear and dispose PPEs regularly and appropriately

Effective waste management practices

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

PC15. ensure recyclable, non-recyclable and hazardous wastes are segregated as per SOP

PC16. ensure proper mechanism is followed while collecting and disposing of non-recyclable, recyclable and reusable waste

Material/energy conservation practices

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

PC17. ensure malfunctioning (fumes/sparks/emission/vibration/noise) and lapse in maintenance of equipment are resolved effectively

PC18. prepare and analyze material and energy audit reports to decipher excessive consumption of material and water

PC19. identify possibilities of using renewable energy and environment friendly fuels

PC20. identify processes where material and energy/electricity utilization can be optimized

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. the organisation's emergency procedures for different emergency situations and the importance of following the same

KU3. evacuation procedures for workers and visitors

KU4. how and when to report hazards as well as the limits of responsibility for dealing with hazards

KU5. potential hazards, risks and threats based on the nature of work

KU6. various types of fire extinguisher

KU7. various types of safety signs and their meaning

KU8. appropriate first aid treatment relevant to different condition e.g. bleeding, minor burns, eye injuries etc.

KU9. relevant standards, procedures and policies related to 5S followed in the company

KU10. the various materials used and their storage norms

KU11. importance of efficient utilisation of material and water

KU12. basics of electricity and prevalent energy efficient devices

KU13. common practices of conserving electricity

KU14. common sources and ways to minimize pollution

KU15. categorisation of waste into dry, wet, recyclable, non-recyclable and items of single-use plastics

KU16. waste management techniques

KU17. significance of greening

Generic Skills (GS)

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

GS1. read safety instructions/guidelines
GS2. modify work practices to improve them
GS3. work with supervisors/team members to carry out work related tasks
GS4. complete tasks efficiently and accurately within stipulated time
GS5. inform/report to concerned person in case of any problem
GS6. make timely decisions for efficient utilization of resources
GS7. write reports such as accident report, in at least English/regional language

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Maintain safe and secure working environment	**20**	**13**	**-**	**8**
PC1. identify hazardous activities and the possible causes of risks or accidents in the workplace	4	2	-	2
PC2. implement safe working practices for dealing with hazards to ensure safety of self and others	3	1	-	2
PC3. conduct regular checks of the machines with support of the maintenance team to identify potential hazards	2	2	-	1
PC4. ensure that all the tools/equipment/fasteners/spare parts are arranged as per specifications/utility into proper trays, cabinets, lockers as mentioned in the 5S guidelines/work instructions	3	2	-	1
PC5. organise safety drills or training sessions to create awareness amongst others on the identified risks and safety practices	2	-	-	-
PC6. fill daily check sheet to report improvements done and risks identified	2	2	-	-
PC7. ensure that relevant safety boards/signs are placed on the shop floor for the safety of self and others	2	2	-	1
PC8. report any identified breaches in health, safety and security policies and procedures to the designated person	2	2	-	1
Maintain Health and Hygiene	**13**	**7**	**-**	**5**
PC9. ensure workplace, equipment, restrooms etc. are sanitized regularly	3	2	-	1
PC10. ensure team is aware about hygiene and sanitation regulations and following them on the shop floor	2	1	-	-
PC11. ensure availability of running water, hand wash and alcohol-based sanitizers at the workplace	2	2	-	1
PC12. report advanced hygiene and sanitation issues to appropriate authority	1	1	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. follow stress and anxiety management techniques and support employees to cope with stress, anxiety etc	2	1	-	1
PC14. wear and dispose PPEs regularly and appropriately	3	-	-	1
Effective waste management practices	**6**	**4**	**-**	**1**
PC15. ensure recyclable, non-recyclable and hazardous wastes are segregated as per SOP	3	2	-	-
PC16. ensure proper mechanism is followed while collecting and disposing of non-recyclable, recyclable and reusable waste	3	2	-	1
Material/energy conservation practices	**11**	**6**	**-**	**6**
PC17. ensure malfunctioning (fumes/sparks/emission/vibration/noise) and lapse in maintenance of equipment are resolved effectively	2	2	-	1
PC18. prepare and analyze material and energy audit reports to decipher excessive consumption of material and water	3	2	-	1
PC19. identify possibilities of using renewable energy and environment friendly fuels	3	1	-	2
PC20. identify processes where material and energy/electricity utilization can be optimized	3	1	-	2
NOS Total	**50**	**30**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N9810
NOS Name	Manage work and resources (Manufacturing)
Sector	Automotive
Sub-Sector	Generic
Occupation	Generic
NSQF Level	5
Credits	2
Version	2.0
Last Reviewed Date	31/08/2021
Next Review Date	31/08/2024
NSQC Clearance Date	31/08/2021

ASC/N6443: Develop solutions for complex business problems

Description

This NOS unit is about developing machine learning models using the extracted data and making predictive analytics solutions for complex business problems. It also involves project management using project tracking tools and task prioritization for all team members

Scope

The scope covers the following :

- Execute training phase in the machine learning project lifecycle
- Execute testing phase in the machine learning project lifecycle
- Deployment of the developed analytics model solution into production
- Deployment of the analytics model solution into production line

Elements and Performance Criteria

Execute training phase in the machine learning project lifecycle

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

PC1. Select and install relevant libraries and tools for model making

PC2. Split and prepare the dataset into training, validation and testing sets

PC3. Configure hyperparameters for the selected model, establish the training pipelines and execute the training phase

PC4. Store the model and network parameters to be used in the testing phase

PC5. Prevent underfitting and overfitting of the model

PC6. Solve the imbalanced dataset problem when the samples from minority class are very few

PC7. Evaluate the training performance of the machine learning model for training and validation accuracy

Execute testing phase in the machine learning project lifecycle

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

PC8. Test the models with testing datasets

PC9. Ensure the inference time per sample is as per the business requirement

PC10. Evaluate the testing performance of the machine learning model for testing accuracy

Deployment of the developed analytics model solution into production

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

PC11. Develop a front-end application to fetch inputs from the user and consume developed model for inference

PC12. Verify the production performance of the machine learning model

PC13. Analyse performance of the machine learning model and prepare feedback on the wrong predictions

PC14. Implement the feedback back to the training phase and retrain the machine learning model

Deployment of the analytics model solution into production line

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

PC15. Select relevant libraries and machine learning operations (MLOPS) tools and packages for deploying the analytics model solution into production line

PC16. Install the selected libraries and tools for machine learning operations tasks

PC17. Setup the continuous training, continuous integration, and continuous delivery pipelines for the developed machine learning models

PC18. Monitor the analytics model solution performance in the deployment phase

PC19. Carry out commissioning of the end-to-end system

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 databases

KU2. Organizational policies and procedures for sharing data

KU3. Organizational policies and procedures for documenting databases architectures and backup mechanisms

KU4. Who to involve while developing the different stages in the machine learning lifecycle

KU5. Descriptive and Inferential statistics for creating charts and predictive analytics modelling

KU6. Types of data wrangling and data cleaning methods to create visualization

KU7. Suitable documentation of the organization for the metadata creation

KU8. Updated internal and external network regulations

KU9. How to make an API interface for the developed machine learning model in Python using REST API framework

KU10. How to diagnose and resolve underfitting, overfitting and imbalanced dataset issues

KU11. How to use different machine learning algorithms for specific functions like regression, classification and clustering

KU12. How to use python programming constructs for developing machine learning models using open-source libraries like for example, scikit-learn

KU13. How to develop necessary front end to consume the developed analytics solution

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 errors

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Execute training phase in the machine learning project lifecycle	**16**	**16**	**-**	**7**
PC1. Select and install relevant libraries and tools for model making	2	2	-	1
PC2. Split and prepare the dataset into training, validation and testing sets	3	3	-	1
PC3. Configure hyperparameters for the selected model, establish the training pipelines and execute the training phase	3	3	-	1
PC4. Store the model and network parameters to be used in the testing phase	2	2	-	1
PC5. Prevent underfitting and overfitting of the model	2	2	-	1
PC6. Solve the imbalanced dataset problem when the samples from minority class are very few	2	2	-	1
PC7. Evaluate the training performance of the machine learning model for training and validation accuracy	2	2	-	1
Execute testing phase in the machine learning project lifecycle	**5**	**5**	**-**	**3**
PC8. Test the models with testing datasets	2	2	-	1
PC9. Ensure the inference time per sample is as per the business requirement	1	1	-	1
PC10. Evaluate the testing performance of the machine learning model for testing accuracy	2	2	-	1
Deployment of the developed analytics model solution into production	**8**	**8**	**-**	**4**
PC11. Develop a front-end application to fetch inputs from the user and consume developed model for inference	2	2	-	1
PC12. Verify the production performance of the machine learning model	2	2	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. Analyse performance of the machine learning model and prepare feedback on the wrong predictions	2	2	-	1
PC14. Implement the feedback back to the training phase and retrain the machine learning model	2	2	-	1
Deployment of the analytics model solution into production line	**11**	**11**	**-**	**6**
PC15. Select relevant libraries and machine learning operations (MLOPS) tools and packages for deploying the analytics model solution into production line	2	2	-	1
PC16. Install the selected libraries and tools for machine learning operations tasks	2	2	-	1
PC17. Setup the continuous training, continuous integration, and continuous delivery pipelines for the developed machine learning models	3	3	-	2
PC18. Monitor the analytics model solution performance in the deployment phase	2	2	-	1
PC19. Carry out commissioning of the end-to-end system	2	2	-	1
NOS Total	**40**	**40**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N6443
NOS Name	Develop solutions for complex business problems
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Production Engineering
NSQF Level	7
Credits	6
Version	1.0
Next Review Date	NA

ASC/N6449: Manage data extraction and collection in automotive manufacturing entities

Description

This NOS unit is about performing tasks related to managing extraction and collection of data from various manufacturing entities

Scope

The scope covers the following :

- Monitor assessment of project requirements
- Perform and monitor designing of project outline
- Support in selection of data integration platform to integrate the data from various department

Elements and Performance Criteria

Monitor assessment of project requirements

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

PC1. Support during evaluation of the project requirements to be catered with either visualization platforms or analytics and predictive modelling solutions

PC2. Monitor and guide team during designing of data architecture for collection and extraction of data from various departments using connectors and platforms

PC3. Identify the people required to execute the business analytics project requirements

PC4. Assess all organizational processes related to the use of data and analytics

PC5. Check that the existing setup is capable or not for data collection and analysis

Perform and monitor designing of project outline

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

PC6. Plan and prepare project layout where it should defend the choice of technology and its cost

PC7. Support and prepare the outline of the development process and its requirements for both material and resources

PC8. Define various data attributes and what level of analytics is required to analyse data and deliver value

PC9. Prepare the timeline and resource requirements

PC10. Manage project by using appropriate project tracking tools and task prioritization for all team members

PC11. Obtain the necessary approvals within the organization for data collection and extraction from various departments

Support in selection of data integration platform to integrate the data from various department

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

PC12. Select the data integration platform with the capabilities like- data transformation, application connectors, file processing, routing, orchestration, event handling, stream processing, API management, no-vendor lock-in.

PC13. Create and monitor an end-to-end data flow using ETL (Extract-Transform-Load) tool using different connectors for different types of data sources

PC14. Design and create a data warehouse for data acquisition
PC15. Develop data pipelines using connectors to populate the data in the data warehouse

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 databases
KU2. Organizational policies and procedures for sharing data
KU3. Organizational policies and procedures for documenting databases architectures and backup mechanisms
KU4. Who to involve while designing and developing the database architecture and pipelines for the solution
KU5. Range of standard platforms and tools available and how to use them
KU6. Database connectors and application connectors for application-cloud communications
KU7. Updated internal and external cybersecurity regulations
KU8. Impacts of network on the environment and human health
KU9. ETL tools like Talend, SQL Server Integration Services (SSIS), etc
KU10. Basics of SQL

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 errors

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Monitor assessment of project requirements	**11**	**11**	**-**	**5**
PC1. Support during evaluation of the project requirements to be catered with either visualization platforms or analytics and predictive modelling solutions	3	3	-	1
PC2. Monitor and guide team during designing of data architecture for collection and extraction of data from various departments using connectors and platforms	2	2	-	1
PC3. Identify the people required to execute the business analytics project requirements	2	2	-	1
PC4. Assess all organizational processes related to the use of data and analytics	2	2	-	1
PC5. Check that the existing setup is capable or not for data collection and analysis	2	2	-	1
Perform and monitor designing of project outline	**20**	**20**	**-**	**11**
PC6. Plan and prepare project layout where it should defend the choice of technology and its cost	4	4	-	2
PC7. Support and prepare the outline of the development process and its requirements for both material and resources	3	3	-	2
PC8. Define various data attributes and what level of analytics is required to analyse data and deliver value	3	3	-	2
PC9. Prepare the timeline and resource requirements	3	3	-	2
PC10. Manage project by using appropriate project tracking tools and task prioritization for all team members	4	4	-	2
PC11. Obtain the necessary approvals within the organization for data collection and extraction from various departments	3	3	-	1
Support in selection of data integration platform to integrate the data from various department	**9**	**9**	**-**	**4**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. Select the data integration platform with the capabilities like- data transformation, application connectors, file processing, routing, orchestration, event handling, stream processing, API management, no-vendor lock-in.	2	2	-	1
PC13. Create and monitor an end-to-end data flow using ETL (Extract-Transform-Load) tool using different connectors for different types of data sources	3	3	-	1
PC14. Design and create a data warehouse for data acquisition	2	2	-	1
PC15. Develop data pipelines using connectors to populate the data in the data warehouse	2	2	-	1
NOS Total	**40**	**40**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N6449
NOS Name	Manage data extraction and collection in automotive manufacturing entities
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Production Engineering
NSQF Level	6
Credits	2
Version	1.0
Next Review Date	NA

ASC/N6450: Prepare and analyse data by using analytical tools

Description

This NOS unit is about performing exploratory data analysis on the data extracted, deciding which data attributes are required for analytics and analysing the extracted attributes using excel/ open-source python libraires

Scope

The scope covers the following :

- Identify business goals for which data need to be analysed,
- Support in preparation of data
- Perform statistical analysis of data

Elements and Performance Criteria

Identify business goal for which data need to be analysed

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

PC1. Define business problems and business goals which can be achieved using available datasets from the manager

PC2. Select the relevant source of data to define business goal

PC3. Validate the criterion in the business problem with domain person

Support in preparation of data

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

PC4. Support and create a set of metadata for the selected dataset

PC5. Identify the attributes or columns in the datasets which are most significant from analysis perspective

PC6. Perform exploratory data analysis to check for missing or duplicate data

Perform statistical analysis of data

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

PC7. Perform descriptive statistical analysis on the data by following SOP

PC8. Perform inferential statistics analysis on the data by following SOP

PC9. Prepare list of highly correlated attributes

PC10. . Find correlation amongst the selected attributes of the data and plot their heatmap

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 databases

KU2. Organizational policies and procedures for sharing data

KU3. Organizational policies and procedures for documenting databases architectures and backup mechanisms

KU4. Descriptive and Inferential statistics for creating charts and predictive analytics modelling
KU5. Types of data wrangling and data cleaning methods to create visualization
KU6. Suitable documentation of the organization for the metadata creation
KU7. Aggregate the charts to create a dashboard to address the business problem
KU8. Addition of filters and chart tips to make the dashboard interactive

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 errors

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Identify business goal for which data need to be analysed	**11**	**11**	**-**	**6**
PC1. Define business problems and business goals which can be achieved using available datasets from the manager	3	3	-	2
PC2. Select the relevant source of data to define business goal	4	4	-	2
PC3. Validate the criterion in the business problem with domain person	4	4	-	2
Support in preparation of data	**16**	**16**	**-**	**7**
PC4. Support and create a set of metadata for the selected dataset	6	6	-	3
PC5. Identify the attributes or columns in the datasets which are most significant from analysis perspective	5	5	-	2
PC6. Perform exploratory data analysis to check for missing or duplicate data	5	5	-	2
Perform statistical analysis of data	**13**	**13**	**-**	**7**
PC7. Perform descriptive statistical analysis on the data by following SOP	3	3	-	2
PC8. Perform inferential statistics analysis on the data by following SOP	3	3	-	2
PC9. Prepare list of highly correlated attributes	3	3	-	1
PC10. . Find correlation amongst the selected attributes of the data and plot their heatmap	4	4	-	2
NOS Total	**40**	**40**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N6450
NOS Name	Prepare and analyse data by using analytical tools
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Production Engineering
NSQF Level	6
Credits	2
Version	1.0
Next Review Date	NA

ASC/N6451: Analyse assembly line data in automotive manufacturing entity

Description

This NOS unit is about performing analysis projects related to production process in assembly line using analytics and Business Intelligence tools.

Scope

The scope covers the following :

- Optimization of production processes to improve output and efficiency
- Identification of data needs expert analysis
- Deployment of the projects in local server or on the cloud

Elements and Performance Criteria

Optimization of production processes to improve output and efficiency

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

PC1. Create demand forecast of the project to ensure the right spare parts mix in assembly line

PC2. Analyse safety and quality data to reduce risk in assembly line

PC3. Conduct predictive health maintenance of assembly line machines

Identification of data needs expert analysis

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

PC4. Support in identification and verification of sensor level data sources in assembly line

PC5. Validate the data which needs expert analysis

Deployment of the projects in local server or on the cloud

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

PC6. Support in deployment of the project on the local server or cloud

PC7. Monitor and verify the compatibility of dashboard on different devices

PC8. Monitor the alert system in real time dashboard as per requirement

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 networks

KU2. Organizational policies and procedures for sharing data

KU3. Organizational policies and procedures for documenting network designs and fall-back mechanisms

KU4. Different types of visualizations charts Bar Graph, Line Graph, Stacked Bar Graph, Pie Chart, Scatter Plot Chart, etc.

KU5. Different types and categories of data variables qualitative, quantitative, nominal, ordinal, discrete, continuous, etc

KU6. Different types of visualizations tools like Microsoft Power BI Desktop, Tableau Public

KU7. Local machine server architecture

KU8. Python based on tools like Anaconda, Jupyter, VS Code, etc.

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. Refer anomalies to the supervisor

GS7. Ask for clarification and advice from appropriate people

GS8. Analyse the business impact and disseminate relevant information to others

GS9. Apply balanced judgments to different situations

GS10. Check the work is complete and free from errors

GS11. Work independently and collaboratively

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Optimization of production processes to improve output and efficiency	**16**	**16**	**-**	**8**
PC1. Create demand forecast of the project to ensure the right spare parts mix in assembly line	5	5	-	3
PC2. Analyse safety and quality data to reduce risk in assembly line	5	5	-	2
PC3. Conduct predictive health maintenance of assembly line machines	6	6	-	3
Identification of data needs expert analysis	**11**	**11**	**-**	**5**
PC4. Support in identification and verification of sensor level data sources in assembly line	6	6	-	3
PC5. Validate the data which needs expert analysis	5	5	-	2
Deployment of the projects in local server or on the cloud	**13**	**13**	**-**	**7**
PC6. Support in deployment of the project on the local server or cloud	4	4	-	2
PC7. Monitor and verify the compatibility of dashboard on different devices	5	5	-	3
PC8. Monitor the alert system in real time dashboard as per requirement	4	4	-	2
NOS Total	**40**	**40**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N6451
NOS Name	Analyse assembly line data in automotive manufacturing entity
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Production Engineering
NSQF Level	6
Credits	2
Version	1.0
Next Review Date	NA

DGT/VSQ/N0104: Employability Skills (120 Hours)

Description

This unit is about employability skills, Constitutional values, becoming a professional in the 21st Century, digital, financial, and legal literacy, diversity and Inclusion, English and communication skills, customer service, entrepreneurship, and apprenticeship, getting ready for jobs and career development.

Scope

The scope covers the following :

- Introduction to Employability Skills
- Constitutional values - Citizenship
- Becoming a Professional in the 21st Century
- Basic English Skills
- Career Development & Goal Setting
- Communication Skills
- Diversity & Inclusion
- Financial and Legal Literacy
- Essential Digital Skills
- Entrepreneurship
- Customer Service
- Getting ready for Apprenticeship & Jobs

Elements and Performance Criteria

Introduction to Employability Skills

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

PC1. understand the significance of employability skills in meeting the current job market requirement and future of work

PC2. identify and explore learning and employability relevant portals

PC3. research about the different industries, job market trends, latest skills required and the available opportunities

Constitutional values – Citizenship

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

PC4. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. for personal growth and the nation's progress

PC5. follow personal values and ethics such as honesty, integrity, caring and respecting others, etc.

PC6. follow and promote environmentally sustainable practices

Becoming a Professional in the 21st Century

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

PC7. recognize the significance of 21st Century Skills for employment

PC8. practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life

PC9. adopt a continuous learning mindset for personal and professional development

Basic English Skills

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

PC10. use English as a medium of formal and informal communication while dealing with topics of everyday conversation in different contexts

PC11. speak over the phone in English, in an audible manner, using appropriate greetings, opening, and closing statements both on personal and work front

PC12. read and understand routine information, notes, instructions, mails, letters etc. written in English

PC13. write short messages, notes, letters, e-mails etc., using accurate English

Career Development & Goal Setting

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

PC14. identify career goals based on the skills, interests, knowledge, and personal attributes

PC15. prepare a career development plan with short- and long-term goals

Communication Skills

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

PC16. follow verbal and non-verbal communication etiquette while communicating in professional and public settings

PC17. use active listening techniques for effective communication

PC18. communicate in writing using appropriate style and format based on formal or informal requirements

PC19. work collaboratively with others in a team

Diversity & Inclusion

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

PC20. • ensure personal behaviour, conduct, and use appropriate communication by taking gender into • consideration

PC21. empathize with a PwD and aid a PwD, if asked

PC22. escalate any issues related to sexual harassment at the workplace in accordance with the POSH Act

Financial and Legal Literacy

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

PC23. identify and select reliable institutions for various financial products and services such as bank account, debit and credit cards, loans, insurance etc.

PC24. carry out offline and online financial transactions, safely and securely, using various methods and check the entries in the passbook

PC25. identify common components of salary and compute income, expenses, taxes, investments etc

PC26. identify relevant rights and laws and use legal aids to fight against legal exploitation

Essential Digital Skills

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

PC27. operate digital devices and use their features and applications securely and safely

PC28. carry out basic internet operations by connecting to the internet safely and securely, using the mobile data or other available networks through Bluetooth, Wi-Fi, etc.

PC29. display responsible online behaviour while using various social media platforms

PC30. create a personal email account, send and process received messages as per requirement

PC31. carry out basic procedures in documents, spreadsheets and presentations using respective and appropriate applications

PC32. utilize virtual collaboration tools to work effectively

Entrepreneurship

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

PC33. identify different types of Entrepreneurship and Enterprises

PC34. use research and networking skills to identify and assess opportunities for potential business

PC35. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion

PC36. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity

Customer Service

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

PC37. identify different types of customers

PC38. identify and respond to customer requests and needs in a professional manner

PC39. use appropriate tools to collect customer feedback

PC40. follow appropriate hygiene and grooming standards

Getting ready for apprenticeship & Jobs

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

PC41. create a professional Curriculum vitae (Résumé)

PC42. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively

PC43. apply to identified job openings using offline /online methods as per requirement

PC44. answer questions politely, with clarity and confidence, during recruitment and selection

PC45. identify apprenticeship opportunities and register for it as per guidelines and requirements

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. need for employability skills

KU2. different learning and employability related portals

KU3. various constitutional and personal values

KU4. different environmentally sustainable practices and their importance

KU5. Twenty first (21st) century skills and their importance

KU6. how to use English language for effective verbal (face to face and telephonic) and written communication in formal and informal set up

KU7. importance of career development and setting long- and short-term goals

KU8. Do's and don'ts of effective communication
KU9. POSH Act
KU10. inclusivity and its importance
KU11. different types of disabilities and appropriate verbal and non-verbal communication and behaviour towards PwD
KU12. different types of financial institutes, products, and services
KU13. components of salary and how to compute income and expenditure
KU14. importance of maintaining safety and security in offline and online financial transactions
KU15. different legal rights and laws
KU16. different types of digital devices and the procedure to operate them safely and securely
KU17. how to create and operate an e- mail account
KU18. use applications such as word processors, spreadsheets etc.
KU19. different types of Enterprises and ways to identify business opportunities
KU20. types and needs of customers
KU21. how to apply for a job and prepare for an interview
KU22. apprenticeship scheme and the process of registering on apprenticeship portal

Generic Skills (GS)

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

GS1. read and write different types of documents/instructions/correspondence in English and other languages
GS2. communicate effectively using appropriate language in formal and informal settings
GS3. behave politely and appropriately with all to maintain effective work relationship
GS4. how to work in a virtual mode, using various technological platforms
GS5. perform calculations efficiently
GS6. solve problems effectively
GS7. pay attention to details
GS8. manage time efficiently
GS9. maintain hygiene and sanitization to avoid infection

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Introduction to Employability Skills	**1**	**1**	**-**	**-**
PC1. understand the significance of employability skills in meeting the current job market requirement and future of work	-	-	-	-
PC2. identify and explore learning and employability relevant portals	-	-	-	-
PC3. research about the different industries, job market trends, latest skills required and the available opportunities	-	-	-	-
Constitutional values – Citizenship	**2**	**1**	**-**	**-**
PC4. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. for personal growth and the nation's progress	-	-	-	-
PC5. follow personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
PC6. follow and promote environmentally sustainable practices	-	-	-	-
Becoming a Professional in the 21st Century	**2**	**3**	**-**	**-**
PC7. recognize the significance of 21st Century Skills for employment	-	-	-	-
PC8. practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-
PC9. adopt a continuous learning mindset for personal and professional development	-	-	-	-
Basic English Skills	**2**	**3**	**-**	**-**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. use English as a medium of formal and informal communication while dealing with topics of everyday conversation in different contexts	-	-	-	-
PC11. speak over the phone in English, in an audible manner, using appropriate greetings, opening, and closing statements both on personal and work front	-	-	-	-
PC12. read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
PC13. write short messages, notes, letters, e-mails etc., using accurate English	-	-	-	-
Career Development & Goal Setting	**1**	**2**	**-**	**-**
PC14. identify career goals based on the skills, interests, knowledge, and personal attributes	-	-	-	-
PC15. prepare a career development plan with short- and long-term goals	-	-	-	-
Communication Skills	**2**	**3**	**-**	**-**
PC16. follow verbal and non-verbal communication etiquette while communicating in professional and public settings	-	-	-	-
PC17. use active listening techniques for effective communication	-	-	-	-
PC18. communicate in writing using appropriate style and format based on formal or informal requirements	-	-	-	-
PC19. work collaboratively with others in a team	-	-	-	-
Diversity & Inclusion	**1**	**2**	**-**	**-**
PC20. • ensure personal behaviour, conduct, and use appropriate communication by taking gender into • consideration	-	-	-	-
PC21. empathize with a PwD and aid a PwD, if asked	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC22. escalate any issues related to sexual harassment at the workplace in accordance with the POSH Act	-	-	-	-
Financial and Legal Literacy	**2**	**3**	**-**	**-**
PC23. identify and select reliable institutions for various financial products and services such as bank account, debit and credit cards, loans, insurance etc.	-	-	-	-
PC24. carry out offline and online financial transactions, safely and securely, using various methods and check the entries in the passbook	-	-	-	-
PC25. identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-
PC26. identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
Essential Digital Skills	**2**	**3**	**-**	**-**
PC27. operate digital devices and use their features and applications securely and safely	-	-	-	-
PC28. carry out basic internet operations by connecting to the internet safely and securely, using the mobile data or other available networks through Bluetooth, Wi-Fi, etc.	-	-	-	-
PC29. display responsible online behaviour while using various social media platforms	-	-	-	-
PC30. create a personal email account, send and process received messages as per requirement	-	-	-	-
PC31. carry out basic procedures in documents, spreadsheets and presentations using respective and appropriate applications	-	-	-	-
PC32. utilize virtual collaboration tools to work effectively	-	-	-	-
Entrepreneurship	**2**	**3**	**-**	**-**
PC33. identify different types of Entrepreneurship and Enterprises	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC34. use research and networking skills to identify and assess opportunities for potential business	-	-	-	-
PC35. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
PC36. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity	-	-	-	-
Customer Service	**1**	**2**	**-**	**-**
PC37. identify different types of customers	-	-	-	-
PC38. identify and respond to customer requests and needs in a professional manner	-	-	-	-
PC39. use appropriate tools to collect customer feedback	-	-	-	-
PC40. follow appropriate hygiene and grooming standards	-	-	-	-
Getting ready for apprenticeship & Jobs	**2**	**4**	**-**	**-**
PC41. create a professional Curriculum vitae (Résumé)	-	-	-	-
PC42. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-
PC43. apply to identified job openings using offline /online methods as per requirement	-	-	-	-
PC44. answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
PC45. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
NOS Total	**20**	**30**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	DGT/VSQ/N0104
NOS Name	Employability Skills (120 Hours)
Sector	Cross Sectoral
Sub-Sector	Professional Skills
Occupation	Employability
NSQF Level	6
Credits	4
Version	1.0
Last Reviewed Date	27/05/2021
Next Review Date	27/05/2024
NSQC Clearance Date	27/05/2021

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.

2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.

3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below).

4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training centre based on these criteria.

5. In case of successfully passing only certain number of NOSs, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.

6. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack

Minimum Aggregate Passing % at QP Level : 70

(**Please note**: Every Trainee should score a minimum aggregate passing percentage as specified above, to

successfully clear the Qualification Pack assessment.)

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ASC/N9810.Manage work and resources (Manufacturing)	50	30	-	20	100	15
ASC/N6443.Develop solutions for complex business problems	40	40	-	20	100	20
ASC/N6449.Manage data extraction and collection in automotive manufacturing entities	40	40	-	20	100	20
ASC/N6450.Prepare and analyse data by using analytical tools	40	40	-	20	100	20
ASC/N6451.Analyse assembly line data in automotive manufacturing entity	40	40	-	20	100	15
DGT/VSQ/N0104.Employability Skills (120 Hours)	20	30	-	-	50	10
Total	**230**	**220**	**-**	**100**	**550**	**100**

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training

Glossary

Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.
Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.

Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.