Model Curriculum

QP Name: Automotive Electric Vehicle BSS (Battery Swapping System) Planning Engineer

QP Code: ASC/Q8314

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-2015/8212.0100
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 ** Knowledge of Algaritham deign desirable
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.

- Assessing targeted EV architecture design, targeted applications & market requirements
- Assessing mode of battery swapping to be used
- Review market trends for the similar applications and best practices
- Define different BSS Strategies based on vehicle applications
- Prepare hardware, software & control system components required for BSS
- Conduct simulation modelling for verifying design options & do necessary improvements to meet specifications
- Plan for DVP requirements & support for completing validations with the testing team
- Publish technical verification / validations results, architectures options with budget requirements & propose most suitable option for decision
- 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 Electric Vehicle BSS (Battery Swapping System) Planning Engineer	5:00	0:00			5:00
ASC/N9818: 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/N8345– Review the targeted design architecture of EV **NOS Version No. –1.0** **NSQF Level – 5.5**	**30:00**	**30:00**	**30:00**		**90:00**
Module 15: Assess the BSS requirements	15:00	15:00	15:00		45:00
Module 16: Assessing the mode of battery swapping	15:00	15:00	15:00		45:00
ASC/N8333 – Develop prominent options of BSS architecture, infrastructure and solutions **NOS Version No. –1.0** **NSQF Level – 5.5**	**80:00**	**79:00**	**81:00**		**240:00**
Module 17: Prepare timeline, budgets for the selected solution	35:00	25:00	30:00		90:00
Module 18: Review design and plan for Design validation and planning (DVP) requirements	40:00	44:00	41:00		125:00
Module 19: Publish technical verification / validations results and architectures options	5:00	10:00	10:00		25:00
ASC/N8334 – Assist manager & project teams to execute implementation of BSS	**45:00**	**60:00**	**45:00**		**150:00**

NOS Version No. –1.0 **NSQF Level – 5.5**					
Module 20: Prepare for implementation of BSS	15:00	30:00	15:00		60:00
Module 21: Support manager & project teams to execute implementation of BSS	30:00	30:00	30:00		90:00
Total Duration	**216:00**	**258:00**	**156:00**		**630:00**

Module Details

Module 1: Introduction to the role of an Automotive Electric Vehicle BSS (Battery Swapping System) Planning Engineer

Bridge module

Terminal Outcomes:

- Discuss the role and responsibilities of an Automotive Electric Vehicle BSS (Battery Swapping System) Planning Engineer.

Duration: *<05:00>*	**Duration**: *<00:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the role and responsibilities of an Automotive Electric Vehicle BSS (Battery Swapping System) Planning Engineer. • Discuss the job opportunities for an Automotive Electric Vehicle BSS (Battery Swapping System) Planning 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 flex fuel design 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: Assess the BSS requirements

Mapped to ASC/N8345, v1.0

Terminal Outcomes:

- Perform steps to assess the BSS requirements

Duration: *<15:00>*	**Duration**: *<15:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe 2W/3W/4W EV, its design architecture, components, and operational parameters. • List market trends of latest technologies, types of EVs, types of EV Batteries. • Illustrate drawings & vehicle layout architectures. • Discuss the information obtained from benchmarking data of previous project. • Describe BSS System & EV basics, its components & working principals. • List hardware & software for BMS. • Discuss ways to prepare budget of BSS system development. • List best BSS suitable solutions available.	• Apply appropriate ways to evaluate the type of EV that is 2W/3W/4W for information about vehicle design architecture, its components, and operational parameters to be received from the customer/OEM for the BMS infrastructure • Apply appropriate ways to evaluate the targeted applications and market requirements for the current project • Apply appropriate ways to check the types of BSS solution to be deployed to meet the customer requirement • Show how to identify prominent battery architectural and storage issues in the selected BSS options for the current project • Show how to identify required hardware & software for BSS with estimated budgeting • Propose the best suitable solutions to manager for the selection
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
PCs/Laptops, Internet with Wi-Fi (Min2 Mbps Dedicated) BSS system, EV	

Module 16: Assessing the mode of battery swapping

Mapped to ASC/N8345, v1.0

Terminal Outcomes:

- Perform steps to assess the the mode of battery swapping of BSS.

Duration: *<15:00>*	**Duration**: *<15:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss range of standard templates and tools available and how to use them • Illustrate process layouts, drawings & other technical details • Describe energy consumptions & usage • Describe ways of energy controlling & monitoring systems, its types & limitations • Discuss updated internal and external regulations for systems design • Discuss impact of organisational processes & products on the environment and human health safety guidelines	• Show how to prepare the outline for proposed battery swapping system and cell design packaging • Apply appropriate ways to evaluate proposed battery thermal management system design considering applications and vehicle architecture • Apply appropriate ways to evaluate time available/targeted for 1 swapping to be done and total number of transactions to be done • Show how to review several market solutions and latest trends for the similar applications and best practices to carefully choose from available best solutions • Show how to benchmark BSS in the market comparing target vehicle • Show how to review policy guidelines on the safety measurements for similar applications.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
PCs/Laptops, Internet with Wi-Fi (Min2 Mbps Dedicated) BSS system, EV	

Module 17: Prepare timeline, budgets for the selected solution

Mapped to ASC/N8333, v1.0

Terminal Outcomes:

- Prepare timeline, budgets for the selected solution

Duration: *<35:00>*	**Duration**: *<25:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Elaborate ways to analyse & initiate concept for BSS and its configurations, parameters, specifications, project scope etc. • Describe government norms for EV, legal requirements, safety requirements as per IEC TS 62840-1:2016 & compliances for designing BSS. • List the resources including the project stakeholders • Discuss the cost allocated to the project and the timelines for disbursements •	• Show how to analyse & initiate analyse & initiate concept for BSS and its configurations, parameters, specifications, project scope etc. • Role play a situation on conducting core team interactions to define boundaries for BMS architectures. • Show how to prepare overall project planning with critical milestones like Design Review (DR), Validation plans, Trial run, Pilot and Start of Production (SOP). • Show how to prepare budget tracking documents to be shared at regular intervals with stakeholders. • Demonstrate organisational procedure of submitting the budget and solution for approval to the management.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
PCs/Laptops, Internet with Wi-Fi (Min2 Mbps Dedicated) BSS system, EV	

Module 18: Review design and plan for Design validation and planning (DVP) requirements

Mapped to ASC/N8333, v1.0

Terminal Outcomes:

- Perform steps to review design options & do necessary improvements to meet specifications.
- Demonstrate how to plan for DVP requirements & support for completing validations with the testing team.

Duration: *<40:00>*	**Duration**: *<44:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List internal responsible departments and team members. • List leading component suppliers and competition designs. • Describe MPP-Microsoft project planning tool. • Discuss BSS types and pros and cons. • Describe Battery types, Cooling, and storage procedures. • Discuss Thermal Management of Battery System & its requirements. • List testing requirements & testing procedures, DVP for various components & systems. • Describe design Validation Plan (DVP). •	• Demonstrate procedure of conducting thorough comparison of the requirement vs the proposed technical solutions. • Show how to review the synthesis and comparison including any earlier experience database. • Role play a situation on discussing with superior & perform design improvements for BSS architecture. • Show how to benchmark technical guidelines TGR/TGW for similar BSS. • Role play a situation on getting the design Validation Plan (DVP) from the solution provider considering design requirements, loading conditions, vehicle applications, usage patterns, Governing legal regulations & Safety standards & requirements, recyclability and resume consideration Compliance, EMI/EMC Requirements. • Show how to support testing & planning team to complete testing / validations on technical topics.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
testing tools, simulation tools, software testing tools, hand tools, measuring tools, measuring instruments, gauges	

Module 19: Publish technical verification / validations results and architectures options

Mapped to ASC/N8333, v1.0

Terminal Outcomes:

- Perform steps to publish technical verification / validations results and architectures options.

Duration: *<5:00>*	**Duration**: *<10:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss integrated reporting to all stakeholders.	• Show how to prepare comparison study with verification & testing results outcomes. • Apply appropriate ways to prepare most suitable BMS architecture option recommendation considering design parameters, adaption complexity, cost etc.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
testing tools, simulation tools, software testing tools, hand tools, measuring tools, measuring instruments, gauges	

Module 20: Prepare for implementation of BSS

Mapped to ASC/N8334, v1.0

Terminal Outcomes:

- Perform preparatory steps for BSS implementation.

Duration: *<15:00>*	**Duration**: *<30:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Illustrate electrical connection layout, energy maps, energy costs. • List various materials used in BSS and their environmental impacts. • List battery power cycles and prevalent energy efficient devices. • Describe types of Batteries used in EV, Loading cycles and its impacts on battery life, Safety requirements for selected battery types. • Discuss ways to communicating with internal & external stakeholders. • Illustrate design & drawings for system and various components, Conventions used in drawings, Product design management & release. • Discuss updated internal and external regulations for system and component designs.	• Show how to prepare complete technical approved design including the type of solution agreed, its timeline and the project resources allotted for deployment both internally as well as from the solution provider. • Show how to prepare the deployment plan to be tracked on a regular basis to ensure smooth launch. • Demonstrate organisational procedure of releasing detail design, architecture Drawings for development. • Show how to track the proposal agreed by R&D teams including the sign-off document.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
testing tools, simulation tools, software testing tools, hand tools, measuring tools, measuring instruments, gauges	

Module 21: Support manager & project teams to execute implementation of BSS

Mapped to ASC/N8334, v1.0

Terminal Outcomes:

- Perform steps to support manager & project teams to execute implementation of BSS.

Duration: *<30:00>*	**Duration**: *<30:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List latest technology discussion forums and future technology study. • List field issues, its relationship with BMS system & its resolutions. • Discuss need of team working & communications. • List latest Automotive trends & development strategies.	• Role play a situation in participating in design reviews with the team internally & externally. • Show how to support the core team for necessary technical clarifications & resolutions from R&D network. • Show how to support for vehicle integration & series implementation. • Role play a situation in participating quality meetings & receive BMS performance feedback. • Apply appropriate ways to identify field issues regarding BSS related to various architecture, durability or control system issues. • Apply appropriate ways to propose & provide necessary technical resolution for the issues during deployment.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
testing tools, simulation tools, software testing tools, hand tools, measuring tools, measuring instruments, gauges	

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 Electric Vehicle BSS (Battery Swapping System) Planning Engineer, ASC/Q8314, 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 Electric Vehicle BSS (Battery Swapping System) Planning Engineer, ASC/Q8314, 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