Model Curriculum

QP Name: Automotive Additive Manufacturing Engineer

QP Code: ASC/Q6414

NSQF Level: 5.5

Automotive Skills Development Council
E-113, GF Floor, Okhla Industrial Area, Phase – III ,New Delhi – 110020

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Training Parameters

Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Production Engineering
Country	India
NSQF Level	5.5
Aligned to NCO/ISCO/ISIC Code	NCO-2015/8142.1100
Minimum Educational Qualification and Experience	12th Class pass with 3 years relevant experience. OR Completed 3 years Diploma (after Class 10th) with 2 Years of relevant experience. OR Pursuing 3rd year of B.E/B.Tech OR Certificate NSQF (Automotive Prototype Manufacturing Lead Technician Level 4.5) with 2 Years of relevant experience
Pre-Requisite License or Training	
Minimum Job Entry Age	22 years
Last Reviewed On	28th July, 2022
Next Review Date	28th July, 2025
NSQC Approval Date	28th July, 2022
Model Curriculum Creation Date	28th July, 2022
Model Curriculum Valid Up to Date	28th July, 2025
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.

- Show how to finalize design specification and ensure reliability and validity of the product design.
- Identify product specifications and requirements for CAD designing.
- Carry out designing of product on CAD software.
- Use 3D printing machine for the printing of automotive components.
- Work effectively and efficiently as per schedules and timelines.
- Implement safety practices.
- Use resources optimally to ensure less wastage and maximum conservation.
- Communicate effectively and develop interpersonal skills.

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 Additive Manufacturing Engineer	5:00	0:00			5:00
ASC/N9810: Manage work and resources (Manufacturing) NOS Version No. – 1.0 NSQF Level – 5.5	**15:00**	**40:00**			**55:00**
Module 2: Manage work and resources according to safety and conservation standards	15:00	40:00			55:00
ASC/N6435 – Prepare for product designing NOS Version No. – 1.0 NSQF Level – 5.5	**35:00**	**95:00**	**80:00**		**210:00**
Module 3: Prepare for product designing	35:00	95:00	80:00		210:00
ASC/N6436 – Design	**10:00**	**60:00**	**80:00**		**150:00**

automotive component, jigs & fixtures using CAD Software NOS Version No. –1.0 NSQF Level – 5.5					
Module 4: Design automotive component, jigs & fixtures using CAD Software	10:00	60:00	80:00		150:00
ASC/N6437 – Develop product prototype by 3D printing NOS Version No. –1.0 NSQF Level – 5.5	**05:00**	**35:00**	**80:00**		**120:00**
Module 5: Develop product prototype by 3D printing	05:00	35:00	80:00		120:00
DGT/VSQ/N0103-Employability Skills (90 hours) NOS Version No. – 1.0 NSQF Level – 5.5	**36:00**	**54:00**			**90:00**
Module 6: Introduction to Employability Skills	1:00	2:00			3:00
Module 7: Constitutional values - Citizenship	0.5:00	1:00			1.5:00
Module 8: Becoming a Professional in the 21st Century	2:00	3:00			5:00
Module 9: Basic English Skills	4:00	6:00			10:00
Module 10: Career Development & Goal Setting	1.5:00	2.5:00			4:00
Module 11: Communication Skills	4:00	6:00			10:00
Module 12: Diversity & Inclusion	1:00	1.5:00			2.5:00
Module 13: Financial and Legal Literacy	4:00	6:00			10:00
Module 14: Essential Digital Skills	8:00	12:00			20:00
Module 15: Entrepreneurship	3:00	4:00			7:00
Module 16: Customer Service	4:00	5:00			9:00
Module 17: Getting ready for apprenticeship & Jobs	3:00	5:00			8:00
Total Duration	**106:00**	**284:00**	**240:00**		**630:00**

Module Details

Module 1: Introduction to the role of an Automotive Additive Manufacturing Engineer

Bridge module

Terminal Outcomes:

- Discuss the role and responsibilities of an Automotive Additive Manufacturing Engineer.

Duration: *<05:00>*	**Duration**: *<00:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the role and responsibilities of an Automotive Additive Manufacturing Engineer. • Discuss the job opportunities for an Automotive Additive Manufacturing 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 manufacturing and automotive product 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/N9810, 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: Prepare for product designing

Mapped to ASC/N6435, v1.0

Terminal Outcomes:

- Perform the steps to carry out 3D modelling of product in CAD software.
- Demonstrate how to support the manager in finalization of design specification and ensuring reliability and validity of the product design.

Duration: *<35:00>*	**Duration**: *<95:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List sequence of operations for each process • Elaborate ways to analyse product requirements like basic customer preferences, benchmarking data, technology parameters etc. • List various designing software like CATIA, Auto-CAD, Unigraphics etc. required during the designing process. • Elaborate ways to analyse the technology and technique to be used for designing of the product. • List the design requirement in terms of material used for making the product. • Elaborate draughting standards and techniques- e.g. ANSI series IS/ ISO. • List technical drawing practices as per the company standards. • Describe drawings and modelling techniques like 2D and 3D. • Discuss ways to maintain aspects of aesthetic appeal, ergonomics etc. while designing the physical product. • Describe the impact of shape/ size/ environment on the product design. • List the steps to be performed for creating 3D model of product in CAD software. • Describe various CAD techniques available in the CAD software and required or designing of product 3D model. • Discuss elements related to color design (interior and exterior) of the product. • Discuss reliability requirements on the basis of benchmarks, competitive analysis, cost, safety, etc. • List the steps to be performed for testing the feasibility of product with the customer requirements by conducting simulation/ packaging study.	• Show how to select the designing software like CATIA, Auto-CAD, Unigraphics etc. for creating the designs and models. • Demonstrate the use of designing software. • Apply appropriate ways to examine the type of material required. • Employ appropriate ways to create a picture/image of the design. • Demonstrate ways to define the shape/ size/ environmental impact of the design. • Show how to visualise the customer requirements and prepare a rough sketch of product according to it. • Prepare a sample design geometry of product by applying appropriate CAD techniques. • Demonstrate how to product (Jigs & Fixtures, Automotive components) with its technical and structural constituents in CAD software on the basis of the initial sketches. • Show how to support the team during creation of design input specifications and requirement specifications for each of the aggregates, 3D model of the product, etc. • Apply appropriate ways to achieve the required specification of the product and ensure conformance between design output and design input. • Apply appropriate ways for maintaining and taking backup of CAD files and records of related information by following organisational guidelines. • Apply appropriate methods to develop a Quality Cost Delivery analysis for all decision metrics for developing the prototype of the component and cost involved.

• List key reliability risk items in a product design. • Describe risk reduction strategies. • Elaborate ways to analyses failure risks and mechanics in the product model. • Describe design of experiments methodology. • Describe Life Data Analysis (LDA) techniques.	• Apply appropriate ways to define the elements related to color design (interior and exterior) through analysis of a range of data. • Apply appropriate ways to define reliability requirements on the basis of benchmarks, competitive analysis, cost, safety, etc. • Demonstrate use of simulation models to estimate the products design reliability and analyse product reliability. • Demonstrate use of design of experiments methodology to identify factors significant to the life of the vehicle. • Demonstrate Life Data Analysis (LDA) techniques to statistically estimate the reliability of the product design and calculate various reliability-related metrics.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
• Drafting tools, MS office, designing software like CATIA, Auto-CAD, Unigraphics • Handbook and Technical Reference Books. • Safety materials: Fire extinguisher, safety gloves, aprons, safety glasses, ear plug, safety shoes and first-aid kit	

Module 4: Design automotive component, jigs & fixtures using CAD Software

Mapped to ASC/N6436, v1.0

Terminal Outcomes:

- Identify requirements and specifications for the product designing process.
- Perform preparatory activities to carry out product designing process.
- Perform the steps to carry out 3D modelling of product in CAD software.

Duration: *<10:00>*	**Duration**: *<60:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the information needed to collect from the work order, process manuals and instructions from internal design team and supervisor about the customer requirements and work to be done. • List various designing software like CATIA, Unigraphics, Fusion 360 etc. required for creating the designs and models. • List the design requirement in terms of material used for making the component, packaging and other requirements to decide the dimensions, measurements and tolerances of the aggregate/ component. • Elaborate draughting standards and techniques e.g. ANSI series IS/ ISO. • List technical drawing practices as per the company standards. • Describe drawings and modelling techniques like 2D and 3D. • Identify the reporting hierarchy and procedure for escalating faults and issues related to design concept clarity, dimensions and practicality. • Describe algebra and trigonometric rules and applications. • Describe Geometric and Trigonometric rules/ formula for developing the specifications of the component. • List the steps to be performed for creating 3D model of product in CAD software. • Describe various CAD techniques available in the CAD software and required or designing of product 3D model. • List types of files format such as STL or AMF etc. generated in the various steps of the process. • List the steps to be performed for checking and correcting the common	• Demonstrate how to interpret the work order, process manuals, instructions etc. to obtain the design requirements. • Show how to select the designing software like CATIA, Unigraphics, Fusion 360 etc. for creating the designs and models. • Demonstrate the use of designing software. • Demonstrate how to interpret the new or existing product to collect the design requirements. • Show how to create an object model as per drawing/dimension by using selected CAD software. • Demonstrate use of the Geometric and Trigonometric rules/ formula for developing the specifications of the component. • Apply appropriate procedure of setting required units and dimension parameters in the CAD file. • Demonstrate how to insert sketches, scanned images, diagrams, signs or symbols etc. in a CAD file. • Prepare a sample 3D model of product by applying appropriate CAD techniques. • Demonstrate the use of software features like tools modelling, sculpting, generative design, simulation, assemblies, collaboration, tool validation and design options for creating the object model. • Apply appropriate ways to verify the object model by comparing it with the information and specifications mentioned in the product modelling document. • Show how to convert the object model into STL or AMF file format. • Apply appropriate ways check and rectify the common errors in object model files

errors in object model file. • Discuss methods of using instruments like Vernier callipers, Micrometres, rulers and other inspection tools.	by following organisational guidelines. • Demonstrate steps to transfer the verified object model STL / AMF file into portable storage device or directly to 3D printer.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
• Drafting tools, MS office, designing software like CATIA, Unigraphics, Fusion 360 • Handbook, job orders and Technical Reference Books • 3D Printing machines- Fixed Deposition Modelling Machine, Stereo-Lithography Machine, Metal Sintering Machine & any other type of 3D printing machine with the all the consumables required, Flash Drive (With pre-stored program) • Safety materials: Fire extinguisher, safety gloves, aprons, safety glasses, ear plug, safety shoes and first-aid kit.	

Module 5: Develop product prototype by 3D printing

Mapped to ASC/N6437, v1.0

Terminal Outcomes:

- Perform the steps to operate and set up the machine for printing the automotive components.
- Demonstrate post-processing activities like quality check, segregation, storage etc.

Duration: *<05:00>*	**Duration**: *<35:00>*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the information needed to interpret from the instructions received from supervisor related to work to be done and work requirements. • Explain various 3D Printing technologies such as Fused Deposition Modelling, StereoLithography etc. • Identify various symbols and notifications being displayed by the 3D Printing machine. • Describe functionality of the 3D printing machine. • Explain the selection criteria of 3D printing machine as per the product specifications. • Recall various specifications of machine such as build speed, extrusion speed, nozzle temperature etc. • List machine operating parameters such as room temperature range, air cleanliness. • Explain standard tessellation language (.stl) code file and its selection criteria for machine operation. • List steps for preparing 3D printing machine for operation. • List the steps to be performed for operating the 3D printing machine. • List the steps to be performed for uploading and removing new code files in the machine memory. • Describe post-processing techniques such as removing and cleaning printed parts, inspection, segregation etc. of parts. • Discuss ways for removing the fabricated part from machine and support structures from the part. • Explain methods of inspecting the quality and non-conformities of the part. • Discuss the process of storing of ok parts as per organisational guidelines.	• Demonstrate how to convert a standard design model into standard tessellation language (.stl) file format. • Show how to select encoding format for the 3D printing program file. • Use appropriate resources to obtain information about part orientation, support structure requirement, machine specifications, machine operating parameters etc. as per the work requirement. • Show how to set the 3D printing machine and its parameters as per SOP/WI. • Demonstrate how to connect the data storage devices with the machine. • Role play a situation on how to co-ordinate with the designer for rectifying the errors generated during file uploading and observed during running of process. • Demonstrate organizational specified procedure of starting and operating the 3D printing machine for printing of automotive components. • Show how to select the optimum orientation of part. • Apply appropriate ways to identify and rectify errors in machine during the machine operation. • Prepare a sample report about the errors identified and rectified in the machine. • Demonstrate how to remove the printed part and support structures from the machine carefully. • Apply appropriate ways to clean the part for getting required surface finish. • Apply appropriate inspection methods for checking the quality and non-conformities of the part. • Apply appropriate ways to identify

• List maintenance activities for a 3D printing machine. • List the steps to be performed for troubleshooting and repairing defects in the machine. • Discuss the importance of placing tags on machines for next maintenance cycles. • Summarise the documents, records and information to be maintained related to the maintenance and repairing done.	measurement errors between 3D printed files and drafted files provided. • Apply appropriate methods to remove the errors in product design and rectify the difference. • Demonstrate how to store and preserve the manufactured automotive parts as per organisational guidelines. • Show how to prepare the maintenance plan and checklist as per machinery requirement. • Employ appropriate ways for troubleshooting and repairing defects in the machine. • Apply appropriate ways to ensure the smooth running and appropriate working of the repaired 3D printing machine.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
3D Printing machines- Fixed Deposition Modelling Machine, Stereo-Lithography Machine, Metal Sintering Machine & any other type of 3D printing machine with the all the consumables required, Flash Drive (With pre-stored program)	

Module 6: 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 7: 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 8: 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 9: 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 10: 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 11: 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 12: 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 13: 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 14: 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 15: 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 16: 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 17: 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	

Annexure

Trainer Requirements

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

Trainer Certification	
Domain Certification	**Platform Certification**
"Automotive Additive Manufacturing Engineer, ASC/Q6414, version 1.0". Minimum accepted score is 80%.	Recommended that the trainer is certified for the job role "Trainer (VET and Skills)", Mapped to Qualification Pack: MEP/Q2601, V2.0" Minimum accepted score is 80%.

Assessor Requirements

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

Assessor Certification	
Domain Certification	**Platform Certification**
"Automotive Additive Manufacturing Engineer, ASC/Q6414, version 1.0". Minimum accepted score is 80%.	Recommended that the Accessor is certified for the job role "Assessor (VET and Skills)", Mapped to Qualification Pack: MEP/Q2701, V2.0" Minimum accepted score is 80%.

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