



Model Curriculum

MCr Name: ARC* Technician-Solar Cell
OEM Name: ARC* Technician-Solar Cell

MCr Code: ELE/MCr-0005

MCr Version: 1.0

NSQF Level: 4.5

Model Curriculum Version: 1.0

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Training Parameters

Sector	Electronics
Sub-Sector	Solar & LED
Occupation	Quality & Testing -S&L
Country	India
NSQF Level	4.5
Aligned to NCO/ISCO/ISIC Code	NCO-xxxx/xxxxxxx
Minimum Educational Qualification and Experience	1. Diploma after 10th in Electronics and Communication Engineering/ Electrical Engineering with 6 Months of relevant experience required 2. 12th Grade or Equivalent with 1.5 years of relevant experience 3. 10th Grade or equivalent with 4.5 years of relevant experience 4. Previous NSQF qualifications of Level 4 with 1.5 years of relevant experience *Relevant Experience in Solar Cell Manufacturing or Semiconductor Domain
Pre-Requisite License or Training	NA
Minimum Job Entry Age	NA
Last Reviewed On	08.07.2026
Next Review Date	08.07.2029
NSQC Approval Date	08.07.2026
MCR Version	1.0
Model Curriculum Creation Date	08.07.2026
Model Curriculum Valid Up to Date	08.07.2029
Model Curriculum Version	1.0
Maximum Duration of the Course	30 Hrs.
Minimum Duration of the Course	30 Hrs.

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:

Compulsory:

- Basic lecture introduces different aspects of ARC (Anti Reflective Coatings techniques) on optical components and exposure to the current activities at a particular.

Compulsory Modules:

The table lists the modules and their duration corresponding to the Compulsory MCr of the QF.

MCr and Module Details	Theory / Demonstration Duration (In Hours)	Practical/OJT Duration (In Hours)	On-the-Job Training Duration (in hours) (Mandatory)	On-the-Job Training Duration (in hours) (Recommended)	Total Duration (In Hours)
ELE/MCr-0005	12:00	18:00	00:00	00:00	30:00
Module 1: Introduction to ARC* Technician- Solar Cell	12:00	18:00	00:00	00:00	30:00
Total Duration	12:00	18:00	00:00	00:00	30:00

Module Details

Module 1: Introduction to ARC* Technician-Solar Cell

Mapped to ELE/MCr-0005

Terminal Outcomes:

Upon completion of the module on Introduction ARC* Technician-Solar Cell, students will:

- Gain foundational knowledge of ARC principles, coating materials, and equipment preparation requirements.
- Operate ARC equipment and perform ARC application processes as per defined procedures and specifications.
- Conduct quality control and testing of ARC layers to ensure coating performance and adherence to standards.
- Maintain and troubleshoot ARC equipment to ensure reliable and efficient operation.
- Apply professional skills, safety practices, and compliance requirements during all ARC operations.

Duration: 12:00 hrs

Theory - Key Learning Outcomes

- Understand the principles of light interference, transmission, and the role of ARC in improving optical performance.
- Explain the properties and applications of ARC materials such as silicon dioxide in reducing reflection.
- Identify major components of ARC equipment, including vacuum chambers, actuators, valves, sensors, and control systems.
- Describe the requirements for preparing a coating environment with respect to cleanliness and calibration.
- Explain coating process parameters such as temperature, pressure, and material flow and their impact on coating quality.
- Interpret quality parameters related to ARC layers, including uniformity, reflectance, transmission, and adhesion.
- Understand preventive maintenance concepts and common causes of ARC equipment malfunctions.
- Recognize workplace safety practices, use of PPE, waste disposal norms, and environmental compliance requirements.

Duration: 18:00 hrs

Practical - Key Learning Outcomes

- Prepare substrates for ARC coating through proper cleaning and alignment techniques.
- Set up and calibrate ARC equipment by adjusting temperature, pressure, and material flow parameters.

- Operate and monitor the ARC application process to ensure coating uniformity and quality.
- Inspect and evaluate ARC coatings during and after application to identify defects.
- Conduct visual inspections and measure uniformity and basic performance characteristics of ARC layers.
- Perform basic tests for reflectance, transmission, and adhesion of ARC coatings.
- Carry out preventive maintenance tasks on ARC equipment as per defined schedules.
- Troubleshoot common coating and equipment-related issues and record corrective actions taken.
- Apply safety protocols, use PPE correctly, and maintain a safe and clean work environment.
- Dispose of waste materials in accordance with environmental and safety regulations.

Classroom Aids: (If Offline mode)

- Whiteboard and Markers
- Chart paper and sketch pens
- LCD Projector and Laptop for presentations

Tools, Equipment and Other Requirements

Labs equipped with the following:

- ARC Coating System (PECVD / PVD), Process Control Panel/Components, Wafers, Thickness Measurement Tool, Optical Microscope, Surface Reflectance Meter, Adhesion Test Kit, Vernier Caliper / Micrometer Multimeter, Tool Kit (Mechanical), Electrical Tool Kit, Vacuum Leak Detector, Cleaning Tools, Calibration Weights & Gauges, Personal Protective Equipment (PPE), Gas Leak Detector, Fire Extinguisher, Emergency Shower & Eye Wash, Safety Signage

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Graduate Science & Engineering	Electrical/ Mechanical/ Electronics	1	Semiconductor / VLSI / Solar Cell Manufacturing	1	Semiconductor/ VLSI / Solar Cell Manufacturing	
Diploma/ITI	Electrical/ Mechanical/ Electronics	2	Semiconductor / VLSI / Solar Cell Manufacturing	1	Semiconductor/ VLSI / Solar Cell Manufacturing	

Trainer Certification	
Domain Certification	Platform Certification
“ARC* Technician-Solar Cell, ELE/MCr-0005, version 1.0”. Minimum accepted score is 80%.	Recommended that the Trainer is certified for the ARC* Technician-Solar Cell “Trainer (VET and Skills)”, mapped to the Qualification Pack: “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	
Graduate Science & Engineering	Electrical/ Mechanical/ Electronics	2	Semiconductor / VLSI / Solar Cell Manufacturing	1	Semiconductor/ VLSI / Solar Cell Manufacturing	
Diploma/ITI	Electrical/ Mechanical/ Electronics	3	Semiconductor / VLSI / Solar Cell Manufacturing	1	Semiconductor/ VLSI / Solar Cell Manufacturing	

Assessor Certification	
Domain Certification	Platform Certification
“ARC* Technician-Solar Cell, ELE/MCr-0005, version 1.0”. Minimum accepted score is 80%.	Recommended that the Assessor is certified for the ARC* Technician-Solar Cell “Assessor (VET and Skills)”, mapped to the Qualification Pack: “MEP/Q2701, V2.0”, with minimum score of 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 MCr 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
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do 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/OJT application).
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.
National Occupational Standard	National Occupational Standard specify the standard of performance an individual must achieve when carrying out a function in the workplace
Persons with Disability	Persons with Disability are those who have long-term physical, mental, intellectual, or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others

Acronyms and Abbreviations

Term	Description
QF	Qualification File
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards
SSC	Skill Sectors Councils
NASSCOM	National Association of Software & Service Companies
NCO	National Classification of Occupations
ISO	International Organization for Standardization
SLA	Service Level Agreement
IT	Information Technology
CRM	Customer Relationship Management
PC	Performance Criteria
PwD	Persons with Disability
SOP	Standard Operating Procedure