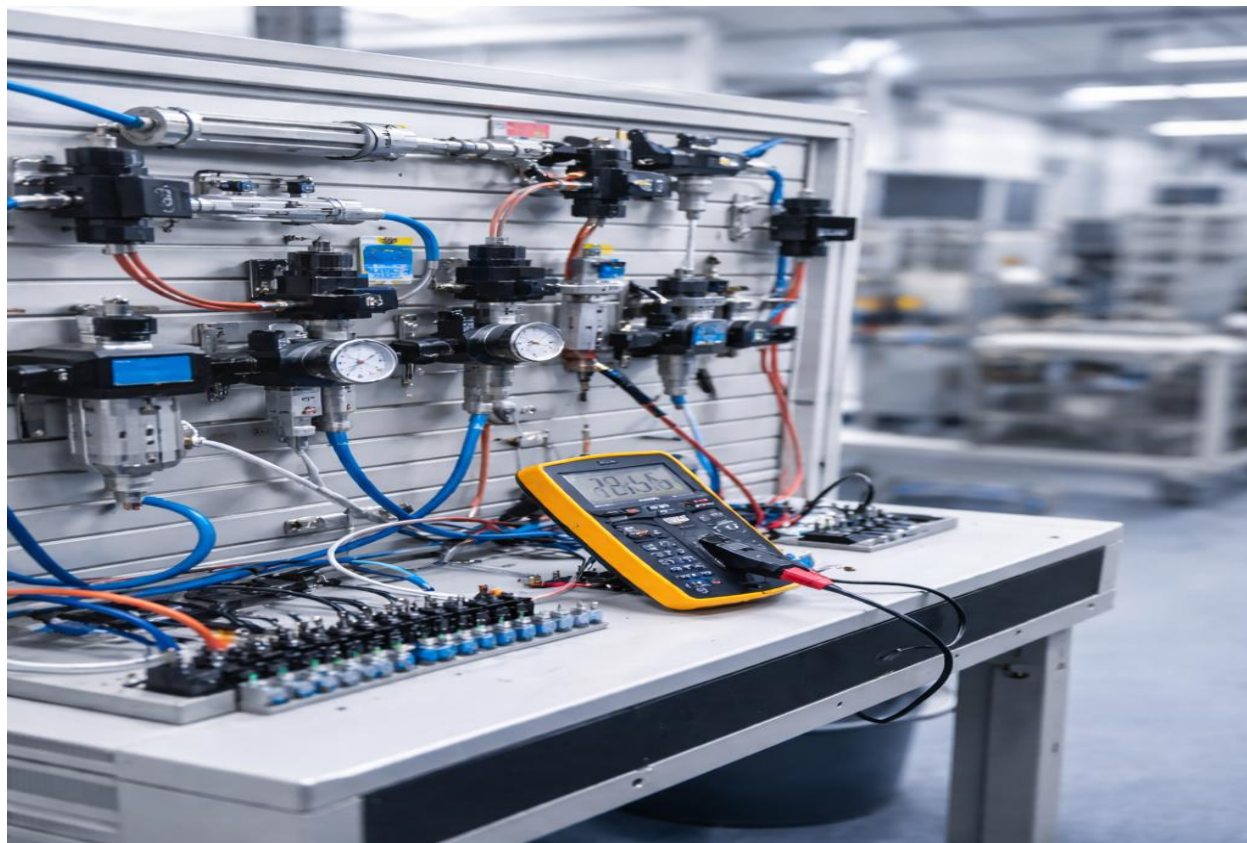




Model Curriculum

MCr Name: Basic Pneumatics in Semiconductor Manufacturing
OEM Name: Basic Pneumatics in Semiconductor Manufacturing

MCr Code: ELE/MCr-0007

MCr Version: 1.0

NSQF Level: 4.5

Model Curriculum Version: 1.0

Electronics Sector Skills Council of India || 155, 2nd Floor ESC House, Okhla Industrial Area – Phase 3,
New Delhi - 110020

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Training Parameters

Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Quality Assurance -S & C
Country	India
NSQF Level	4.5
Aligned to NCO/ISCO/ISIC Code	NCO-xxxx/xxxxxxx
Minimum Educational Qualification and Experience	Diploma after 10th in Electronics / Electrical / Mechanical Engineering with 6 Months of relevant experience required 12th Grade or Equivalent with 1.5 years of relevant experience 10th Grade or equivalent with 4.5 years of relevant experience Previous NSQF qualifications of Level 4 with 1.5 years of relevant experience #Relevant Experience in Semiconductor Manufacturing 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 Basic Pneumatics in Semiconductor Manufacturing 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/OJ T 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-0007	12:00	18:00	00:00	00:00	30:00
Module 1 Basic Pneumatics in Semiconductor Manufacturing	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: Basic Pneumatics in Semiconductor Manufacturing

Mapped to ELE/MCr-0007

Terminal Outcomes:

Upon completion of the module on Basic Pneumatics in Semiconductor Manufacturing, students will:

- Understand the properties, behavior, and applications of compressed air in semiconductor manufacturing processes.
- Identify different types of pneumatic compressors and evaluate their efficiency and suitability.
- Operate essential pneumatic system components, including air preparation units, actuators, and valves.
- Maintain and troubleshoot pneumatic systems to ensure reliable and efficient operation.
- Apply pneumatic principles to improve process efficiency and equipment performance in semiconductor manufacturing.

Duration: 12:00 hrs

Theory - Key Learning Outcomes

- Identify the properties of compressed air, including pressure, flow, and humidity.
- Explain air compression principles such as Boyle's Law and their practical relevance.
- Recognize the importance of compressed air properties in semiconductor manufacturing applications.
- Identify and compare different types of pneumatic compressors and their applications.
- Evaluate compressors based on efficiency parameters such as volumetric and thermal efficiency.
- Explain the functions of pneumatic system components, including filters, regulators, dryers, lubricators, valves, and actuators.
- Understand pneumatic system optimization concepts for improving process efficiency and reliability.

Duration: 18:00 hrs

Practical - Key Learning Outcomes

- Select appropriate compressors based on air demand and operating conditions.
- Set up and operate pneumatic system components with proper filtration, regulation, and lubrication.
- Operate safely directional control valves and actuators in line with safety protocols.
- Perform routine maintenance activities such as inspections, filter replacement, and valve adjustments.

- Troubleshoot common pneumatic issues related to pressure loss, flow restriction, and blockages.
- Adjust airflow and pressure settings to meet specific semiconductor process requirements.
- Implement pneumatic system improvements to enhance process efficiency and long-term performance.

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:

- Magnetic Symbols, SMC Electro-Pneumatic Training Software, Electro-Pneumatic Hands-on training kit, Product samples/cut-sections set, Training exercises set, SMC Circuit simulation software

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 Manufacturing	1	Semiconductor Manufacturing	
Diploma/ITI	Electrical/ Mechanical/ Electronics	2	Semiconductor Manufacturing	1	Semiconductor Manufacturing	

Trainer Certification	
Domain Certification	Platform Certification
“Basic Pneumatics in Semiconductor Manufacturing, ELE/MCr-0007, version 1.0”. Minimum accepted score is 80%.	Recommended that the Trainer is certified for the Basic Pneumatics in Semiconductor Manufacturing “Trainer (VET and Skills)”, mapped to the Qualification Pack: “MEP/Q2601, V2.0”, with minimum score of 80%

Assessor Requirements

7 | MCr Name: Basic Pneumatics in Semiconductor Manufacturing
 OEM Name: Basic Pneumatics in Semiconductor Manufacturing

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Graduate Science & Engineering	Electrical/ Mechanical/ Electronics	2	Semiconductor Manufacturing	1	Semiconductor Manufacturing	
Diploma/ITI	Electrical/ Mechanical/ Electronics	3	Semiconductor Manufacturing	1	Semiconductor Manufacturing	

Assessor Certification	
Domain Certification	Platform Certification
“Basic Pneumatics in Semiconductor Manufacturing, ELE/MCr-0007, version 1.0”. Minimum accepted score is 80%.	Recommended that the Assessor is certified for the Basic Pneumatics in Semiconductor Manufacturing “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