Model Curriculum

QP Name: Fundamentals of Robotronics

QP Code: ELE/N7123

QP Version: 1.0

NSQF Level: 2.5

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	Industrial Automation
Occupation	Product Design- I& A
Country	India
NSQF Level	2.5
Aligned to NCO/ISCO/ISIC Code	NCO-2015/3139.1400
Minimum Educational Qualification and Experience	1. 9th Grade No experience required 2. 8th Grade Pass and continuous education No experience required
Pre-Requisite License or Training	NA
Minimum Job Entry Age	12 years
Last Reviewed On	27.08.2024
Next Review Date	27.08.2027
NSQC Approval Date	27.08.2024
QP Version	1.0
Model Curriculum Creation Date	27.08.2024
Model Curriculum Valid Up to Date	27.08.2027
Model Curriculum Version	1.0
Maximum Duration of the Course	210 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.

- Execute assembly and testing procedures for robotics systems
- Provide technical assistance through troubleshooting processes
- Lead the operations of a Robot Training Academy
- Instruct individuals on robotics principles and techniques
- Support as a robotics assistant technician

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
ELE/N7123: Fundamentals of Robotronics	**90:00**	**120:00**	**00:00**	**00:00**	**210:00**
Module 1: Knowing the parts and fundamentals of a robotics system's operation	15:00	30:00	00:00	00:00	45:00
Module 2: Understanding the fundamental functions and applications of a robotics system	30:00	30:00	00:00	00:00	60:00
Module 3: Testing and Maintenance of Robotics Systems	30:00	30:00	00:00	00:00	60:00
Module 4: Reporting and Documentation	15:00	30:00	00:00	00:00	45:00
Total Duration	**90:00**	**120:00**	**00:00**	**00:00**	**210:00**

Module Details

Module 1: Knowing the parts and fundamentals of a robotics system's operation

Mapped to ELE/N7123

Terminal Outcomes:

- Able to gain foundational understanding of robotics including basic principles and components of robotic systems
- Able to define key concepts of voltage, current, electricity and their relations
- Able to describe different types of circuits and circuit diagram
- Able to integrate and synthesize information gained in theory sessions for assembling and troubleshooting of connections practically
- Able to build and demonstrate basic projects on hardware and digital platform independently
- Able to demonstrate technical skills after completion of basic projects, justify with reasoning, and solve problems effectively
- Identify different types of robots
- Explain about diodes, darlington transistor, motors and their applications
- Reflect their learning on logic gates, compare and analyse using truth tables.
- Perform different hands-on projects on hardware and digital platforms about good conductors, amplification of current, use of fuse, Electricity conversion to other forms, effect of series and parallel circuits on loads, use of diodes, capacitors and logic gates.
- Develop critical thinking skills and the ability to draw well-reasoned conclusions.
- Improve their ability to formulate and communicate scientific findings of the projects performed.

Duration: *15:00*	**Duration**: *30:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Introduction to Robotics • Discuss uses and opportunity for electronic, coding and robotics design and prototyping • Voltage, Current and Electricity fundamental and relation with each other • Learn about breadboards • Circuit and its components • Explain the use of various types of electronic components like Power indicator, Power supply connector unit Buzzer, Resistor, White LED, Connectors, push button switch • Series and Parallel Circuits • Short Circuits	The trainees will be able to: Assembly Procedure & Basic Troubleshooting • Identify and match the physical component and their polarity • Identify short circuits • Attend to warnings and shock hazards • Putting component backwards • Loose Connections Building Projects on Hardware and Digital Platform • Demonstrate the concept of open and closed circuits. • Demonstrate the Push Button Switch, Buzzer function and how electricity is used to generate sound

• Open and Closed circuits • Use of Fuse • Polarity in circuits • Sound and Light energy • Troubleshoot circuit and other functionaries • Electronically controlled switches • Discussion on different types of transistors • Different types of Robots - Remote Control, Autonomous Robots, Industrial Robots • Good and Bad conductor of electricity • Learn about Diodes, Application and use of diode • darlington Transistor • Mechanical Energy • Motors - Analyse motor operations • Logic gates • Compare the behaviour with the truth table for OR gate/AND gate with different inputs • Draw a comparison table • Analyse real time applications using logics • Explain Flashing LED function • Make stunning rainbow project for campus	• Demonstrate the LED function and how electricity is used to light up an LED. • Demonstrate how LED's like one-way valves let electricity flow only in one direction. • Demonstrate conductor and insulator of electricity. • Demonstrate the use of fuse to make electrical circuits safer. • Demonstrate the function of a Resistor in series with a Buzzer. • Demonstrate how a series Resistor is used to protect an LED. • Demonstrate how electric circuits can be built to turn on multiple loads at a time without affecting the performance of the other load. • Demonstrate the use of electronically controlled switches like Transistors using Push Button Switch for Input and Buzzer for Output. • Demonstrate how a transistor as a switch can control an LED output. • Get creative with circuits, demonstration of Push Button Switch in reverse function with Buzzer for Output. • To try and see for yourself if the switch reverse function works for an LED output. • Demonstrate if the human body is a good conductor of electricity using human touch as Input and Buzzer as Output. • Demonstrate the amplification of current via darlington Transistor with LED as Output. • Demonstrate the use of fuse to make electrical circuits safer with a Motor Output. • Demonstrate how electricity is converted into Sound, Light and Mechanical energy at the same time. • Demonstrate the characteristics of voltage, current, and resistance in a parallel circuit. • Demonstrate the characteristics of voltage, current, and resistance in a parallel circuit. • Demonstrate the effect of series and parallel circuits on loads. • Demonstrate the use of a free wheeling diode alongside the DC Motor in the DC Motor Block LU4. • Demonstrate the use of a capacitor alongside the DC Motor in the DC Motor Block LU4. • Demonstrate This OR That logic using Inputs as Push Button Switches and Output as Buzzer.

	• Demonstrate This OR That logic using Inputs as Push Button Switches and Output as DC Motor. • Demonstrate This OR That logic using Inputs as Push Button Switches and Output as LED. • Demonstrate This AND That logic using Inputs as Push Button Switches and Output as Buzzer. • Demonstrate This AND That logic using Inputs as Push Button Switches and Output as DC Motor. • Demonstrate This AND That logic using Inputs as Push Button Switches and Output as LED. • Demonstrate the Dual LED function. • Demonstrate the RGB LED function. • Demonstrate the concept of open and closed circuits. • To reiterate the Darlington Transistor concept with DC Motor as Output. • Demonstrate the amplification of current via darlington Transistor with Flashing LED as Output. • Demonstrate the function of Resistor 1K with a Dual LED Output. • To study different LED Outputs. • Demonstrate the Output using a Dual LED, when there is a change in the Input. • Demonstrate the Output using an RGB LED, when there is a change in the Input. • Demonstrate the use of electronically controlled switches like Transistors using Push Button Switch for Input and Flashing LED for Output. • 10 Practice Circuits
Classroom Aids:	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Robot Workstation/Kit, Multimeter, Tool Box includes cutter, screwdriver, nut driver, nut & bolts etc. Batteries/Power Bank	

Module 2: Understanding the fundamental functions and applications of a robotics system

Mapped to ELE/N7123

Terminal Outcomes:

- Understand the applications of robotics in different fields.
- Analyse the use of slide switch, latching circuits.
- Explore key concepts of DC motor and its types, Voltage, Current and RPM characteristics.
- List the steps to be performed for starting and analysing the functioning of the robot
- Understand RF communication and its applications
  Build and demonstrate Projects on Hardware and Digital Platform
- Apply knowledge to solve real-world problems.
- Demonstrate a comprehensive understanding of the fundamental principles, components, and types of robotic systems used in various applications.
- Understand Robot inputs, Batteries and motor driver units
- Perform practically different Movements of the robots
- Develop problem-solving skills related to diagnosing and resolving issues with robotic systems, as well as routine maintenance practices.
- Building Projects on Hardware of Conveyor Belt, Escalator belt, model of Hopping Robot & Cardboard Robot

Duration: *30:00*	**Duration**: *30:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Robotic Applications in different Fields, Agriculture, Industrial, defence, Consumer, Necessity of Robotics in Industries • How Robots are useful in day to day life • Analyse and use of slide switch • Latching Circuit • Different applications of Robots • Motors used in Robotics • Dc motor, types of DC motors • Geared Motors • Types of wheels • List the steps to be performed for starting and analysing the functioning of the robot RF Communication • Radio frequency range from Spectrum • Application with RF wireless Communication • Data Encode & Decode • Modulation & Demodulation Robot inputs • Push button	Building Projects on Hardware and Digital Platform • Demonstrate the use of electronically controlled switches like Transistors using Slide Switch for Input and Buzzer for Output. • Demonstrate the function of a Slide Switch. • Demonstrate how electric energy is converted into mechanical energy with the use of another Input Block. • Demonstrate how electric energy is converted into sound energy with the use of another Input Block. • Demonstrate a Latching circuit with Buzzer as the Output. • To demonstrate a Latching Circuit with DC Motor as the Output. • To demonstrate a Latching Circuit with LED as the Output. Preparations to build • Connecting Dc motor to battery • DC motor Clockwise and Anticlockwise rotation Manual check • Measuring battery voltage, current with Digital Multimeter • Logic high and logic low(VCC,GND) • Operating Dc motor using push button input

- Slide switch
- Reed Sensor and its working
- Touch point and its working
- Learn other different Inputs

Batteries

- Dc power source, Types of DC sources
- Cell or battery
- Measuring Voltage, Current with Multimeter
- Adding or removing cells based on requirements

Motor Driver units

- Transistor
- Darlington Transistor
- L293D motor driver
- H-Bridge driving capabilities

- Introduction to simple robots Applications
- Movements of the different robots
- Digital Circuit Building

- Robot construction using DC motors, battery and wheels
- RF module communication test

Building Projects on Hardware and Digital Platform

- Build a bot which moves in the Left direction on pressing the Push Button Switch.
- Build a bot which moves in the Left and Right directions on pressing the respective Push Button Switches.
- Build a bot which moves in the Left, Right and Forward directions on pressing the respective Push Button Switches.
- Build a bot which moves in the Left, Right, Forward and Reverse directions on pressing the respective Push Button Switches.
- Build a bot which moves in the Left, Right, Forward and Reverse directions on activating the respective Slide Switches, by moving the slider to your right.
- Build a bot which moves in the Left, Right, Forward and Reverse directions on activating the respective Reed Switches with a magnet.
- Build a bot which moves in the Left direction using human touch as input.
- Build a bot which moves in the Left and Right directions on holding the respective Touch points
- Build a bot which moves in the Left, Right and Forward directions on holding the respective Touch Points
- Build a bot which moves in the Left, Right, Forward and Reverse directions on holding the respective Touch Points.
- Build a bot which moves in the Left, Right, Forward and Reverse directions on activating four different inputs Reed Switch, Touch Point, Push Button Switch and Slide Switch respectively.

Building Projects on Hardware

- Construct and Build STEAM model of Conveyor Belt
- Construct and Build STEAM model of Escalator Belt
- Construct and Build STEAM model of Hopping Robot
- Construct and Build STEAM model of Cardboard Robot
- Construct and Build STEAM model of Walking Robot
- Construct and Build STEAM model of Carnival Ride
- Construct and Build STEAM model of Ant Bot
- Construct and Build STEAM model of Pac Man Bot
- Construct and Build STEAM model of Dog Bot
- Construct and Build STEAM model of Frog Bot

Classroom Aids:

Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop

Tools, Equipment and Other Requirements
Robot Workstation/Kit, Multimeter, Tool Box includes cutter, screwdriver, nut driver, nut & bolts etc. Batteries/Power Bank

Module 3: Testing and Maintenance of Robotics Systems

Mapped to ELE/N7123

Terminal Outcomes:

- Demonstrate proficiency in programming and controlling robotic systems
- Understand Arduino interactive prototyping platform
- Program robots using Arduino coding operations
- Build models of Walking robot, Carnival ride, Ant bot, Man Bot, FrogBot.
- Build different projects independently through arduino coding
- Implement control algorithms to make robots move and perform tasks accurately and efficiently.
- Understand how robots perceive their environment through sensors and how this data is used for decision-making.
- Understand the terms related to sensing, digitising, processing and analysis
- Differentiate types of sensors-assembly sensors, intelligent sensors, contact-non contact sensors.
- Demonstrate the working of a Reed Sensor, LDR Sensor with different Outputs

Duration: *30:00*	**Duration**: *30:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Introduction to simple robots Applications • Movements of the different robots • Explain the basics of programming. • Introduce Arduino Coding Arduino Operators • Different types of variables and sample codes checking output with Serial window. • Arithmetic operators (Add, Sub, Mul, Div) • Relational Operators (Less than, Greater than, Equal, Not Equal) • 'for' loop operations • 'while' loop usage • Conditional Statement 'if' and its sample codes • Decision Making with If—else • Multiple conditions if-else-if- else. Arduino Functions:	Arduino Installation • Open source platform • Download from Google , https://www.arduino.cc/en/software • Getting Started with IDE • Arduino Sketch Structure and flow • Sketch Main loop and Demonstration • Arduino Sketch variable Declaration • Few rules to declare Variables • Sketch Setup configuration Getting started with Arduino • Arduino Boards (UNo, Nano, Mega) • USB cable physical connection with board • understanding Arduino Pins and their usage for programming • Access Pins (input/Output)and develop sample source code • Explanation on logic High and Logic Low. Start Building Projects • Practice on IDE • Open new Sketch ,

- Structure of Function
- User defined functions declaration, call and return type.
- Return value and arguments
- Digital write, Digital read predefined Functions understanding and usage

Coding aspects

- Understanding Debounce
- Buzzer interfacing:(Output)
- Connecting buzzer with Arduino
- Operating buzzer with delay

- Explain the use of sensors and sensor-based systems in robotics.
- Explain the architecture and use of machine vision systems in robotics.
- Explain sensing, digitising, image processing and analysis.
- Explain the use of robotic assembly sensors and intelligent sensors.
- Explain the visual servo-control.
- Explain the difference between the contact and non-contact sensors.
- Explain different types of sensors used in robotics
- Demonstrate the use of the appropriate types of sensors in robotics as per the requirement.

- save, compile
- adding libraries,
- Checking Serial window Print operations
- Testing Arithmetic Operations with simple codes, Sketch Variable, Setup and Main loop build and compile.
- Practice codes with relational Operators and check outputs on Serial Window.
- Checking increment count, Decrement count outputs with Serial window
- checking input lower case character or uppercase character
- Finding Marks Average and Grades of students with Marks
- True or false results example code testing with Serial window.
- Board and Port selection from IDE
- Checking existance examples from IDE.(compile and Upload)
- Breadboard construction
- Understanding Power supply and its Terms voltage, current, Resistance , wires, Jumpers,.
- Demonstrate the Push Button Switch, Buzzer and generate sound with Arduino Sketch
- Generate Red flashing light
- Generate Green flashing light
- Generate Blue flashing light
- Generate secondary color Yellow with the sum of two primary colors Red and Green
- Generate secondary color Magenta with the sum of two primary colors Red and Blue
- Generate secondary color Cyan with the sum of two primary colors Green and Blue
- Generate White light with the sum of three primary colors Red, Green and Blue
- Generate a rainbow of colors, each with a unique Buzzer Sound.

Start Building Sensor Projects

- Demonstrate the working of a Reed Sensor with Buzzer Output.
- Demonstrate the working of a Reed Sensor with DC Motor Output.
- Demonstrate the working of a Reed Sensor Z9 with an LED Output.
- Demonstrate the working of a Reed Sensor Z9 with a Flashing LED Output.
- Demonstrate the working of a Reed Sensor Z9 with a Dual LED Output.
- Demonstrate the working of an LDR Sensor, Resistor

	10K and Transistor BC 557. ● Demonstrate the working of an LDR Sensor with a Fan Output. ● Demonstrate the working of an LDR Sensor with an LED Output. ● Demonstrate the working of an LDR Sensor with a Flashing LED. ● Demonstrate the working of an LDR Sensor with a Dual LED.
Classroom Aids:	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Robot Workstation/Kit, Multimeter, Tool Box includes cutter, screwdriver, nut driver, nut & bolts etc. Batteries/Power Bank	

Module 4: Reporting and Documentation

Mapped to ELE/N7123

Terminal Outcomes:

- Classify and categorise sensors commonly used in robotics based on their sensing principles, applications, and characteristics.
- Ability to select the most appropriate sensors for specific robotic tasks
- Understand RF and Bluetooth communication
- Hands-on Build and demonstrate Robot with multiple applications using different sensors
- Classify and categorise robotic applications based on their domains and use cases
- Develop the skills to calibrate sensors and conduct tests to ensure their accuracy and reliability in robotic applications.
- Understand Life size Bot and their applications
- Apply and demonstrate robotic principles on different models -Line following robot, Auto metro train,Metal detector Robot,Pick and place robot,Voice Controlled Robot.
- Do assembly of life size bot,circuit connections and troubleshooting.
- Learn how to adapt and optimise robotic systems to address changing requirements and challenges within different applications.
- Develop teamwork and communication skills

Duration: *15:00*	**Duration**: *30:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
● Different types of sensors and their uses in robotics applications	● Build an Obstacle Avoidance Robot using IR- Photo Sensor ● Build an Obstacle Avoidance Robot using Ultrasonic

- Demonstrate how to measure distance using suitable sensors.
- Demonstrate the use of the contact and non-contact sensor.
- Application of touch sensor
- Analyse use of magnetic switch
- Analyse and use of LDR Sensor
- Analyse and use of Obstacle Sensor
- Analyse and use of Infrared and Photodiode
- Analyse and use of Ultrasonic Sensor
  - Introduction to different robotics applications
  - 2 wheel drive
  - 4 wheel drive
  - Movements of the different robots
  - Introduction to Life size Bot and their applications
  - Features & Sensor used

RF Communication

- Radio frequency range from Spectrum
- Application with RF wireless Communication
- Data Encode & Decode
- Modulation & Demodulation

Bluetooth Communication

- Transmitter & Receiver Pairing
- App & Voice control

Sensor

- Build an Obstacle Avoidance Robot using IR-LDR Sensor
- Build a Line following Robot using IR-Photo Sensor
- Build a Line following robot using IR- LDR Sensor
- Build an Edge detector robot using IR-Photo Sensor
- Build an Edge detector robot using Ultrasonic sensor
- Build an Edge detector robot using IR- LDR Sensor
- Build a Remote Car
- Build a Snake Bot
- Build a Hammer
- Build a Maze Solver Car using IR Photo Sensor
- Build a Wall follower robot using IR Photo Sensor
- Build a Wall follower robot using Ultrasonic Sensor
- Build a Wall follower robot using IR- LDR Sensor
- Build a Magnet detector robot
- Create different structures or add accessories for different applications.

  Such as:

  1. Mopping Robot
  2. Sweeping Robot, etc.

- Experience robotic model - Line following robot and operate following instructions
- Experience robotic application - Auto Metro Train and operate following instructions
- Experience robotic application - Metal Detector Robot and operate following instructions
- Experience robotic application - Pick N Place Robot and operate following instructions
- Experience robotic application - Voice Controlled Robot and operate following instructions
- Assembly life size bot - base, structure, frame, head, eyes, etc,.
- Assembly the circuit and make connections
- Troubleshooting

Classroom Aids:

Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop

Tools, Equipment and Other Requirements

Robot Workstation/Kit, Robot Frames and accessories, Multimeter, Tool Box includes cutter, screwdriver, nut driver, nut & bolts etc. Batteries/Power Bank

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
BE/B.Tech	Electrical/ Electronics/ Mechanical	0	Relevant Industry Robotics	0	Training	
Diploma/ITI /Certified in relevant CITS Trade	Electrical/ Electronics/ Mechanical	1	Relevant Industry Robotics	1	Training	

Trainer Certification	
Domain Certification	**Platform Certification**
"Fundamentals of Robotronics, ELE/N7123, version 1.0". Minimum accepted score is 80%.	Recommended that the Trainer is certified for the **Fundamentals of Robotronics** "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/Assessment Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
BE/B.Tech	Electrical/ Electronics/ Mechanical	1	Relevant Industry Robotics	1	Training	
Diploma/ITI/ Certified in relevant CITS Trade	Electrical/ Electronics/ Mechanical	2	Relevant Industry Robotics	1	Training	

Assessor Certification	
Domain Certification	**Platform Certification**
"Fundamentals of Robotronics, ELE/N7123, version 1.0". Minimum accepted score is 80%.	Recommended that the Assessor is certified for the Fundamentals of Robotronics "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 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

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

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

Acronyms and Abbreviation

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