Electrical Technician

QP Code: ELE/Q6301
Version: 2.0
NSQF Level: 3
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ELE/Q6301: Electrical Technician

Brief Job Description

The individual at work integrates modules and sub parts together that form the electronic system of the product.

Personal Attributes

The job requires the individual to be physically fit and work in high-decibel noise environment.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. ELE/N6301: Integrate electrical sub system
2. ELE/N9972: Communicate and coordinate effectively with others
3. ELE/N1003: Work effectively, sustainably and safely

Qualification Pack (QP) Parameters

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<thead>
<tr>
<th>Sector</th>
<th>Electronics</th>
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<tbody>
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<td>Sub-Sector</td>
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<td>Assembly And Integration</td>
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<td>Pre-Requisite License or Training</td>
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Remarks:

- NA
ELE/N6301: Integrate electrical sub system

Description

This OS unit is about integrating all control boards and any other electronic components to obtain the entire electrical sub system of the product

Scope

The scope covers the following:

- Understand work requirements from the supervisor
- Assemble electrical and electronic sub system
- Report problems to supervisor
- Achieve productivity, quality and safety standards as per company's policy

Elements and Performance Criteria

_Understand work requirements from the supervisor_

To be competent, the user/individual on the job must be able to:

PC1. communicate with the supervisor in order to understand the day’s production requirement and plan work

PC2. apply approved drawings, job instructions or work manuals

_Assemble electrical and electronic sub system_

To be competent, the user/individual on the job must be able to:

PC3. collect assembled pcbs from the assembly team
PC4. collect consumables such as wires and connectors need for the assembly process
PC5. collect the work manual/job instruction from the supervisor
PC6. visually inspect the boards and components received for any physical damage, any loose or wrong connections
PC7. record faults and pass the board on to the PCB assembly team for re-work
PC8. follow the standard operating procedure to assemble the electrical sub system
PC9. follow the standard operating procedure to assemble the electrical sub system
PC10. interpret accurately drawings, wiring and job specifications/instructions
PC11. ensure that the finished assembly meets specifications
PC12. coordinate with the PCB assembly team to ensure that production targets are met

_Report problems to supervisor_

To be competent, the user/individual on the job must be able to:

PC13. underline any errors in previous step of the assembly process identified
PC14. report defective or inadequate number of components
PC15. report about inadequate quantity of consumables such as wires, connectors, screws, nuts, etc.
PC16. report any problems in the assembly line in time
Achieve productivity, quality and safety standards as per company’s policy
To be competent, the user/individual on the job must be able to:
PC17. accomplish 100% target for number of products to be manufactured per day
PC18. achieve 100% of planned work as scheduled
PC19. achieve zero errors as per company’s standards
PC20. achieve zero damage because of electrostatic discharge
PC21. maintain work area clean and organized
PC22. record any defects/inadequacies noted during the assembly process
PC23. maintain safety standards as per company policy
PC24. achieve clean work protocol

Knowledge and Understanding (KU)
The individual on the job needs to know and understand:

KU1. company's policies on: incentives, personnel management
KU2. company's code of conduct
KU3. importance of individuals role in the work flow
KU4. organisation culture
KU5. company's reporting structure
KU6. company's documentation policy
KU7. electro-mechanical assembly instructions
KU8. general principles of wiring and assembly
KU9. circuit design, block diagram of the product being assembled and functioning of its different modules
KU10. fundamentals of electricity such as Ohms law, difference between Ac and DC, series and parallel connections
KU11. basic electronics of components such as diode, transformer, LED, photo transistor, capacitor, resistor, inductor, thermistor, ICs
KU12. how to read values of resistors, capacitors, diodes and integrated circuits with specific reference to colour coding, polarity, orientation, tolerance
KU13. specific safety precautions while working in an electronic assembly unit
KU14. ESD precautions
KU15. protective gear such as gloves, rubber base shoes
KU16. maintenance of tools used during the assembly process
KU17. frequently occurring errors in the assembly process, causes and preventive measure
KU18. how to communicate with PCB assembly operators in order to meet production deadlines
KU19. documents and procedures used in the during the assembly process
KU20. handling of different electrical and mechanical products

Generic Skills (GS)
User/individual on the job needs to know how to:

GS1. use computers for documenting
GS2. complete forms such as work orders, invoices, maintenance records
GS3. read warnings, instructions and other text material on product labels, components, etc.
GS4. read job sheets or work orders
GS5. receive and ask for clarifications from supervisor on the job requirement
GS6. follow standard operating procedures while making decisions
GS7. take approval from supervisor in case the decision has to be made for exceptions
GS8. supervisor and co-workers to achieve smooth workflow
GS9. superior and co-workers to share knowledge and learning
GS10. ensure quality standards and standard operating procedures are maintained
GS11. ensure that the finished assembly meets specifications
GS12. assemble together various control boards and other electronic components in order to obtain the electrical sub system
GS13. achieve the required quality and meet overall quality standards
GS14. interpret accurately drawings, wiring and job specifications/instructions
GS15. improve work processes
GS16. reduce repetition of errors
## Assessment Criteria

<table>
<thead>
<tr>
<th>Assessment Criteria for Outcomes</th>
<th>Theory Marks</th>
<th>Practical Marks</th>
<th>Project Marks</th>
<th>Viva Marks</th>
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</thead>
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<td>PC2. apply approved drawings, job instructions or work manuals</td>
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<td><em>Assemble electrical and electronic sub system</em></td>
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<td>PC4. collect consumables such as wires and connectors need for the assembly process</td>
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<td>PC12. coordinate with the PCB assembly team to ensure that production targets are met</td>
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<td>Assessment Criteria for Outcomes</td>
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<td>PC18. achieve 100% of planned work as scheduled</td>
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<td>PC20. achieve zero damage because of electrostatic discharge</td>
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<td>PC21. maintain work area clean and organized</td>
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<td>PC22. record any defects/inaequacies noted during the assembly process</td>
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<td>PC24. achieve clean work protocol</td>
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<td>Industrial Automation</td>
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<td>27/01/2022</td>
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ELE/N9972: Communicate and coordinate effectively with others

Description

This unit is about effective, respectful communication and coordination with supervisors and colleagues.

Scope

The scope covers the following:

- Communicate effectively with supervisor and colleagues
- Respect gender and ability differences

Elements and Performance Criteria

Communicate effectively with supervisor and colleagues

To be competent, the user/individual on the job must be able to:

PC1. communicate potential hazards of a particular location
PC2. comply with organisation’s policies and procedures for working with colleagues
PC3. maintain personal hygiene and professional appearance
PC4. seek clarification on the information provided by supervisor, if needed
PC5. respect the personal and professional space of colleagues and superiors
PC6. report work completed as per the schedule to superior and inform of any deviations or anomalies
PC7. analyse and act on feedback received from supervisor

Respect gender and ability differences

To be competent, the user/individual on the job must be able to:

PC8. work depicting proper behaviour towards all genders and people with disability
PC9. identify acts of discrimination and sexual harassment and report to concerned authorities

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. importance of personal grooming
KU2. organisation’s policy on code of conduct
KU3. organisation's reporting structure and documentation policy
KU4. how to communicate effectively through all means including face-to-face, telephonic as well as written
KU5. different types of information that colleagues might need and the importance of providing the same as and when required
KU6. rights and duties w.r.t PwD at workplace
KU7. organisation policies and standards to support PwD
KU8. gender and disability based concepts or issues such as social and cultural bias, gender roles stereotypes, gender inequality and discrimination, especially for women and transgender
KU9. organisation grievance redressal mechanisms and related legislations
KU10. health and safety precautions for all individuals, including PwD at workplace

Generic Skills (GS)

User/Individual on the job needs to know how to:

GS1. listen actively and carefully in all interactions
GS2. communicate politely under all circumstances
GS3. report potential areas of disruptions to work process in writing or in person
GS4. maintain positive and effective relationships with others
GS5. decide when to report to supervisor and when to deal with a colleague depending on the type of concern
GS6. receive and act on supervisor's feedback in a constructive manner
GS7. speak, listen, and write using gender-inclusive or gender-neutral terms and gestures
GS8. be aware and accountable of ones own gender identity and role, as well as beliefs and practices about disability
## Assessment Criteria

<table>
<thead>
<tr>
<th>Assessment Criteria for Outcomes</th>
<th>Theory Marks</th>
<th>Practical Marks</th>
<th>Project Marks</th>
<th>Viva Marks</th>
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<td>PC3. maintain personal hygiene and professional appearance</td>
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<td>PC7. analyse and act on feedback received from supervisor</td>
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<td>Respect gender and ability differences</td>
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<td>PC9. identify acts of discrimination and sexual harassment and report to concerned authorities</td>
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ELE/N1003: Work effectively, sustainably and safely

Description

This unit is about following health and safety procedures, waste management procedures and resource management in order to achieve required productivity and quality.

Scope

The scope covers the following:

- Achieve optimum productivity and quality
- Implement health and safety procedures
- Organise waste management and recycling
- Conserve resources

Elements and Performance Criteria

Achieve optimum productivity and quality

To be competent, the user/individual on the job must be able to:

PC1. keep immediate work area clean and tidy
PC2. work effectively to meet daily target
PC3. deliver work of expected quality despite constraints
PC4. ensure timely completion of tasks
PC5. comply with organization's policies and procedures

Implement health and safety procedures

To be competent, the user/individual on the job must be able to:

PC6. take ESD precautions while doing work
PC7. avoid any damage in components due to negligence in ESD procedures
PC8. participate in fire drills or any other safety workshops organised by the organisation
PC9. use appropriate Personal Protective Equipment (PPE) as advised by the organisation

Organise waste management and recycling

To be competent, the user/individual on the job must be able to:

PC10. identify and segregate recyclable/non-recyclable and hazardous wastes
PC11. dispose waste as per the suggested procedures by the organization
PC12. participate in waste management and waste disposal workshops organised at workplace

Conserve resources

To be competent, the user/individual on the job must be able to:

PC13. use all resources judiciously
PC14. perform routine cleaning of tools, machines and equipment
PC15. report malfunctioning of machines and equipment
PC16. connect electrical equipment and appliances properly when in use and turn off when not in use
Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. importance of time management
KU2. organizational safety and health policy
KU3. different waste categories such as dry, wet, recyclable, non-recyclable and single use plastic items
KU4. usage of different colours of dustbins to dispose waste
KU5. cause and effect of greening of jobs
KU6. methods of waste disposal
KU7. methods of recycling as well as repairing and reusing electronic components
KU8. efficient utilisation of material and water
KU9. basics of electricity and prevalent energy efficient devices
KU10. ways to recognise common electrical problems
KU11. common practices of conserving electricity

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. read job cards/complaint registers for the work requirement
GS2. organise work and be punctual
GS3. read instructions, warnings, labels on equipment while doing work
GS4. escalate any health and safety issues to supervisors
GS5. report any inappropriate incidents/issues to the relevant person
GS6. write in local/English language and complete written work with attention to detail
## Assessment Criteria

<table>
<thead>
<tr>
<th>Assessment Criteria for Outcomes</th>
<th>Theory Marks</th>
<th>Practical Marks</th>
<th>Project Marks</th>
<th>Viva Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Achieve optimum productivity and quality</strong></td>
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<td>PC1. keep immediate work area clean and tidy</td>
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<td>PC2. work effectively to meet daily target</td>
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<td>PC3. deliver work of expected quality despite constraints</td>
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<td>PC4. ensure timely completion of tasks</td>
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<td>PC5. comply with organization's policies and procedures</td>
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<td><strong>Implement health and safety procedures</strong></td>
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<td>PC6. take ESD precautions while doing work</td>
<td>2</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PC7. avoid any damage in components due to negligence in ESD procedures</td>
<td>2</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PC8. participate in fire drills or any other safety workshops organised by the organisation</td>
<td>2</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PC9. use appropriate Personal Protective Equipment (PPE) as advised by the organisation</td>
<td>3</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Organise waste management and recycling</strong></td>
<td>8</td>
<td>12</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PC10. identify and segregate recyclable/non-recyclable and hazardous wastes</td>
<td>3</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PC11. dispose waste as per the suggested procedures by the organization</td>
<td>2</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PC12. participate in waste management and waste disposal workshops organised at workplace</td>
<td>3</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Conserve resources</strong></td>
<td>11</td>
<td>16</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PC13. use all resources judiciously</td>
<td>2</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PC14. perform routine cleaning of tools, machines and equipment</td>
<td>3</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Assessment Criteria for Outcomes</td>
<td>Theory Marks</td>
<td>Practical Marks</td>
<td>Project Marks</td>
<td>Viva Marks</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>--------------</td>
<td>----------------</td>
<td>---------------</td>
<td>------------</td>
</tr>
<tr>
<td>PC15. report malfunctioning of machines and equipment</td>
<td>3</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PC16. connect electrical equipment and appliances properly when in use and turn off when not in use</td>
<td>3</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>NOS Total</td>
<td>40</td>
<td>60</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
National Occupational Standards (NOS) Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOS Code</td>
<td>ELE/N1003</td>
</tr>
<tr>
<td>NOS Name</td>
<td>Work effectively, sustainably and safely</td>
</tr>
<tr>
<td>Sector</td>
<td>Electronics</td>
</tr>
<tr>
<td>Sub-Sector</td>
<td>Generic</td>
</tr>
<tr>
<td>Occupation</td>
<td>Generic - Health Safety</td>
</tr>
<tr>
<td>NSQF Level</td>
<td>3</td>
</tr>
<tr>
<td>Credits</td>
<td>TBD</td>
</tr>
<tr>
<td>Version</td>
<td>2.0</td>
</tr>
<tr>
<td>Last Reviewed Date</td>
<td>24/02/2022</td>
</tr>
<tr>
<td>Next Review Date</td>
<td>02/06/2025</td>
</tr>
<tr>
<td>NSQC Clearance Date</td>
<td>24/02/2022</td>
</tr>
</tbody>
</table>

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.

2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.

3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.

4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below).

5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on this criterion.

6. To pass the Qualification Pack, every trainee should score a minimum of 70% of aggregate marks to successfully clear the assessment.

7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.
Minimum Aggregate Passing % at QP Level : 70

(Please note: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

Assessment Weightage

Compulsory NOS

<table>
<thead>
<tr>
<th>National Occupational Standards</th>
<th>Theory Marks</th>
<th>Practical Marks</th>
<th>Project Marks</th>
<th>Viva Marks</th>
<th>Total Marks</th>
<th>Weightage</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELE/N6301.Integrate electrical sub system</td>
<td>40</td>
<td>60</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>ELE/N9972.Communicate and coordinate effectively with others</td>
<td>35</td>
<td>65</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>25</td>
</tr>
<tr>
<td>ELE/N1003.Work effectively, sustainably and safely</td>
<td>40</td>
<td>60</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>115</strong></td>
<td><strong>185</strong></td>
<td>-</td>
<td>-</td>
<td><strong>300</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
# Acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOS</td>
<td>National Occupational Standard(s)</td>
</tr>
<tr>
<td>NSQF</td>
<td>National Skills Qualifications Framework</td>
</tr>
<tr>
<td>QP</td>
<td>Qualifications Pack</td>
</tr>
<tr>
<td>TVET</td>
<td>Technical and Vocational Education and Training</td>
</tr>
<tr>
<td>NOS</td>
<td>National Occupational Standard(s)</td>
</tr>
<tr>
<td>NVQF</td>
<td>National Vocational Qualifications Framework</td>
</tr>
<tr>
<td>NSQF</td>
<td>National Qualifications Framework</td>
</tr>
<tr>
<td>NVEQF</td>
<td>National Vocational Education Qualifications Framework</td>
</tr>
<tr>
<td>QP</td>
<td>Qualification pack</td>
</tr>
</tbody>
</table>
### Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sector</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Sub-sector</strong></td>
<td>Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td>Occupation is a set of job roles, which perform similar/related set of functions in an industry.</td>
</tr>
<tr>
<td><strong>Job role</strong></td>
<td>Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.</td>
</tr>
<tr>
<td><strong>Occupational Standards (OS)</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Performance Criteria (PC)</strong></td>
<td>Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.</td>
</tr>
<tr>
<td><strong>National Occupational Standards (NOS)</strong></td>
<td>NOS are occupational standards which apply uniquely in the Indian context.</td>
</tr>
<tr>
<td><strong>Qualifications Pack (QP)</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Unit Code</strong></td>
<td>Unit code is a unique identifier for an Occupational Standard, which is denoted by an ‘N’</td>
</tr>
<tr>
<td><strong>Unit Title</strong></td>
<td>Unit title gives a clear overall statement about what the incumbent should be able to do.</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Scope</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Knowledge and Understanding (KU)</strong></td>
<td>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.</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Organisational Context</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Technical Knowledge</strong></td>
<td>Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.</td>
</tr>
<tr>
<td><strong>Core Skills/ Generic Skills (GS)</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Electives</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Options</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Sector</strong></td>
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</tbody>
</table>
National Occupational Standard | 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 world. These skills are typically needed in any work environment in today 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 contribute 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.