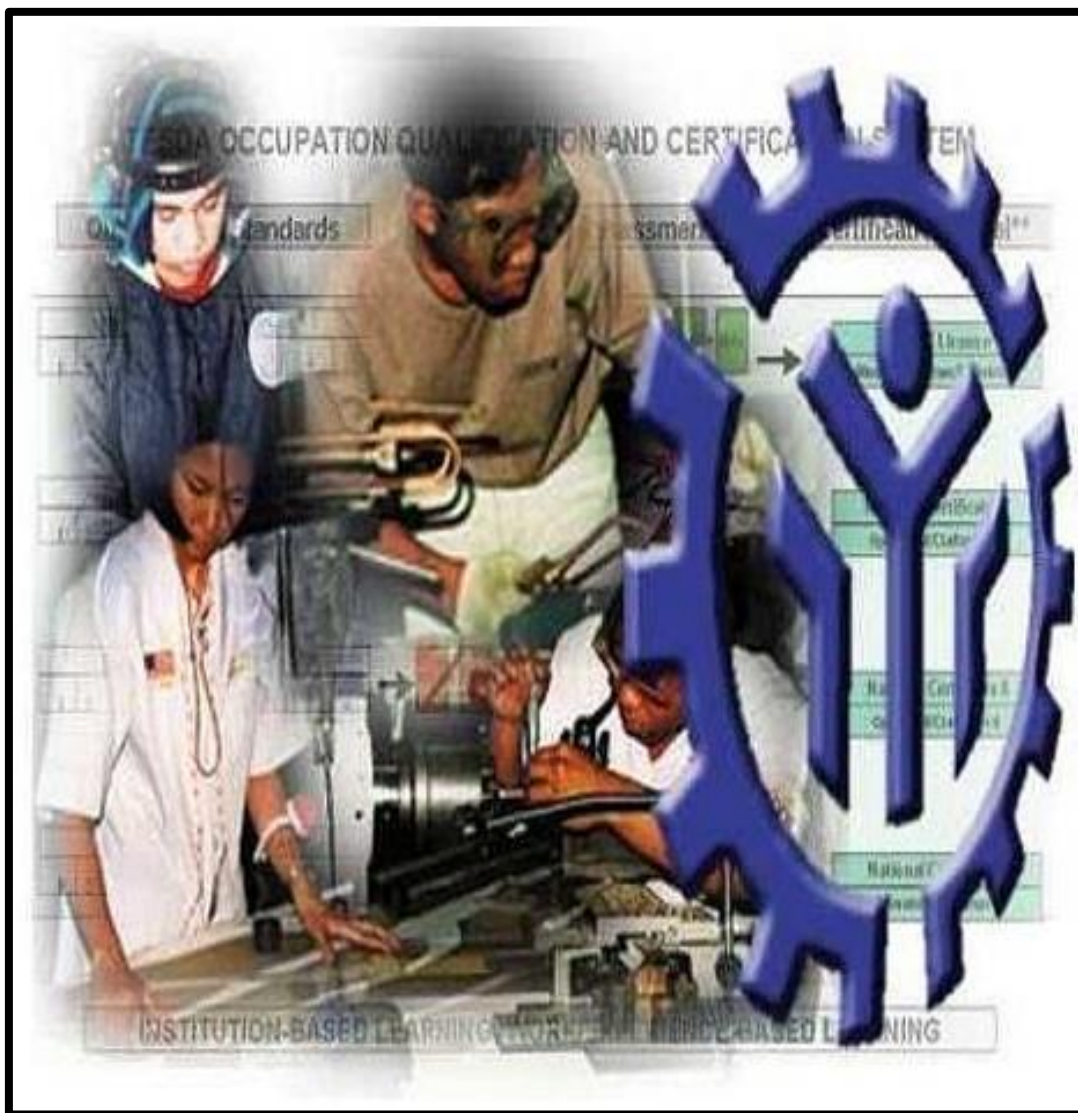


# COMPETENCY STANDARDS

## INTERNET OF THINGS (IOT) SYSTEMS INTEGRATION SERVICES LEVEL III



### INFORMATION AND COMMUNICATIONS TECHNOLOGY SECTOR

**TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY**

TESDA Complex East Service Road, South Luzon Expressway (SLEX),  
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# COMPETENCY STANDARDS FOR INTERNET OF THINGS (IOT) SYSTEMS INTEGRATION SERVICES LEVEL III

## SECTION 1 DEFINITION OF QUALIFICATION

The **INTERNET OF THINGS (IOT) SYSTEMS INTEGRATION SERVICES LEVEL III** qualification consists of competencies that a person must achieve to prepare network plan, oversee installation and configuration of Internet of Things (IoT) systems, and develop Internet of Things (IoT) system user manual.

The units of competency comprising this qualification include the following:

| Unit Code           | BASIC COMPETENCIES                                                           |
|---------------------|------------------------------------------------------------------------------|
| 400311319           | Lead workplace communication                                                 |
| 400311320           | Lead small teams                                                             |
| 400311321           | Apply critical thinking and problem-solving techniques in the workplace      |
| 400311322           | Work in a diverse environment                                                |
| 400311323           | Propose methods of applying learning and innovation in the organizations     |
| 400311324           | Use information systematically                                               |
| 400311325           | Evaluate occupational safety and health work practices                       |
| 400311326           | Evaluate environmental work practices                                        |
| 400311327           | Facilitate entrepreneurial skills for micro-small-medium enterprises (MSMEs) |
|                     |                                                                              |
| Unit Code           | COMMON COMPETENCIES                                                          |
| ICT315202           | Apply quality standards                                                      |
| ICT311203           | Perform computer operations                                                  |
| CS-ICT252101        | Ensure compliance with data privacy and ethics                               |
|                     |                                                                              |
| Unit Code           | CORE COMPETENCIES                                                            |
| AB-ICT1381100252301 | Prepare network plan                                                         |
| AB-ICT1381100252302 | Oversee installation and configuration of Internet of Things (IoT) systems   |
| AB-ICT1381100252303 | Develop Internet of Things (IoT) system user manual                          |

**A person who has achieved this qualification is competent to be:**

- Systems Integrator
- Junior IoT Specialist

## SECTION 2 COMPETENCY STANDARD

This section gives the details of the contents of the units of competency required in INTERNET OF THINGS (IOT) SYSTEMS INTEGRATION SERVICES LEVEL III.

### BASIC COMPETENCIES

**UNIT OF COMPETENCY : LEAD WORKPLACE COMMUNICATION**

**UNIT CODE : 400311319**

**UNIT DESCRIPTOR :** This unit covers the knowledge, skills and attitudes required to lead in the effective dissemination and discussion of ideas, information, and issues in the workplace. This includes preparation of written communication materials.

| ELEMENTS                                             | PERFORMANCE CRITERIA<br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                                                                                                                                                                                                         | REQUIRED KNOWLEDGE                                                                                                                                                                          | REQUIRED SKILLS                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Communicate information about workplace processes | 1.1 Relevant <b>communication method</b> is selected based on workplace procedures<br><br>1.2 Multiple operations involving several topics/areas are communicated following enterprise requirements<br><br>1.3 Questioning is applied to gain extra information<br><br>1.4 Relevant sources of information are identified in accordance with workplace/client requirements<br><br>1.5 Information is selected and organized following enterprise | 1.1 Organization requirements for written and electronic communication methods<br><br>1.2 Effective verbal communication methods<br><br>1.3 Business writing<br><br>1.4 Workplace etiquette | 1.1 Organizing information<br><br>1.2 Conveying intended meaning<br><br>1.3 Participating in a variety of workplace discussions<br><br>1.4 Complying with organization requirements for the use of written and electronic communication methods<br><br>1.5 Effective business writing<br><br>1.6 Effective clarifying and probing skills |

| ELEMENTS                      | PERFORMANCE CRITERIA<br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                                                                                                                                              | REQUIRED KNOWLEDGE                                                                                                                                                     | REQUIRED SKILLS                                                                                                                                                                                                                                                                                         |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               | <p>procedures</p> <p>1.6 Verbal and written reporting is undertaken when required</p> <p>1.7 Communication and negotiation skills are applied and maintained in all relevant situations</p>                                                                                                                                                                                           |                                                                                                                                                                        | 1.7 Effective questioning techniques (clarifying and probing)                                                                                                                                                                                                                                           |
| 2. Lead workplace discussions | <p>2.1 Response to workplace issues is sought following enterprise procedures</p> <p>2.2 Response to workplace issues is provided immediately</p> <p>2.3 Constructive contributions are made to <b>workplace discussions</b> on such issues as production, quality and safety</p> <p>2.4 Goals/ objectives and action plans undertaken in the workplace are communicated promptly</p> | <p>2.1 Organization requirements for written and electronic communication methods</p> <p>2.2 Effective verbal communication methods</p> <p>2.3 Workplace etiquette</p> | <p>2.1 Organizing information</p> <p>2.2 Conveying intended meaning</p> <p>2.3 Participating in variety of workplace discussions</p> <p>2.4 Complying with organization requirements for the use of written and electronic communication methods</p> <p>2.5 Effective clarifying and probing skills</p> |

| <b>ELEMENTS</b>                                             | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                                                                                                                                                     | <b>REQUIRED KNOWLEDGE</b>                                                                                                                                                                                                                                | <b>REQUIRED SKILLS</b>                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3. Identify and communicate issues arising in the workplace | <p>3.1 Issues and problems are identified as they arise</p> <p>3.2 Information regarding problems and issues are organized coherently to ensure clear and effective communication</p> <p>3.3 Dialogue is initiated with appropriate personnel</p> <p>3.4 Communication problems and issues are raised as they arise</p> <p>3.5 Identify barriers in communication to be addressed appropriately</p> | <p>3.1 Organization requirements for written and electronic communication methods</p> <p>3.2 Effective verbal communication methods</p> <p>3.3 Workplace etiquette</p> <p>3.4 Communication problems and issues</p> <p>3.5 Barriers in communication</p> | <p>3.1 Organizing information</p> <p>3.2 Conveying intended meaning</p> <p>3.3 Participating in a variety of workplace discussions</p> <p>3.4 Complying with organization requirements for the use of written and electronic communication methods</p> <p>3.5 Effective clarifying and probing skills</p> <p>3.6 Identifying issues</p> <p>3.7 Negotiation and communication skills</p> |

## RANGE OF VARIABLES

| VARIABLE                    | RANGE                                                                                                                                                                          |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Methods of communication | May include:<br>1.1 Non-verbal gestures<br>1.2 Verbal<br>1.3 Face-to-face<br>1.4 Two-way radio<br>1.5 Speaking to groups<br>1.6 Using telephone<br>1.7 Written<br>1.8 Internet |
| 2. Workplace discussions    | May include:<br>2.1. Coordination meetings<br>2.2. Toolbox discussion<br>2.3. Peer-to-peer discussion                                                                          |

## EVIDENCE GUIDE

|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Critical aspects of Competency | Assessment requires evidence that the candidate:<br>1.1 Dealt with a range of communication/information at one time<br>1.2 Demonstrated leadership skills in workplace communication<br>1.3 Made constructive contributions in workplace issues<br>1.4 Sought workplace issues effectively<br>1.5 Responded to workplace issues promptly<br>1.6 Presented information clearly and effectively written form<br>1.7 Used appropriate sources of information<br>1.8 Asked appropriate questions<br>1.9 Provided accurate information |
| 2. Resource Implications          | The following resources should be provided:<br>2.1 Variety of Information<br>2.2 Communication tools<br>2.3 Simulated workplace                                                                                                                                                                                                                                                                                                                                                                                                   |
| 3. Methods of Assessment          | Competency in this unit may be assessed through:<br>Case problem<br>3.1 Third-party report<br>3.2 Portfolio<br>3.3 Interview<br>3.4 Demonstration/Role-playing                                                                                                                                                                                                                                                                                                                                                                    |
| 4. Context for Assessment         | 4.1 Competency may be assessed in the workplace or in a simulated workplace environment                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**UNIT OF COMPETENCY : LEAD SMALL TEAMS**

**UNIT CODE : 400311320**

**UNIT DESCRIPTOR :** This unit covers the knowledge, skills and attitudes to lead small teams including setting, maintaining and monitoring team and individual performance standards.

| <b>ELEMENT</b>             | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                                                                                                                                    | <b>REQUIRED KNOWLEDGE</b>                                                                                                                                                                                                                                            | <b>REQUIRED SKILLS</b>                                                                                                                                                   |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Provide team leadership | <p>1.1 <b>Work requirements</b> are identified and presented to team members based on company policies and procedures</p> <p>1.2 Reasons for instructions and requirements are communicated to team members based on company policies and procedures</p> <p>1.3 <b>Team members' and leaders' concerns</b> are recognized, discussed and dealt with based on company practices</p> | <p>1.1 Facilitation of Team work</p> <p>1.2 Company policies and procedures relating to work performance</p> <p>1.3 Performance standards and expectations</p> <p>1.4 Monitoring individual's and team's performance vis a vis client's and group's expectations</p> | <p>1.1 Communication skills required for leading Teams</p> <p>1.2 Group facilitation skills</p> <p>1.3 Negotiating skills</p> <p>1.4 Setting performance expectation</p> |
| 2. Assign responsibilities | <p>2.1 Responsibilities are allocated having regard to the skills, knowledge and aptitude required to undertake the assigned task based on company policies</p>                                                                                                                                                                                                                    | <p>2.1 Work plan and procedures</p> <p>2.2 Work requirements and targets</p> <p>2.3 Individual and group expectations</p>                                                                                                                                            | <p>2.1 Communication skills</p> <p>2.2 Management skills</p> <p>2.3 Negotiating skills</p> <p>2.4 Evaluation skills</p> <p>2.5 Identifying team member's</p>             |

| ELEMENT                                          | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                           | REQUIRED KNOWLEDGE                                                                                                           | REQUIRED SKILLS                                                                                                                     |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
|                                                  | 2.2 Duties are allocated having regard to individual preference, domestic and personal considerations, whenever possible                                                                                                                                                  | 2.4 Ways to improve group leadership and membership                                                                          | strengths and rooms for improvement                                                                                                 |
| 3. Set performance expectations for team members | 3.1 Performance expectations are established based on client needs<br><br>3.2 Performance expectations are based on individual team member's knowledge, skills and aptitude<br><br>3.3 Performance expectations are discussed and disseminated to individual team members | 3.1 One's roles and responsibilities in the team<br><br>3.2 Feedback giving and receiving<br><br>3.3 Performance expectation | 3.1 Communication skills<br>3.2 Accurate empathy<br>3.3 Congruence<br>3.4 Unconditional positive regard<br>3.5 Handling of Feedback |
| 4. Supervise team performance                    | 4.1 <b>Performance is monitored</b> based on defined performance criteria and/or assignment instruction<br><br>4.2 Team members are provided with <b>feedback</b> , positive support and                                                                                  | 4.1 Performance Coaching<br>4.2 Performance management<br>4.3 Performance Issues                                             | 4.1 Communication skills required for leading teams<br>4.2 Coaching skills                                                          |

| ELEMENT | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | REQUIRED KNOWLEDGE | REQUIRED SKILLS |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------|
|         | <p>advice on strategies to overcome any deficiencies based on company practices</p> <p>4.3 <b>Performance issues</b> which cannot be rectified or addressed within the team are referred to appropriate personnel according to employer policy</p> <p>4.4 Team members are kept informed of any changes in the priority allocated to assignments or tasks which might impact on client/customer needs and satisfaction</p> <p>4.5 Team operations are monitored to ensure that employer/client needs and requirements are met.</p> <p>4.6 Follow-up communication is provided on all issues affecting the variables team</p> <p>4.7 All relevant documentation is</p> |                    |                 |

| <b>ELEMENT</b> | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables | <b>REQUIRED KNOWLEDGE</b> | <b>REQUIRED SKILLS</b> |
|----------------|-------------------------------------------------------------------------------------------------|---------------------------|------------------------|
|                | completed in accordance with company procedures                                                 |                           |                        |

## RANGE OF VARIABLES

| <b>VARIABLE</b>           | <b>RANGE</b>                                                                                                                                                   |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Work requirements      | May include:<br>1.1 Client Profile<br>1.2 Assignment instructions                                                                                              |
| 2. Team member's concerns | May include:<br>2.1 Roster/shift details                                                                                                                       |
| 3. Monitor performance    | May include:<br>3.1 Formal process<br>3.2 Informal process                                                                                                     |
| 4. Feedback               | May include:<br>4.1 Formal process<br>4.2 Informal process                                                                                                     |
| 5. Performance issues     | May include:<br>5.1 Work output<br>5.2 Work quality<br>5.3 Team participation<br>5.4 Compliance with workplace protocols<br>5.5 Safety<br>5.6 Customer service |

## EVIDENCE GUIDE

|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Critical aspects of Competency | <p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> <li>1.1 Maintained or improved individuals and/or team performance given a variety of possible scenario</li> <li>1.2 Assessed and monitored team and individual performance against set criteria</li> <li>1.3 Represented concerns of a team and individual to next level of management or appropriate specialist and to negotiate on their behalf</li> <li>1.4 Allocated duties and responsibilities, having regard to individual's knowledge, skills and aptitude and the needs of the tasks to be performed</li> <li>1.5 Set and communicated performance expectations for a range of tasks and duties within the team and provided feedback to team members</li> </ul> |
| 2. Resource Implications          | <p>The following resources should be provided:</p> <ul style="list-style-type: none"> <li>2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place</li> <li>2.2 Materials relevant to the proposed activity or task</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 3. Methods of Assessment          | <p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> <li>3.1 Written Examination</li> <li>3.2 Oral Questioning</li> <li>3.3 Portfolio</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 4. Context for Assessment         | <ul style="list-style-type: none"> <li>4.1 Competency may be assessed in the actual workplace or at the designated TESDA Accredited Assessment Center.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

**UNIT OF COMPETENCY : APPLY CRITICAL THINKING AND PROBLEM-SOLVING TECHNIQUES IN THE WORKPLACE**

**UNIT CODE : 400311321**

**UNIT DESCRIPTOR :** This unit covers the knowledge, skills and attitudes required to solve problems in the workplace including the application of problem-solving techniques and to determine and resolve the root cause/s of specific problems in the workplace.

| <b>ELEMENTS</b>                          | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                                                                  | <b>REQUIRED KNOWLEDGE</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>REQUIRED SKILLS</b>                                                                                                                                                                                                                                                  |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Examine specific workplace challenges | <p>1.1 Variances are examined <i>from</i> normal operating <i>parameters</i>; and product quality.</p> <p>1.2 Extent, cause and nature of the specific problem are defined through observation, investigation and <i>analytical techniques</i>.</p> <p>1.3 <i>Problems</i> are clearly stated and specified.</p> | <p>1.1 Competence includes a thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognize non-standard situations.</p> <p>1.2 Competence to include the ability to apply and explain, enough for the identification of fundamental causes of specific workplace challenges.</p> <p>1.3 Relevant equipment and operational processes.</p> <p>1.4 Enterprise goals, targets and measures.</p> <p>1.5 Enterprise quality OHS and</p> | <p>1.1 Using range of analytical techniques (e.g., planning, attention, simultaneous and successive processing of information) in examining specific challenges in the workplace.</p> <p>1.2 Identifying extent and causes of specific challenges in the workplace.</p> |

|                                                        |                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                        |                                                                                                                                                                                                                                                                                                             | <p>environmental requirement.</p> <p>1.6 Enterprise information systems and data collation</p> <p>1.7 Industry codes and standards.</p>                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                        |
| 2. Analyze the causes of specific workplace challenges | <p>2.1 Possible causes of specific problems are identified based on experience and the use of problem-solving tools / analytical techniques.</p> <p>2.2 Possible cause statements are developed based on findings.</p> <p>2.3 Fundamental causes are identified per results of investigation conducted.</p> | <p>2.1 Competence includes a thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognize non-standard situations.</p> <p>2.2 Competence to include the ability to apply and explain, sufficient for the identification of fundamental cause, determining the corrective action and provision of recommendations.</p> <p>2.3 Relevant equipment and operational processes.</p> <p>2.4 Enterprise goals, targets and measures.</p> <p>2.5 Enterprise quality OSH and environmental requirement.</p> | <p>2.1 Using range of analytical techniques (e.g., planning, attention, simultaneous and successive processing of information) in examining specific challenges in the workplace.</p> <p>2.2 Identifying extent and causes of specific challenges in the workplace.</p> <p>2.3 Providing clear-cut findings on the nature of each identified workplace challenges.</p> |

|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>2.6 Enterprise information systems and data collation.</p> <p>2.7 Industry codes and standards.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p>3. Formulate resolutions to specific workplace challenges</p> | <p>3.1 All possible options are considered for resolution of the problem.</p> <p>3.2 Strengths and weaknesses of possible options are considered.</p> <p>3.3 Corrective actions are determined to resolve the problem and possible future causes.</p> <p>3.4 <b>Action plans</b> are developed identifying measurable objectives, resource needs and timelines in accordance with safety and operating procedures</p> | <p>3.1 Competence to include the ability to apply and explain, sufficient for the identification of fundamental cause, determining the corrective action and provision of recommendations</p> <p>3.2 Relevant equipment and operational processes</p> <p>3.3 Enterprise goals, targets and measures</p> <p>3.4 Enterprise quality OSH and environmental requirement</p> <p>3.5 Principles of decision-making strategies and techniques</p> <p>3.6 Enterprise information systems and data collation</p> <p>3.7 Industry codes and standards</p> | <p>3.1 Using range of analytical techniques (e.g., planning, attention, simultaneous and successive processing of information) in examining specific challenges in the workplace.</p> <p>3.2 Identifying extent and causes of specific challenges in the workplace.</p> <p>3.3 Providing clear-cut findings on the nature of each identified workplace challenges.</p> <p>3.4 Devising, communicating, implementing and evaluating strategies and techniques in addressing specific workplace challenges.</p> |

|                                                          |                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>4. Implement action plans and communicate results</p> | <p>4.1 Action plans are implemented and evaluated.</p> <p>4.2 Results of plan implementation and recommendations are prepared.</p> <p>4.3 Recommendations are presented to appropriate personnel.</p> <p>4.4 Recommendations are followed-up, if required.</p> | <p>4.1 Competence to include the ability to apply and explain, sufficient for the identification of fundamental cause, determining the corrective action and provision of recommendations</p> <p>4.2 Relevant equipment and operational processes</p> <p>4.3 Enterprise goals, targets and measures</p> <p>4.4 Enterprise quality, OSH and environmental requirement</p> <p>4.5 Principles of decision-making strategies and techniques</p> <p>4.6 Enterprise information systems and data collation</p> <p>4.7 Industry codes and standards</p> | <p>4.1 Using range of analytical techniques (e.g., planning, attention, simultaneous and successive processing of information) in examining specific challenges in the workplace.</p> <p>4.2 Identifying extent and causes of specific challenges in the workplace.</p> <p>4.3 Providing clear-cut findings on the nature of each identified workplace challenges.</p> <p>4.4 Devising, communicating, implementing and evaluating strategies and techniques in addressing specific workplace challenges.</p> |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## RANGE OF VARIABLES

| VARIABLES                | RANGE                                                                                                                                                                                                                                                                             |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Parameters            | May include:<br>1.1 Processes<br>1.2 Procedures<br>1.3 Systems                                                                                                                                                                                                                    |
| 2. Analytical techniques | May include:<br>2.1 Brainstorming<br>2.2 Intuitions/Logic<br>2.3 Cause and effect diagrams<br>2.4 Pareto analysis<br>2.5 SWOT analysis<br>2.6 Gant chart, Pert CPM and graphs<br>2.7 Scattergrams                                                                                 |
| 3. Problem               | May include:<br>3.1 Routine, non – routine and complex workplace and quality problems<br>3.2 Equipment selection, availability and failure<br>3.3 Teamwork and work allocation problem<br>3.4 Safety and emergency situations and incidents<br>3.5 Risk assessment and management |
| 4. Action plans          | May include:<br>4.1 Priority requirements<br>4.2 Measurable objectives<br>4.3 Resource requirements<br>4.4 Timelines<br>4.5 Co-ordination and feedback requirements<br>4.6 Safety requirements<br>4.7 Risk assessment<br>4.8 Environmental requirements                           |

## EVIDENCE GUIDE

|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Critical aspects of Competency | <b>Assessment requires evidence that the candidate:</b> <ul style="list-style-type: none"> <li>1.1 Examined specific workplace challenges.</li> <li>1.2 Analyzed the causes of specific workplace challenges.</li> <li>1.3 Formulated resolutions to specific workplace challenges.</li> <li>1.4 Implemented action plans and communicated results on specific workplace challenges.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 2. Resource Implications          | 2.1 Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios / case studies / what ifs will be required as well as bank of questions which will be used to probe the reason behind the observable action.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 3. Methods of Assessment          | <b>Competency in this unit may be assessed through:</b> <ul style="list-style-type: none"> <li>3.1 Observation</li> <li>3.2 Case Formulation</li> <li>3.3 Life Narrative Inquiry</li> <li>3.4 Standardized test</li> </ul> <p>The unit will be assessed in a holistic manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk through of the relevant competency components.</p> <p>These assessment activities should include a range of problems, including new, unusual and improbable situations that may have happened.</p> |
| 4. Context for Assessment         | In all workplace, it may be appropriate to assess this unit concurrently with relevant teamwork or operation units.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

**UNIT OF COMPETENCY : WORK IN A DIVERSE ENVIRONMENT**

**UNIT CODE : 400311322**

**UNIT DESCRIPTOR :** This unit covers the outcomes required to work effectively in a workplace characterized by diversity in terms of religions, beliefs, races, ethnicities and other differences.

| <b>ELEMENT</b>                                                | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                                                                                                   | <b>REQUIRED KNOWLEDGE</b>                                                                                                                                                                                                                                                                                                            | <b>REQUIRED SKILLS</b>                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Develop an individual's cultural awareness and sensitivity | <p>1.1 Individual differences with clients, customers and fellow workers are recognized and respected in accordance with enterprise policies and core values.</p> <p>1.2 Differences are responded to in a sensitive and considerate manner</p> <p>1.3 <b>Diversity</b> is accommodated using appropriate verbal and nonverbal communication.</p> | <p>1.1 Understanding cultural diversity in the workplace</p> <p>1.2 Norms of behavior for interacting and dialogue with specific groups (e. g., Muslims and other non-Christians, non-Catholics, tribes/ethnic groups, foreigners)</p> <p>1.3 Different methods of verbal and nonverbal communication in a multicultural setting</p> | <p>1.1 Applying cross-cultural communication skills (i.e., different business customs, beliefs, communication strategies)</p> <p>1.2 Showing affective skills – establishing rapport and empathy, understanding, etc.</p> <p>1.3 Demonstrating openness and flexibility in communication</p> <p>1.4 Recognizing diverse groups in the workplace and community as defined by divergent culture, religion, traditions and practices</p> |

| ELEMENT                                                                               | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                                                                                                                                                            | REQUIRED KNOWLEDGE                                                                                                                                                                                                                                                                                                                    | REQUIRED SKILLS                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2. Work effectively in an environment that acknowledges and values cultural diversity | 2.1 Knowledge, skills and experiences of others are recognized and documented in relation to team objectives.<br><br>2.2 Fellow workers are encouraged to utilize and share their specific qualities, skills or backgrounds with other team members and clients to enhance work outcomes.<br><br>2.3 Relations with customers and clients are maintained to show that diversity is valued by the business. | 2.1 Value of diversity in the economy and society in terms of Workforce development<br><br>2.2 Importance of inclusiveness in a diverse environment<br><br>2.3 Shared vision and understanding of and commitment to team, departmental, and organizational goals and objectives<br><br>2.4 Strategies for customer service excellence | 2.1 Demonstrating cross cultural communication skills and active listening<br><br>2.2 Recognizing diverse groups in the workplace and community as defined by divergent culture, religion, traditions and practices<br><br>2.3 Demonstrating collaboration skills<br><br>2.4 Exhibiting customer service excellence |
| 3. Identify common issues in a multicultural and diverse environment                  | 3.1 <b><i>Diversity-related conflicts</i></b> within the workplace are effectively addressed and resolved.<br><br>3.2 Discriminatory behaviors towards customers/stake holders are minimized and                                                                                                                                                                                                           | 3.1 Value, and leverage of cultural diversity<br><br>3.2 Inclusivity and conflict resolution<br><br>3.3 Workplace harassment<br><br>3.4 Change management and ways to overcome resistance to change                                                                                                                                   | 3.1 Addressing diversity-related conflicts in the workplace<br><br>3.2 Eliminating discriminatory behavior towards customers and coworkers<br><br>3.3 Utilizing change management policies in the workplace                                                                                                         |

| ELEMENT | PERFORMANCE CRITERIA<br><i>Italicized terms</i> are elaborated in the Range of Variables           | REQUIRED KNOWLEDGE                                      | REQUIRED SKILLS |
|---------|----------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------|
|         | addressed accordingly.<br><br>3.3 Change management policies are in place within the organization. | 3.5 Advanced strategies for customer service excellence |                 |

## RANGE OF VARIABLES

| VARIABLE                       | RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Diversity                   | This refers to diversity in both the workplace and the community and may include divergence in: <ul style="list-style-type: none"> <li>1.1 Religion</li> <li>1.2 Ethnicity, race or nationality</li> <li>1.3 Culture</li> <li>1.4 Gender, age or personality</li> <li>1.5 Educational background</li> </ul>                                                                                                                                                                                   |
| 2. Diversity-related conflicts | May include conflicts that result from: <ul style="list-style-type: none"> <li>2.1 Discriminatory behaviors</li> <li>2.2 Differences of cultural practices</li> <li>2.3 Differences of belief and value systems</li> <li>2.4 Gender-based violence</li> <li>2.5 Workplace bullying</li> <li>2.6 Corporate jealousy</li> <li>2.7 Language barriers</li> <li>2.8 Individuals being differently-abled persons</li> <li>2.9 Ageism (negative attitude and behavior towards old people)</li> </ul> |

## EVIDENCE GUIDE

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|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Critical aspects of Competency | <b>Assessment requires evidence that the candidate:</b> <ul style="list-style-type: none"> <li>1.1 Adjusted language and behavior as required by interactions with diversity</li> <li>1.2 Identified and respected individual differences in colleagues, clients and customers</li> <li>1.3 Applied relevant regulations, standards and codes of practice</li> </ul> |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2. Resource Implications  | <b>The following resources should be provided:</b><br>2.1 Access to workplace and resources<br>2.2 Manuals and policies on Workplace Diversity                                                                                                                                                                |
| 3. Methods of Assessment  | <b>Competency in this unit may be assessed through:</b><br>3.1 Demonstration or simulation with oral questioning<br>3.2 Group discussions and interactive activities<br>3.3 Case studies/problems involving workplace diversity issues<br>3.4 Third-party report<br>3.5 Written examination<br>3.6 Role Plays |
| 4. Context for Assessment | Competency assessment may occur in workplace or any appropriately simulated environment                                                                                                                                                                                                                       |

**UNIT OF COMPETENCY : PROPOSE METHODS OF APPLYING LEARNING AND INNOVATION IN THE ORGANIZATION**

**UNIT CODE : 400311323**

**UNIT DESCRIPTOR :** This unit covers the knowledge, skills and attitudes required to assess general obstacles in the application of learning and innovation in the organization and to propose practical methods of such in addressing organizational challenges.

| <b>ELEMENTS</b>                                                                   | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                                                                     | <b>REQUIRED KNOWLEDGE</b>                                                                                                                                                                                                                                                                                                                                                                                   | <b>REQUIRED SKILLS</b>                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Assess work procedures, processes and systems in terms of innovative practices | <p>1.1 <b>Reasons</b> for innovation are incorporated to work procedures.</p> <p>1.2 <b>Models of innovation</b> are researched.</p> <p>1.3 <b>Gaps or barriers</b> to innovation in one's work area are analyzed.</p> <p>1.4 Staff who can support and foster innovation in the work procedure are identified.</p> | <p>1.1 Seven habits of highly effective people.</p> <p>1.2 Character strengths that foster innovation and learning (Christopher Peterson and Martin Seligman, 2004)</p> <p>1.3 Five minds of the future concepts (Gardner, 2007).</p> <p>1.4 Adaptation concepts in neuroscience (Merzenich, 2013).</p> <p>1.5 Transtheoretical model of behavior change (Prochaska, DiClemente, &amp; Norcross, 1992).</p> | <p>1.1 Demonstrating collaboration and networking skills.</p> <p>1.2 Applying basic research and evaluation skills</p> <p>1.3 Generating insights on how to improve organizational procedures, processes and systems through innovation.</p> |

| ELEMENTS                                                                    | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | REQUIRED KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                          | REQUIRED SKILLS                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2. Generate practical action plans for improving work procedures, processes | <p>2.1 Ideas for innovative work procedure to foster innovation using individual and group techniques are conceptualized</p> <p>2.2 Range of ideas with other team members and colleagues are evaluated and discussed</p> <p>2.3 Work procedures and processes subject to change are selected based on <b>workplace requirements</b> (feasible and innovative).</p> <p>2.4 Practical action plans are proposed to facilitate simple changes in the work procedures, processes and systems.</p> <p>2.5 <b>Critical inquiry</b> is applied and used to facilitate discourse on adjustments in the simple work procedures, processes and systems.</p> | <p>2.1 Seven habits of highly effective people.</p> <p>2.2 Character strengths that foster innovation and learning (Christopher Peterson and Martin Seligman, 2004)</p> <p>2.3 Five minds of the future concepts (Gardner, 2007).</p> <p>2.4 Adaptation concepts in neuroscience (Merzenich, 2013).</p> <p>2.5 Transtheoretical model of behavior change (Prochaska, DiClemente, &amp; Norcross, 1992).</p> | <p>2.1 Assessing readiness for change on simple work procedures, processes and systems.</p> <p>2.2 Generating insights on how to improve organizational procedures, processes and systems through innovation.</p> <p>2.3 Facilitating action plans on how to apply innovative procedures in the organization.</p> |

| ELEMENTS                                                   | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | REQUIRED KNOWLEDGE                                                                                                                                                                                                       | REQUIRED SKILLS                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3. Evaluate the effectiveness of the proposed action plans | 3.1 Work structure is analyzed to identify the impact of the new work procedures<br><br>3.2 Co-workers/key personnel is consulted to know who will be involved with or affected by the work procedure<br><br>3.3 Work instruction operational plan of the new work procedure is developed and evaluated.<br><br>3.4 Feedback and suggestion are recorded.<br><br>3.5 Operational plan is updated.<br><br>3.6 Results and impact on the developed work instructions are reviewed.<br><br>3.7 Results of the new work procedure are evaluated<br><br>3.8 Adjustments are recommended based on results gathered | 3.1 Five minds of the future concepts (Gardner, 2007).<br><br>3.2 Adaptation concepts in neuroscience (Merzenich, 2013).<br><br>3.3 Transtheoretical model of behavior change (Prochaska, DiClemente, & Norcross, 1992). | 3.1 Generating insights on how to improve organizational procedures, processes and systems through innovation.<br><br>3.2 Facilitating action plans on how to apply innovative procedures in the organization.<br><br>3.3 Communicating results of the evaluation of the proposed and implemented changes in the workplace procedures and systems.<br><br>3.4 Developing action plans for continuous improvement on the basic systems, processes and procedures in the organization. |

## RANGE OF VARIABLES

| VARIABLE                | RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Reasons              | May include:<br>1.1 Strengths and weaknesses of the current systems, processes and procedures.<br>1.2 Opportunities and threats of the current systems, processes and procedures.                                                                                                                                                                                                                                                                                                                                                          |
| 2. Models of innovation | May include:<br>2.1 Seven habits of highly effective people.<br>2.2 Five minds of the future concepts (Gardner, 2007).<br>2.3 Neuroplasticity and adaptation strategies.                                                                                                                                                                                                                                                                                                                                                                   |
| 3. Gaps or barriers     | May include:<br>3.1 Machine<br>3.2 Manpower<br>3.3 Methods<br>3.4 Money                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 4. Critical Inquiry     | May include:<br>4.1 Preparation.<br>4.2 Discussion.<br>4.3 Clarification of goals.<br>4.4 Negotiate towards a Win-Win outcome.<br>4.5 Agreement.<br>4.6 Implementation of a course of action.<br>4.7 Effective verbal communication. See our pages: Verbal Communication and Effective Speaking.<br>4.8 Listening.<br>4.9 Reducing misunderstandings is a key part of effective negotiation.<br>4.10 Rapport Building.<br>4.11 Problem Solving.<br>4.12 Decision Making.<br>4.13 Assertiveness.<br>4.14 Dealing with Difficult Situations. |

## EVIDENCE GUIDE

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|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Critical aspects of Competency | <p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> <li>1.1 Established the reasons why innovative systems are required</li> <li>1.2 Established the goals of a new innovative system</li> <li>1.3 Analyzed current organizational systems to identify gaps and barriers to innovation.</li> <li>1.4 Assessed work procedures, processes and systems in terms of innovative practices.</li> <li>1.5 Generate practical action plans for improving work procedures, and processes.</li> <li>1.6 Reviewed the trial innovative work system and adjusted reflect evaluation feedback, knowledge management systems and future planning.</li> <li>1.7 Evaluated the effectiveness of the proposed action plans.</li> </ul> |
| 2. Resource Implications          | <p>The following resources should be provided:</p> <ul style="list-style-type: none"> <li>2.1 Pens, papers and writing implements.</li> <li>2.2 Cartolina.</li> <li>2.3 Manila papers.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 3. Methods of Assessment          | <p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> <li>3.1 Psychological and behavioral Interviews.</li> <li>3.2 Performance Evaluation.</li> <li>3.3 Life Narrative Inquiry.</li> <li>3.4 Review of portfolios of evidence and third-party workplace reports of on-the-job performance.</li> <li>3.5 Sensitivity analysis.</li> <li>3.6 Organizational analysis.</li> <li>3.7 Standardized assessment of character strengths and virtues applied.</li> </ul>                                                                                                                                                                                                                                                         |
| 4. Context for Assessment         | <ul style="list-style-type: none"> <li>4.1 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

**UNIT OF COMPETENCY****USE INFORMATION SYSTEMATICALLY****UNIT CODE****400311324****UNIT DESCRIPTOR**

This unit covers the knowledge, skills and attitudes required to use technical information systems, apply information technology (IT) systems and edit, format & check information.

| <b>ELEMENT</b>                       | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                                                  | <b>REQUIRED KNOWLEDGE</b>                                                                                                                                                                                                                                                                                                                                                     | <b>REQUIRED SKILLS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Use technical information         | 1.1 <b>Information</b> is collated and organized into a suitable form for reference and use<br><br>1.2 Stored information is classified so that it can be quickly identified and retrieved when needed<br><br>1.3 Guidance is advised and offered to people who need to find and use information | 1.1 Application in collating information<br><br>1.2 Procedures for inputting, maintaining and archiving information<br><br>1.3 Guidance to people who need to find and use information<br><br>1.4 Organize information<br><br>1.5 Classify stored information for identification and retrieval<br><br>1.6 Operate the technical information system by using agreed procedures | 1.1 Collating information<br><br>1.2 Operating appropriate and valid procedures for inputting, maintaining and archiving information<br><br>1.3 Advising and offering guidance to people who need to find and use information<br><br>1.4 Organizing information into a suitable form for reference and use<br><br>1.5 Classifying stored information for identification and retrieval<br><br>1.6 Operating the technical information system by using agreed procedures |
| 2. Apply information technology (IT) | 2.1 <b>Technical information</b> system is operated using                                                                                                                                                                                                                                        | 2.1 Attributes and limitations of available software tools                                                                                                                                                                                                                                                                                                                    | 2.1 Identifying attributes and limitations of                                                                                                                                                                                                                                                                                                                                                                                                                          |

| ELEMENT | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | REQUIRED KNOWLEDGE                                                                                                                                                                                                                                                                                                                                            | REQUIRED SKILLS                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | <p>agreed procedures</p> <p>2.2 Appropriate and valid procedures are operated for inputting, maintaining and archiving information</p> <p>2.3 <b>Software</b> required are utilized to execute the project activities</p> <p>2.4 Information and data obtained are handled, edited, formatted and checked from a range of internal and external <b>sources</b></p> <p>2.5 Information is extracted, entered, and processed to produce the outputs required by <b>customers</b></p> <p>2.6 Own skills and understanding are shared to help others</p> <p>2.7 Specified <b>security measures</b> are implemented to protect the confidentiality and integrity of project data held in IT systems</p> | <p>2.2 Procedures and work instructions for the use of IT</p> <p>2.3 Operational requirements for IT systems</p> <p>2.4 Sources and flow paths of data</p> <p>2.5 Security systems and measures that can be used</p> <p>2.6 Extract data and format reports</p> <p>2.7 Methods of entering and processing information</p> <p>2.8 WWW enabled applications</p> | <p>available software tools</p> <p>2.2 Using procedures and work instructions for the use of IT</p> <p>2.3 Describing operational requirements for IT systems</p> <p>2.4 Identifying sources and flow paths of data</p> <p>2.5 Determining security systems and measures that can be used</p> <p>2.6 Extracting data and format reports</p> <p>2.7 Describing methods of entering and processing Information</p> <p>2.8 Using WWW applications</p> |

| <b>ELEMENT</b>                        | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                     | <b>REQUIRED KNOWLEDGE</b>                                                                                                                                          | <b>REQUIRED SKILLS</b>                                                                                                                                                                                                          |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3. Edit, format and check information | 3.1 Basic editing techniques are used<br><br>3.2 Accuracy of documents are checked<br><br>3.3 Editing and formatting tools and techniques are used for more complex documents<br><br>3.4 Proof reading techniques is used to check that documents look professional | 3.1 Basic file-handling techniques<br><br>3.2 Techniques in checking documents<br><br>3.3 Techniques in editing and Formatting<br><br>3.4 Proof reading techniques | 3.1 Using basic file-handling techniques is used for the software<br><br>3.2 Using different techniques in checking documents<br><br>3.3 Applying editing and formatting techniques<br><br>3.4 Applying proofreading techniques |

## RANGE OF VARIABLES

| <b>VARIABLE</b>          | <b>RANGE</b>                                                                                                                                             |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Information           | May include:<br>1.1 Property<br>1.2 Organizational<br>1.3 Technical reference                                                                            |
| 2. Technical information | May include:<br>2.1 Paper based<br>2.2 Electronic                                                                                                        |
| 3. Software              | May include:<br>3.1 Spreadsheets<br>3.2 Databases<br>3.3 Word processing<br>3.4 Presentation                                                             |
| 4. Sources               | May include:<br>4.1 Other IT systems<br>4.2 Manually created<br>4.3 Within own organization<br>4.4 Outside own organization<br>4.5 Geographically remote |

|                      |                                                                                                                                                           |
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| 5. Customers         | May include:<br>5.1 Colleagues<br>5.2 Company and project management<br>5.3 Clients                                                                       |
| 6. Security measures | May include:<br>6.1 Access rights to input;<br>6.2 Passwords;<br>6.3 Access rights to outputs;<br>6.4 Data consistency and back-up;<br>6.5 Recovery plans |

## EVIDENCE GUIDE

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| 1. Critical aspects of Competency | <b>Assessment requires evidence that the candidate:</b><br>1.1 Used technical information systems and information technology<br>1.2 Applied information technology (IT) systems<br>1.3 Edited, formatted and checked information |
| 2. Resource Implications          | <b>The following resources should be provided:</b><br>2.1 Computers<br>2.2 Software and IT system                                                                                                                                |
| 3. Methods of Assessment          | <b>Competency in this unit should be assessed through:</b><br>3.1 Direct Observation<br>3.2 Oral interview and written test                                                                                                      |
| 4. Context for Assessment         | 4.1. Competency may be assessed individually in the actual workplace or through accredited institution                                                                                                                           |

**UNIT OF COMPETENCY** : **EVALUATE OCCUPATIONAL SAFETY AND HEALTH WORK PRACTICES**

**UNIT CODE** : **400311325**

**UNIT DESCRIPTOR** : This unit covers the knowledge, skills and attitudes required to interpret Occupational Safety and Health practices, set OSH work targets, and evaluate effectiveness of Occupational Safety and Health work instructions

| <b>ELEMENT</b>                                        | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                                | <b>REQUIRED KNOWLEDGE</b>                                                                                                                                                                                                                     | <b>REQUIRED SKILLS</b>                                                                                                     |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| 1. Interpret Occupational Safety and Health practices | 1.1 <b>OSH work practices issues</b> are identified relevant to work requirements<br><br>1.2 OSH work standards and procedures are determined based on applicability to nature of work<br><br>1.3 Gaps in work practices are identified related to relevant OSH work standards | 1.1 OSH work practices issues<br><br>1.2 OSH work standards<br><br>1.3 General OSH principles and legislations<br><br>1.4 Company/ workplace policies/ guidelines<br><br>1.5 Standards and safety requirements of work process and procedures | 1.1 Communication skills<br><br>1.2 Interpersonal skills<br><br>1.3 Critical thinking skills<br><br>1.4 Observation skills |
| 2. Set OSH work targets                               | 2.1 Relevant work information is gathered necessary to determine OSH work targets<br><br>2.2 <b>OSH Indicators</b> based on gathered information are agreed upon to measure effectiveness of workplace OSH policies and procedures                                             | 2.1 OSH work targets<br><br>2.2 OSH Indicators<br><br>2.3 OSH work instructions<br><br>2.4 Safety and health requirements of tasks<br><br>2.5 Workplace guidelines on providing feedback on OSH and security concerns                         | 2.1 Communication skills<br><br>2.2 Collaborating skills<br><br>2.3 Critical thinking skills<br><br>2.4 Observation skills |

| ELEMENT                                                                       | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                         | REQUIRED KNOWLEDGE                                                                                          | REQUIRED SKILLS                                           |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
|                                                                               | 2.3 Agreed OSH indicators are endorsed for approval from appropriate personnel<br><br>2.4 <b>OSH work instructions</b> are received in accordance with workplace policies and procedures*                                                                               | 2.6 OSH regulations Hazard control procedures<br><br>2.7 OSH trainings relevant to work                     |                                                           |
| 3. Evaluate effectiveness of Occupational Safety and Health work instructions | 3.1 OSH Practices are observed based on workplace standards<br><br>3.2 Observed OSH practices are measured against approved <b>OSH metrics</b><br><br>3.3 Findings regarding effectiveness are assessed and gaps identified are implemented based on OSH work standards | 3.1 OSH Practices<br><br>3.2 OSH metrics<br><br>3.3 OSH Evaluation Techniques<br><br>3.4 OSH work standards | 3.1 Critical thinking skills<br><br>3.2 Evaluating skills |

## RANGE OF VARIABLES

| VARIABLE                     | RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. OSH Work Practices Issues | <p>May include:</p> <ul style="list-style-type: none"> <li>1.1 Workers' experience/observance on presence of work hazards</li> <li>1.2 Unsafe/unhealthy administrative arrangements (prolonged work hours, no break-time, constant overtime, scheduling of tasks)</li> <li>1.3 Reasons for compliance/non-compliance to use of PPEs or other OSH procedures/policies/ guidelines</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2. OSH Indicators            | <p>May include:</p> <ul style="list-style-type: none"> <li>2.1 Increased of incidents of accidents, injuries</li> <li>2.2 Increased occurrence of sickness or health complaints/symptoms</li> <li>2.3 Common complaints of workers related to OSH</li> <li>2.4 High absenteeism for work-related reasons</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 3. OSH Work Instructions     | <p>May include:</p> <ul style="list-style-type: none"> <li>3.1 Preventive and control measures, and targets</li> <li>3.2 Eliminate the hazard (i.e., get rid of the dangerous machine)</li> <li>3.3 Isolate the hazard (i.e., keep the machine in a closed room and operate it remotely; barricade an unsafe area off)</li> <li>3.4 Substitute the hazard with a safer alternative (i.e., replace the machine with a safer one)</li> <li>3.5 Use administrative controls to reduce the risk (i.e., give trainings on how to use equipment safely; OSH-related topics, issue warning signages, rotation/shifting work schedule)</li> <li>3.6 Use engineering controls to reduce the risk (i.e., use safety guards to machine)</li> <li>3.7 Use personal protective equipment</li> <li>3.8 Safety, Health and Work Environment Evaluation</li> <li>3.9 Periodic and/or special medical examinations of workers</li> </ul> |
| 4. OSH metrics               | <p>May include:</p> <ul style="list-style-type: none"> <li>4.1 Statistics on incidence of accident and injuries</li> <li>4.2 Morbidity (Type and Number of Sickness)</li> <li>4.3 Mortality (Cause and Number of Deaths)</li> <li>4.4 Accident Rate</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## EVIDENCE GUIDE

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| 1. Critical aspects of Competency | <b>Assessment requires evidence that the candidate:</b> <ul style="list-style-type: none"> <li>1.1 Identify OSH work practices issues relevant to work requirements</li> <li>1.2 Identify gaps in work practices related to relevant OSH work standards</li> <li>1.3 Agree upon OSH Indicators based on gathered information to measure effectiveness of workplace OSH policies and procedures</li> <li>1.4 Receive OSH work instructions in accordance with workplace policies and procedures</li> <li>1.5 Compare Observed OSH practices with against approved OSH work instructions</li> <li>1.6 Assess findings regarding effectiveness based on OSH work standards</li> </ul> |
| 2. Resource Implications          | <b>The following resources should be provided:</b> <ul style="list-style-type: none"> <li>2.1 Facilities, materials, tools and equipment necessary for the activity</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 3. Methods of Assessment          | <b>Competency in this unit may be assessed through:</b> <ul style="list-style-type: none"> <li>3.1 Observation/Demonstration with oral questioning</li> <li>3.2 Third party report</li> <li>3.3 Written exam</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 4. Context for Assessment         | <ul style="list-style-type: none"> <li>4.1 Competency may be assessed in the work place or in a simulated work place setting</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**UNIT OF COMPETENCY** : **EVALUATE ENVIRONMENTAL WORK PRACTICES**

**UNIT CODE** : **400311326**

**UNIT DESCRIPTOR** : This unit covers the knowledge, skills and attitude to interpret environmental Issues, establish targets to evaluate environmental practices and evaluate effectiveness of environmental practices

| <b>ELEMENTS</b>                                               | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                                                                                | <b>REQUIRED KNOWLEDGE</b>                                                                                                                                                                                                               | <b>REQUIRED SKILLS</b>                                                                                                                |
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| 1. Interpret environmental practices, policies and procedures | 1.1 <b><i>Environmental work practices</i></b> issues are identified relevant to work requirements<br><br>1.2 Environmental Standards and Procedures nature of work are determined based on Applicability to nature of work<br><br>1.3 Gaps in work practices related to Environmental Standards and Procedures are identified | 1.1 Environmental Issues<br><br>1.2 Environmental Work Procedures<br><br>1.3 Environmental Laws<br><br>1.4 Environmental Hazardous and Non-Hazardous Materials<br><br>1.5 Environmental required license, registration or certification | 1.1 Analyzing Environmental Issues and Concerns<br><br>1.2 Critical thinking<br><br>1.3 Problem Solving<br><br>1.4 Observation Skills |
| 2. Establish targets to evaluate environmental practices      | 2.1 Relevant information is gathered necessary to determine environmental work targets<br><br>2.2 <b><i>Environmental Indicators</i></b> based on gathered information are set to measure environmental work targets<br><br>2.3 Indicators are verified with appropriate personnel                                             | 2.1 Environmental indicators<br><br>2.2 Relevant Environment Personnel or expert<br><br>2.3 Relevant Environmental Trainings and Seminars                                                                                               | 2.1 Investigative Skills<br><br>2.2 Critical thinking<br><br>2.3 Problem Solving<br><br>2.4 Observation Skills                        |

| ELEMENTS                                             | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                                                                                                                                                          | REQUIRED KNOWLEDGE                                                            | REQUIRED SKILLS                                                                                                                   |
|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| 3. Evaluate effectiveness of environmental practices | 3.1 Work environmental practices are recorded based on workplace standards<br><br>3.2 Recorded work environmental practices are compared against planned indicators<br><br>3.3 Findings regarding effectiveness are assessed and gaps identified are implemented based on environment work standards and procedures<br><br>3.4 Results of environmental assessment are conveyed to appropriate personnel | 3.1 Environmental Practices<br><br>3.2 Environmental Standards and Procedures | 3.1 Documentation and Record Keeping Skills<br><br>3.2 Critical thinking<br><br>3.3 Problem Solving<br><br>3.4 Observation Skills |

## RANGE OF VARIABLES

| VARIABLE                          | RANGE                                                                                                                                                                                              |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Environmental Practices Issues | May include:<br>1.1 Water Quality<br>1.2 National and Local Government Issues<br>1.3 Safety<br>1.4 Endangered Species<br>1.5 Noise<br>1.6 Air Quality<br>1.7 Historic<br>1.8 Waste<br>1.9 Cultural |
| 2. Environmental Indicators       | May include:<br>2.1 Noise level<br>2.2 Lighting (Lumens)<br>2.3 Air Quality - Toxicity<br>2.4 Thermal Comfort<br>2.5 Vibration<br>2.6 Radiation<br>2.7 Quantity of the Resources<br>2.8 Volume     |

## EVIDENCE GUIDE

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| 1. Critical Aspects of Competency | <b>Assessment requires evidence that the candidate:</b><br>1.1 Identified environmental issues relevant to work requirements.<br>1.2 Identified gaps in work practices related to Environmental Standards and Procedures.<br>1.3 Gathered relevant information necessary to determine environmental works targets.<br>1.4 Set environmental indicators based on gathered information to measure environmental work targets.<br>1.5 Recorded work environmental practices are recorded based on workplace standards.<br>1.6 Conveyed results of environmental assessment to appropriate personnel |
| 2. Resource Implications          | <b>The following resources should be provided:</b><br>2.1 Workplace/Assessment location<br>2.2 Legislation, policies, procedures, protocols and local ordinances relating to environmental protection<br>2.3 Case studies/scenarios relating to environmental protection                                                                                                                                                                                                                                                                                                                         |
| 3. Methods of Assessment          | <b>Competency in this unit may be assessed through:</b><br>3.1 Written/Oral Examination                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

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|                           | 3.2 Interview/Third Party Reports<br>3.3 Portfolio (citations/awards from GOs and NGOs, certificate of training – local and abroad)<br>3.4 Simulations and role-plays |
| 4. Context for Assessment | 4.1 Competency may be assessed in actual workplace or at the designated TESDA center.                                                                                 |

**UNIT OF COMPETENCY** : **FACILITATE ENTREPRENEURIAL SKILLS FOR MICRO-SMALL-MEDIUM ENTERPRISES (MSMEs)**

**UNIT CODE** : **400311327**

**UNIT DESCRIPTOR** : This unit covers the outcomes required to build, operate and grow a micro/small-scale enterprise.

| <b>ELEMENT</b>                                                                           | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                                                                                                                                                                                                                                                                | <b>REQUIRED KNOWLEDGE</b>                                                                                                                                                                                                                                                                       | <b>REQUIRED SKILLS</b>                                                                                                                                                                               |
|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Develop and maintain micro-small medium enterprise (MSMEs) skills in the organization | <p>1.1 Appropriate <b>business strategies</b> are determined and set for the enterprise based on current and emerging business environment.</p> <p>1.2 <b>Business operations</b> are monitored and controlled following established procedures.</p> <p>1.3 Quality assurance measures are implemented consistently.</p> <p>1.4 Good relations are maintained with staff/workers.</p> <p>1.5 Policies and procedures on occupational safety and health and environmental concerns are constantly observed.</p> | <p>1.1 Business models and strategies</p> <p>1.2 Types and categories of businesses</p> <p>1.3 Business operation</p> <p>1.4 Basic Bookkeeping</p> <p>1.5 Business internal controls</p> <p>1.6 Basic quality control and assurance concepts</p> <p>1.7 Government and regulatory processes</p> | <p>1.1 Basic bookkeeping/accounting skills</p> <p>1.2 Communication skills</p> <p>1.3 Building relations with customer and employees</p> <p>1.4 Building competitive advantage of the enterprise</p> |

| ELEMENT                                       | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                                                                                                                                        | REQUIRED KNOWLEDGE                                                                                                                                           | REQUIRED SKILLS                                                                                                                                             |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2. Establish and maintain client-base/ market | 2.1 Good customer relations are maintained<br><br>2.2 New customers and markets are identified, explored and reached out to.<br><br>2.3 Promotions /Incentives are offered to loyal customers<br><br>2.4 Additional products and services are evaluated and tried where feasible.<br><br>2.5 <b>Promotional/ advertising initiatives</b> are carried out where necessary and feasible. | 2.1 Public relations concepts<br><br>2.2 Basic product promotion strategies<br><br>2.3 Basic market and feasibility studies<br><br>2.4 Basic business ethics | 2.1 Building customer relations<br><br>2.2 Individual marketing skills<br><br>2.3 Using basic advertising (posters/ tarpaulins, flyers, social media, etc.) |

| ELEMENT                                            | PERFORMANCE CRITERIA<br><i>Italicized terms</i> are elaborated in the Range of Variables                                                                                                                                                                                     | REQUIRED KNOWLEDGE                                                                                                                                | REQUIRED SKILLS                                                                                                                              |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| 3. Apply budgeting and financial management skills | <p>3.1 Enterprise is built up and sustained through judicious control of cash flows.</p> <p>3.2 Profitability of enterprise is ensured through appropriate <b><i>internal controls</i></b>.</p> <p>3.3 Unnecessary or lower-priority expenses and purchases are avoided.</p> | <p>3.1 Cash flow management</p> <p>3.2 Basic financial management</p> <p>3.3 Basic financial accounting</p> <p>3.4 Business internal controls</p> | <p>3.1 Setting business priorities and strategies</p> <p>3.2 Interpreting basic financial statements</p> <p>3.3 Preparing business plans</p> |

## RANGE OF VARIABLES

| VARIABLE                                | RANGE                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Business strategies                  | <p>May include:</p> <p>1.1 Developing/Maintaining niche market</p> <p>1.2 Use of organic/healthy ingredients</p> <p>1.3 Environment-friendly and sustainable practices</p> <p>1.4 Offering both affordable and high-quality products and services</p> <p>1.5 Promotion and marketing strategies (e. g., online marketing)</p> |
| 2. Business operations                  | <p>May include:</p> <p>2.1 Purchasing</p> <p>2.2 Accounting/Administrative work</p> <p>2.3 Production/Operations/Sales</p>                                                                                                                                                                                                    |
| 3. Internal controls                    | <p>May include:</p> <p>3.1 Accounting systems</p> <p>3.2 Financial statements/reports</p> <p>3.3 Cash management</p>                                                                                                                                                                                                          |
| 4. Promotional/ Advertising initiatives | <p>May include:</p> <p>4.1 Use of tarpaulins, brochures, and/or flyers</p> <p>4.2 Sales, discounts and easy payment terms</p> <p>4.3 Use of social media/Internet</p> <p>4.4 "Service with a smile"</p> <p>4.5 Extra attention to regular customers</p>                                                                       |

## EVIDENCE GUIDE

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| 1. Critical aspects of competency | <b>Assessment requires evidence that the candidate :</b><br>1.1 Demonstrated basic entrepreneurial skills<br>1.2 Demonstrated ability to conceptualize and plan a micro/small enterprise<br>1.3 Demonstrated ability to manage/operate a micro/small-scale business |
| 2. Resource Implications          | <b>The following resources should be provided:</b><br>2.1 Simulated or actual workplace<br>2.2 Tools, materials and supplies needed to demonstrate the required tasks<br>2.3 References and manuals                                                                 |
| 3. Methods of Assessment          | <b>Competency in this unit may be assessed through :</b><br>3.1 Written examination<br>3.2 Demonstration/observation with oral questioning<br>3.3 Portfolio assessment with interview<br>3.4 Case problems                                                          |
| 4. Context of Assessment          | 4.1 Competency may be assessed in workplace or in a simulated workplace setting<br>4.2 Assessment shall be observed while tasks are being undertaken whether individually or in-group                                                                               |

## COMMON COMPETENCIES

**UNIT OF COMPETENCY : APPLY QUALITY STANDARDS**

**UNIT CODE : ICT315202**

**UNIT DESCRIPTOR :** This unit covers the knowledge, skills, attitudes and values needed to apply quality standards in the workplace. The unit also includes the application of relevant safety procedures and regulations, organization procedures and customer requirements.

| ELEMENT                                 | PERFORMANCE CRITERIA<br><i>Italicized</i> terms are elaborated in the Range of Variable                                                                                                                                                                                                                                                                                                                                                                              | REQUIRED KNOWLEDGE                                                                                                                                                                                                                                                                                        | REQUIRED SKILLS                                                                                                                         |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 1. Assess quality of received materials | <p>1.1 Work instruction is obtained and work is carried out in accordance with standard operating procedures.</p> <p>1.2 Received materials are checked against workplace standards and specifications</p> <p>1.3 Faulty materials related to work are identified and isolated.</p> <p>1.4 <b>Faults</b> and any identified causes are recorded and/or reported to the supervisor concerned in accordance with workplace procedures.</p> <p>1.5 Faulty materials</p> | <p>1.1 Relevant production processes, materials and products</p> <p>1.2 Characteristics of materials, software and hardware used in production processes</p> <p>1.3 Quality checking Procedures</p> <p>1.4 Quality Workplace Procedures</p> <p>1.5 Identification of faulty materials related to work</p> | <p>1.1 Reading skills required to interpret work instruction</p> <p>1.2 Critical thinking</p> <p>1.3 Interpreting work instructions</p> |

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|                                  | are replaced in accordance with workplace procedures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                        |                                                                       |
| 2. Assess own work               | <p>2.1 Documentation relative to quality within the company is identified and used.</p> <p>2.2 Completed work is checked against workplace standards relevant to the task undertaken.</p> <p>2.3 <b>Errors</b> are identified and isolated.</p> <p>2.4 Information on the quality and other indicators of production performance are recorded in accordance with workplace procedures.</p> <p>2.5 In cases of deviations from specific <b>quality standards</b>, causes are documented and reported in accordance with the workplace's standards operating procedures.</p> | <p>2.1 Safety and environmental aspects of production processes</p> <p>2.2 Fault identification and reporting</p> <p>2.3 Workplace procedure in documenting completed work</p> <p>2.4 Workplace Quality Indicators</p> | 2.1 Carry out work in accordance with OHS policies and procedures     |
| 3. Engage in quality improvement | 3.1 Process improvement procedures are participated in relative to                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>3.1 Quality improvement processes</p> <p>3.2 Company</p>                                                                                                                                                            | <p>3.1 Solution providing and decision-making</p> <p>3.2 Practice</p> |

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|  | workplace assignment.                                                                                              | customers defined. | company process improvement procedure |
|  | 3.2 Work is carried out in accordance with process improvement procedures.                                         |                    |                                       |
|  | 3.3 Performance of operation or quality of product of service to ensure <b>customer</b> satisfaction is monitored. |                    |                                       |

## RANGE OF VARIABLES

| VARIABLE             | RANGE                                                                                                                                                                                                                                    |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Materials         | 1.1 Materials may include but not limited to:<br>1.1.1. Manuals<br>1.1.2. Job orders<br>1.1.3. Instructional videos                                                                                                                      |
| 2. Faults            | 2.1 Faults may include but not limited to: 2.1.1. Materials not to specification 2.1.2. Materials contain incorrect/outdated information<br>2.1.3. Hardware defects<br>2.1.4. Materials that do not conform with any regulatory agencies |
| 3. Documentation     | 3.1 Organization work procedures<br>3.2 Manufacturer's instruction manual<br>3.3 Customer requirements<br>3.4 Forms                                                                                                                      |
| 4. Errors            | 4.1 Errors may be related but not limited to the following:<br>4.1.1. Deviation from the requirements of the Client<br>4.1.2. Deviation from the requirement of the organization                                                         |
| 5. Quality standards | 5.1 Quality standards may be related but not limited to the following:<br>5.1.1. Materials<br>5.1.2. Hardware<br>5.1.3. Final product<br>5.1.4. Production processes<br>5.1.5. Customer service                                          |

|             |                                                                                                         |
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| 6. Customer | 6.1 Co-worker<br>6.2 Supplier/Vendor<br>6.3 Client<br>6.4 Organization receiving the product or service |
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## EVIDENCE GUIDE

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|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Critical Aspects of Competency | <b>Assessment requires evidence that candidate:</b><br>1.1 Carried out work in accordance with the company's standard operating procedures<br>1.2 Performed task according to specifications<br>1.3 Reported defects detected in accordance with standard operating procedures<br>1.4 Carried out work in accordance with the process improvement procedures |
| 2. Method of assessment           | The assessor may select two (2) of the following assessment methods to objectively assess the candidate:<br>2.1 Observation<br>2.2 Questioning<br>2.3 Practical demonstration                                                                                                                                                                                |
| 3. Resource implication           | 3.1 Materials, software and hardware to be used in a real or simulated situation                                                                                                                                                                                                                                                                             |
| 4. Context of Assessment          | 1. Assessment may be conducted in the workplace or in a simulated environment                                                                                                                                                                                                                                                                                |

**UNIT OF COMPETENCY: PERFORM COMPUTER OPERATIONS****UNIT CODE : ICT311203****UNIT DESCRIPTOR :** This unit covers the knowledge, skills, (and) attitudes and values needed to perform computer operations which include inputting, accessing, producing and transferring data using the appropriate hardware and software

| <b>ELEMENT</b>                                | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms are elaborated in the Range of Variable</i>                                                                                                                                                              | <b>REQUIRED KNOWLEDGE</b>                                                                                                                                                                             | <b>REQUIRED SKILLS</b>                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Plan and prepare for task to be undertaken | 1.1 Requirements of task are determined<br><br>1.2 Appropriate <b>hardware</b> and <b>software</b> are selected according to task assigned and required outcome<br><br>1.3 Task is planned to ensure <b>OH&amp;S guidelines</b> and procedures are followed | 1.1 Main types of computers and basic features of different operating systems<br><br>1.2 Main parts of a computer<br><br>1.3 Information on hardware and software<br><br>1.4 Data security guidelines | 1.1 Reading and comprehension skills required to interpret work instruction and to interpret basic user manuals.<br><br>1.2 Communication skills to identify lines of communication, request advice, follow instructions and receive feedback.<br><br>1.3 Interpreting user manuals and security guidelines |
| 2. Input data into computer                   | 2.1 Data are entered into the computer using appropriate program/application in accordance with company procedures.<br><br>2.2 Accuracy of information is checked and information is saved in                                                               | 2.1 Basic ergonomics of keyboard and computer user<br><br>2.2 Storage devices and basic categories of memory<br><br>2.3 Relevant                                                                      | 2.1 Technology skills to use equipment safely including keyboard skills.<br><br>2.2 Entering data                                                                                                                                                                                                           |

| ELEMENT                                       | PERFORMANCE CRITERIA<br><i>Italicized terms are elaborated in the Range of Variable</i>                                                                                                                                                                                                                                                                                                                         | REQUIRED KNOWLEDGE                                                                                                                 | REQUIRED SKILLS                                                                                        |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|                                               | <p>accordance with standard operating procedures</p> <p>2.3 Inputted data are stored in <b>storage media</b> according to requirements.</p> <p>2.4 Work is performed within <b>ergonomic guidelines</b></p>                                                                                                                                                                                                     | types of software                                                                                                                  |                                                                                                        |
| 3. Access information using computer          | <p>3.1 Correct program/application on is selected based on job requirements</p> <p>3.2 Program/application on containing the information required is accessed according to company procedures</p> <p>3.3 <b>Desktop icons</b> are correctly selected, opened and closed for navigation purposes</p> <p>3.4 Keyboard techniques are carried out in line with OH&amp;S requirements for safe use of keyboards</p> | <p>3.1 General security, privacy legislation and copyright</p> <p>3.2 Productivity Application</p> <p>3.3 Business Application</p> | <p>3.1 Accessing Information</p> <p>3.2 Searching and browsing files and data</p>                      |
| 4. Produce/ output data using computer system | <p>4.1 Entered data are processed using appropriate software commands</p> <p>4.2 Data printed out as required using</p>                                                                                                                                                                                                                                                                                         | <p>4.1. Computer application in printing, scanning and sending facsimile</p> <p>4.2 Types and</p>                                  | <p>4.1 Computer data processing</p> <p>4.2 Printing of data</p> <p>4.3 Transferring files and data</p> |

| ELEMENT                                    | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms are elaborated in the Range of Variable</i>                                                                                                                                                                                                                                                                                         | REQUIRED KNOWLEDGE                                                                                                                                                                                                                                        | REQUIRED SKILLS                                                                            |
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|                                            | <p>computer hardware/peripheral devices in accordance with standard operating procedures</p> <p>4.3 Files, data are transferred between compatible systems using computer software, hardware/peripheral devices in accordance with standard operating procedures</p>                                                                                                                   | function of computer peripheral devices.                                                                                                                                                                                                                  |                                                                                            |
| 5. Maintain computer equipment and systems | <p>5.1 Systems for cleaning, minor <b>maintenance</b> and replacement of consumables are implemented</p> <p>5.2 Procedures for ensuring security of data, including regular back-ups and virus checks are implemented in accordance with standard operating procedures</p> <p>5.3 Basic file maintenance procedures are implemented in line with the standard operating procedures</p> | <p>5.1 Computer equipment/system basic maintenance procedures</p> <p>5.2 Viruses</p> <p>5.3 OH&amp;S principles and responsibilities</p> <p>5.4 Calculating computer capacity</p> <p>5.5 System Software</p> <p>5.6 Basic file maintenance procedures</p> | <p>5.1 Removing computer viruses from infected machines</p> <p>5.2 Making backup files</p> |

## RANGE OF VARIABLES

| VARIABLE                           | RANGE                                                                                                                                                                                                                                                                        |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Hardware and peripheral devices | 1.1 Personal computers<br>1.2 Networked systems<br>1.3 Communication equipment<br>1.4 Printers<br>1.5 Scanners<br>1.6 Keyboard<br>1.7 Mouse                                                                                                                                  |
| 2. Software                        | Software includes the following but not limited to:<br>2.1. Word processing packages<br>2.2. Data base packages<br>2.3. Internet<br>2.4 Spreadsheets                                                                                                                         |
| 3. OH & S guidelines               | 3.1 OHS guidelines<br>3.2 Enterprise procedures                                                                                                                                                                                                                              |
| 4. Storage media                   | Storage media include the following but not limited to:<br>4.1 diskettes<br>4.2 CDs<br>4.3 zip disks<br>4.4 hard disk drives, local and remote                                                                                                                               |
| 5. Ergonomic guidelines            | 5.1 Types of equipment used<br>5.2 Appropriate furniture<br>5.3 Seating posture<br>5.4 Lifting posture<br>5.5 Visual display unit screen brightness                                                                                                                          |
| 6. Desktop icons                   | Icons include the following but not limited to:<br>6.1 directories/folders<br>6.2 files<br>6.3 network devices<br>6.4 recycle bin                                                                                                                                            |
| 7. Maintenance                     | 7.1 Creating more space in the hard disk<br>7.2 Reviewing programs<br>7.3 Deleting unwanted files<br>7.4 Backing up files<br>7.5 Checking hard drive for errors<br>7.6 Using up to date security solution programs<br>7.7 Cleaning dust from internal and external surfaces. |

## EVIDENCE GUIDE

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|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Critical Aspects of Competency | <b>Assessment requires evidence that the candidate:</b><br>1.1 Selected and used hardware components correctly and according to the task requirement<br>1.2 Identified and explain the functions of both hardware and software used, their general features and capabilities<br>1.3 Produced accurate and complete data in accordance with the requirements<br>1.4 Used appropriate devices and procedures to transfer files/data accurately<br>1.5 Maintained computer system |
| 2. Method of assessment           | 2.1 <b>The assessor may select two of the following assessment methods to objectively assess the candidate:</b><br>2.1.1. Observation<br>2.1.2. Questioning<br>2.1.3. Practical demonstration                                                                                                                                                                                                                                                                                  |
| 3. Resource implication           | 3.1 Computer hardware with peripherals<br>3.2 Appropriate software                                                                                                                                                                                                                                                                                                                                                                                                             |
| 4. Context of Assessment          | 4.1 Assessment may be conducted in the workplace or in a simulated work environment                                                                                                                                                                                                                                                                                                                                                                                            |

**UNIT OF COMPETENCY: ENSURE COMPLIANCE WITH DATA PRIVACY AND ETHICS****UNIT CODE : CS-ICT252101**

**UNIT DESCRIPTOR** : This unit covers the outcomes required to ensure data privacy, ethical handling, and the integrity of data throughout its lifecycle. It includes maintaining compliance with data privacy regulations, applying ethical guidelines, and implementing practices to safeguard data accuracy and reliability across various projects.

| <b>ELEMENT</b>                              | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variable                                                                                                                                                                                                              | <b>REQUIRED KNOWLEDGE</b>                                                                                                                                                         | <b>REQUIRED SKILLS</b>                                                                                                                                                                                           |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Comply with data privacy regulations     | <p>1.1 Data privacy regulations relevant to data handling are identified and followed based on industry standards</p> <p>1.2 Data handling practices are ensured with Data privacy regulations</p> <p>1.3 Secure storage practices are implemented to protect personal data based on industry standards</p> | <p>1.1 RA 10173 (Data Privacy Act of 2012).</p> <p>1.2 Secure data storage protocols, including encryption and access control</p> <p>1.3 Data Privacy Regulations</p>             | <p>1.1 Identifying Applicable data privacy regulations during annotation and labeling.</p> <p>1.2 Following secure data handling procedures</p> <p>1.3 Storing personal data in compliance with privacy laws</p> |
| 2. Apply ethical standards in data handling | <p>2.1 <b><i>Ethical guidelines</i></b> are applied to avoid bias and promote fairness in data handling processes</p> <p>2.2 Transparency in data usage is ensured through proper documentation of <b><i>data handling</i></b></p>                                                                          | <p>2.1 Knowledge of AI ethics principles, such as fairness, transparency, and accountability</p> <p>2.2 RA 10175 (Cybercrime Prevention Act of 2012)</p> <p>2.3 Importance of</p> | <p>2.1 Applying ethical standards during annotation and labeling to avoid bias</p> <p>2.2 Documenting data handling and usage practices</p> <p>2.3 Obtaining and</p>                                             |

|  |                                                                                                                             |                                                                |                                       |
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|  | <b><i>practices.</i></b><br>2.3 Consent for data usage is obtained and documented following <b><i>ethical standards</i></b> | preventing bias in datasets and ensuring transparent practices | recording user consent for data usage |
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## RANGE OF VARIABLES

| VARIABLE                    | RANGE                                                                                                                                                                 |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Data privacy regulations | May include but not limited to:<br>1.1 RA 10173 (Data Privacy Act of 2012)<br>1.2 Organizational policies on data privacy                                             |
| 2. Ethical guidelines       | May include but not limited to:<br>2.1. Guidelines to prevent bias in data annotation<br>2.2. Ethical AI principles<br>2.3. Transparency and accountability standards |
| 3. Data handling practices  | May include but not limited to:<br>3.1. Secure data transmission<br>3.2. Data anonymization<br>3.3. Data encryption                                                   |
| 4. Ethical standards        | May include but not limited to:<br>4.1. Fairness<br>4.2. Avoiding bias<br>4.3. Transparency<br>4.4. Accountability                                                    |

## EVIDENCE GUIDE

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|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Critical Aspects of Competency | <b>Assessment requires evidence that the candidate:</b><br>1.1 Complied with data privacy regulations<br>1.2 Applied ethical standards in data handling                                                          |
| 2. Method of assessment           | <b>The assessor may select from the following assessment methods but not limited to:</b><br>2.1 Observation<br>2.2 Questioning<br>2.3 Practical demonstration                                                    |
| 3. Resource implication           | 3.1 Access to relevant privacy regulations and ethical guidelines.<br>3.2 Documentation tools for compliance and tracking consent.<br>3.3 AI datasets requiring secure handling and compliance with privacy laws |

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| 4. Context of Assessment | 4.1 Assessment may be conducted in a workplace or simulated environment. |
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## CORE COMPETENCIES

**UNIT OF COMPETENCY : PREPARE NETWORK PLAN**

**UNIT CODE : AB-ICT1381100252301**

**UNIT DESCRIPTOR :** This unit covers the knowledge, skills and attitudes required to draft network plan, present network plan, and, finalize network plan.

| ELEMENT               | PERFORMANCE CRITERIA<br><i>Italicized terms</i> are elaborated in the Range of Variable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | REQUIRED KNOWLEDGE                                                                                                                                                                                                                                                                                                                                                                                                        | REQUIRED SKILLS                                                                                                                                                                                                                                                                                                                                                                                                        |
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| 1. Draft network plan | <p>1.1. Client needs, integration objectives and technical specifications are gathered based on job requirements</p> <p>1.2. <b><i>Client job requirements capacity</i></b> and Internet of Things (IoT) systems compatibility are assessed based on <b><i>industry standards</i></b></p> <p>1.3. Software and hardware components, dependencies, and <b><i>integration constraints</i></b> are determined based on <b><i>integration requirements</i></b></p> <p>1.4. <b><i>Parameters</i></b> are established based on client needs</p> <p>1.5. <b><i>Simulation</i></b> is conducted based on</p> | <p>1.1 Network Design</p> <p>1.2 Network Security</p> <p>1.3 Internet of Things (IoT) and network specifications</p> <p>1.4 Network Mechanism</p> <p>1.5 Vendors</p> <p>1.6 Reliable communication</p> <p>1.7 Internet of Things (IoT) systems compatibility</p> <p>1.8 Software and hardware components, dependencies</p> <p>1.9 Integration constraints</p> <p>1.10 Integration requirements</p> <p>1.11 Parameters</p> | <p>1.1 Implementing Topology</p> <p>1.2 Conducting network security</p> <p>1.3 Cabling</p> <p>1.4 IP Addressing</p> <p>1.5 Routing and switching skills</p> <p>1.6 Troubleshooting ability</p> <p>1.7 Project management</p> <p>1.8 Communication Skills</p> <p>1.9 Analytical Thinking</p> <p>1.10 Problem-Solving</p> <p>1.11 Identifying Software and hardware components, dependencies</p> <p>1.12 Integration</p> |

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|                         | <p>company policy and procedures</p> <p>1.6. <b>Adjustments</b> are made on parameters based on simulation results</p> <p>1.7. Initial network plan is prepared based on company policy and procedures</p>                                                                                                                              | 1.12 Company policy and procedures                                                                                                                                                                                                                                             | <p>requirements</p> <p>1.13 Implementing parameters</p> <p>1.14 Applying company policy and procedures</p>                                                                                                                                                                                                                                                                                                                             |
| 2. Present network plan | <p>2.1 <b>Presentation materials</b> are prepared based on network plan</p> <p>2.2 Simulation is conducted at stakeholder meetings based on proposed network plan</p> <p>2.3 Questions and issues are addressed based on discussions</p> <p>2.4 Technical issues and concerns are documented based on company policy and procedures</p> | <p>2.1 Network objectives</p> <p>2.2 Current Network Environment</p> <p>2.3 Security Planning</p> <p>2.4 Disaster Recovery &amp; Backup</p> <p>2.5 Deployment and Integration</p> <p>2.6 Documentation</p> <p>2.7 Test and Monitor</p> <p>2.8 Maintenance and Optimization</p> | <p>2.1. Identifying network objectives</p> <p>2.2. Assessing current network environment</p> <p>2.3. Implementing security measures</p> <p>2.4. Conducting disaster recovery &amp; backup</p> <p>2.5. Implementing deployment and Integration</p> <p>2.6. Perform documentation</p> <p>2.7. Troubleshooting &amp; Monitoring</p> <p>2.8. Conduct maintenance and optimization</p> <p>2.9. Collaboration &amp; communication skills</p> |

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|                          |                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                           | 2.10. Continuous Learning & Adaptability                                                                                                                                                                                                                                                                                                                                                                                                        |
| 3. Finalize network plan | <p>3.1 Refinements are applied on the revised network plan based on the technical discussions</p> <p>3.2 Network plan is submitted for approval based on company policy procedures</p> <p>3.3 Network plan is coordinated to concerned departments based on company policy and procedures</p> | <p>3.1 Network plan</p> <p>3.2 Company policy and procedures</p> <p>3.3 Regulatory &amp; Compliance Knowledge</p> <p>3.4 Documentation and Reporting</p> <p>3.5 Stakeholder &amp; Project Management</p> <p>3.6 Emerging Technologies</p> | <p>3.1 Interpreting network plan</p> <p>3.2 Applying company policy and procedures</p> <p>3.3 Technical validating &amp; reviewing</p> <p>3.4 Perform documentation and reporting</p> <p>3.5 Implementing security finalization</p> <p>3.6 Identifying stakeholders and project management</p> <p>3.7 Conduct scalability &amp; future-proofing</p> <p>3.8 Cost Assessment &amp; Budgeting</p> <p>3.9 Coordinating to concerned departments</p> |

## RANGE OF VARIABLES

| VARIABLE                            | RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| 1. Client job requirements capacity | <b>May include:</b> <ul style="list-style-type: none"> <li>1.1 Upgrade/Update client systems, devices</li> <li>1.2 Budget</li> <li>1.3 Environment /workplace/location</li> <li>1.4 Timeframe</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 2. Industry Standards               | <b>May include:</b> <ul style="list-style-type: none"> <li>2.1 Network and communication standards</li> <li>2.2 Internet of Things (IoT) security standards</li> <li>2.3 Data and interoperability standards</li> <li>2.4 Industry-specific Internet of Things (IoT) standards</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 3. Integration constraints          | <b>May include:</b> <ul style="list-style-type: none"> <li>3.1 Limited Power Supply</li> <li>3.2 Network Latency &amp; Bandwidth Limitations</li> <li>3.3 Interoperability Challenges</li> <li>3.4 Security Vulnerabilities</li> <li>3.5 Scalability Issues</li> <li>3.6 Data Processing Limitations</li> <li>3.7 Cost Constraints</li> <li>3.8 Compliance &amp; Regulatory Requirements</li> <li>3.9 Hardware Limitations</li> <li>3.10 Environmental Factors</li> </ul>                                                                                                                                                                                                                                           |
| 4. Integration requirements         | <b>May include:</b> <ul style="list-style-type: none"> <li>4.1 Low-power protocols (LoRaWAN, NB-IoT), energy-efficient sensors</li> <li>4.2 Edge computing, adaptive data compression, 5G integration</li> <li>4.3 Standardized protocols (MQTT, OPC UA, BACnet), API-based integration</li> <li>4.4 End-to-end encryption (TLS 1.3), zero-trust architecture, blockchain</li> <li>4.5 Cloud-native architectures, serverless computing, elastic scaling</li> <li>4.6 Edge AI, real-time analytics, optimized data pipelines</li> <li>4.7 Cost-effective sensors, open-source IoT platforms, pay-as-you-go cloud models</li> <li>4.8 ISO 27001, GDPR, HIPAA compliance, industry-specific certifications</li> </ul> |

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|                           | <p>4.9 Optimized firmware, hardware acceleration, modular design</p> <p>4.10 Ruggedized enclosures, adaptive power management, redundancy mechanisms</p>                                       |
| 5. Parameters             | <p><b>May include:</b></p> <p>5.1 Integration objectives</p> <p>5.2 Flowchart</p> <p>5.3 Security measures</p>                                                                                 |
| 6. Simulation             | <p><b>May include:</b></p> <p>6.1 Virtual</p> <p>6.2 Augmented</p> <p>6.3 Physical simulators/Digital Trainor</p>                                                                              |
| 7. Adjustments            | <p><b>May include:</b></p> <p>8.1 Reconfiguration</p> <p>8.2 Technical specifications</p> <p>8.3 Calibration</p> <p>8.4 Reposition</p> <p>8.5 Modification</p>                                 |
| 8. Presentation materials | <p><b>May include:</b></p> <p>8.1 Demonstration videos</p> <p>8.2 PowerPoint slides</p> <p>8.3 Demo units</p> <p>8.4 Printed materials</p> <p>8.5 Initial work plan</p> <p>8.6 Simulations</p> |
| 9. Stakeholders           | <p><b>May include:</b></p> <p>9.1 Client</p> <p>9.2 Supervisor</p> <p>9.3 Manager</p> <p>9.4 Team members</p>                                                                                  |

## EVIDENCE GUIDE

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| 1. Critical aspect of competencies | <p>Assessment requires evidence that the candidate</p> <p>1.1 Drafted network plan</p> <p>1.1.1 Gathered client needs, integration objectives and technical specifications based on job requirements</p> <p>1.1.2 Assessed Client job requirements capacity and Internet of Things (IoT) systems compatibility based on industry standards</p> <p>1.1.3 Determined Software and hardware components,</p> |
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|                           | <p>dependencies, and integration constraints based on integration requirements</p> <p>1.1.4. Established parameters based on client needs</p> <p>1.1.5. Made adjustments on parameters based on simulation results</p> <p>1.2 Presented network plan</p> <p>1.2.1 Prepared presentation materials based on network Plan</p> <p>1.2.2 Conducted simulation at stakeholder meeting based on proposed network plan</p> <p>1.2.3 Addressed questions and issues based on discussions</p> <p>1.2.4 Documented technical issues and concerns documented based on company policy and procedures</p> <p>1.3 Finalized network plan</p> <p>1.3.1 Reflected refinements on the revised network plan based on the technical discussions</p> <p>1.3.2 Submitted network plan for approval based on company policies and procedures</p> <p>1.3.3 Coordinated network plan to concerned departments based on company policies and procedures</p> |
| 2. Resource Implications  | <p>The following resources should be provided:</p> <p>2.1 Computers/ Laptop</p> <p>2.2 Software</p> <p>2.3 Appropriate Equipment and supplies</p> <p>2.4 Designated assessment area.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 3. Methods of Assessment  | <p>Competency in this unit must be assessed through:</p> <p>3.1 Institutional Assessment</p> <p>3.2 Written test</p> <p>3.3 Practical/demonstration with oral questioning</p> <p>3.4 Interview</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 4. Context for Assessment | <p>4.1 Competency may be assessed individually in the actual workplace or in simulated environment in TESDA accredited training institutions</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**UNIT OF COMPETENCY : OVERSEE INSTALLATION AND CONFIGURATION OF INTERNET OF THINGS (IOT) SYSTEMS**

**UNIT CODE : AB-ICT1381100252302**

**UNIT DESCRIPTOR :** This unit covers the knowledge, skills and attitudes required to monitor implementation progress of network : plan, provide guidance on installation and configuration of Internet of Things (IoT) systems, and prepare documentation Internet of Things (IoT) integration.

| <b>ELEMENT</b>                                                       | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variable                                                                                                                                                                                                                                                                                                                                                                              | <b>REQUIRED KNOWLEDGE</b>                                                                                                                                                                                                                                        | <b>REQUIRED SKILLS</b>                                                                                                                                                                                                                                                                                                        |
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| 1. Monitor implementation progress of network plan                   | <p>1.1 <b><i>Internet of Things (IoT) systems</i></b> are checked following <b><i>7-layer Open Systems Interconnection (OSI) model</i></b></p> <p>1.2 <b><i>Performance</i></b> of Internet of Things (IoT) systems is checked based on <b><i>monitoring indicators</i></b></p> <p>1.3 Findings are prepared based on <b><i>company policy and procedures in reports</i></b></p> <p>1.4 Monitoring report is prepared and shared based on company policy and procedures</p> | <p>1.1 7-layer Open Systems Interconnection (OSI) model</p> <p>1.2 Project Management</p> <p>1.3 Monitoring procedures</p> <p>1.4 Company policy and procedures in reports</p> <p>1.5 Business and Industry Knowledge</p> <p>1.6 Reporting and Documentation</p> | <p>1.1 Identifying 7-layer Open Systems Interconnection (OSI) model</p> <p>1.2 Implementing monitoring procedures</p> <p>1.3 Industry-specific knowledge</p> <p>1.4 Leadership and Team Management</p> <p>1.5 Monitoring and Evaluation</p> <p>1.6 Technical and configuration Skills</p> <p>1.7 Customer or client focus</p> |
| 2. Provide guidance on installation and configuration of Internet of | <p>2.1 <b><i>Internet of Things (IoT) system issues</i></b> are analyzed based on monitoring</p>                                                                                                                                                                                                                                                                                                                                                                            | <p>2.1 Understanding IoT Basics</p> <p>2.2 Hardware familiarities and knowledge</p>                                                                                                                                                                              | <p>2.1 Data handling skills</p> <p>2.2 Project Management</p>                                                                                                                                                                                                                                                                 |

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| Things (IoT) systems                                             | <p>findings</p> <p>2.2 <b>Possible solutions</b> are determined based on <b>Original Equipment Manufacturer (OEM)</b></p> <p>2.3 Clear and concise instructions on specific <b>adjustments</b> are provided based on Original Equipment Manufacturer (OEM).</p> <p>2.4 <b>Support</b> is provided in implementing adjustments based on company policy and procedures</p> <p>2.5 Adjustments made are verified based on <b>Internet of Things (IoT) performance criteria</b></p> | <p>2.3 Networking Skills</p> <p>2.4 Programming</p> <p>2.5 Data Management</p> <p>2.6 Security Practices</p> <p>2.7 Troubleshooting and Maintenance</p>                                                                                             | <p>Skills</p> <p>2.3 Adaptability and Lifelong Learning</p> <p>2.4 Technical Skills</p>                                                                                                                                                         |
| 3. Prepare documentation on Internet of Things (IoT) integration | <p>3.1 Data back-ups are implemented following company policy and procedures and <b>OEM back-up guidelines</b></p> <p>3.2 <b>Storage media</b> are shared with <b>concerned personnel</b> based on company policy and procedures and OEM back-up guidelines</p> <p>3.3 Documentation is labeled and stored following company</p>                                                                                                                                                | <p>3.1 Basic Network Fundamentals</p> <p>3.2 Hardware Components</p> <p>3.3 Network Design and Architecture</p> <p>3.4 Security Best Practices knowledge</p> <p>3.5 Performance Monitoring</p> <p>3.6 Risk Management</p> <p>3.7 Compliance and</p> | <p>3.1 Critical Thinking</p> <p>3.2 Technical Writing Skills</p> <p>3.3 Understanding of Networking and Internet of Things (IoT) Concepts</p> <p>3.4 Visualization</p> <p>3.5 Attention to Detail</p> <p>3.6 organizational</p> <p>3.7 Tool</p> |

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|  | policy and procedures | Regulations<br>3.8 Collaboration and Documentation | Proficiency |
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## RANGE OF VARIABLES

| VARIABLE                            | RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| 1. Internet of Things (IoT) systems | <b>May include:</b> <ul style="list-style-type: none"> <li>1.1 Device Parameters <ul style="list-style-type: none"> <li>1.1.1 Device ID/Serial Number</li> <li>1.1.2 Firmware Version</li> <li>1.1.3 Battery Level</li> <li>1.1.4 Signal Strength</li> </ul> </li> <li>1.2 Environmental Variables <ul style="list-style-type: none"> <li>1.2.1 Temperature</li> <li>1.2.2 Humidity</li> <li>1.2.3 Air Quality</li> <li>1.2.4 Light Intensity</li> </ul> </li> <li>1.3 System Status <ul style="list-style-type: none"> <li>1.3.1 Connection Status</li> <li>1.3.2 Operational State</li> <li>1.3.3 Data Transmission Rate</li> </ul> </li> <li>1.4 Control and Actuation Variables <ul style="list-style-type: none"> <li>1.4.1 On/Off State</li> <li>1.4.2 Position</li> <li>1.4.3 Speed</li> </ul> </li> <li>1.5 Network Variables <ul style="list-style-type: none"> <li>1.5.1 Bandwidth</li> <li>1.5.2 Latency</li> <li>1.5.3 Communication Protocol</li> </ul> </li> <li>1.6 Security Variables <ul style="list-style-type: none"> <li>1.6.1 Encryption Type</li> <li>1.6.2 Authentication Tokens</li> <li>1.6.3 Access Control Levels</li> </ul> </li> <li>1.7 Data Variables <ul style="list-style-type: none"> <li>1.7.1 Data Streams</li> <li>1.7.2 Thresholds</li> <li>1.7.3 Historical Data</li> </ul> </li> </ul> |

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| 2. 7-layer OSI (Open Systems Interconnection) model | <b>May include:</b> <ul style="list-style-type: none"> <li>2.1 Physical</li> <li>2.2 Data Link</li> <li>2.3 Network</li> <li>2.4 Transport</li> <li>2.5 Session</li> <li>2.6 Presentation</li> <li>2.7 Application</li> </ul>                                                                                                                                                                                                                                                                |
| 3. Performance                                      | <b>May include:</b> <ul style="list-style-type: none"> <li>3.1 Functionality</li> <li>3.2 Connectivity</li> <li>3.3 Activity</li> <li>3.4 Data sheet</li> <li>3.5 Graph</li> </ul>                                                                                                                                                                                                                                                                                                           |
| 4. Monitoring indicators                            | <b>May include but not limited to:</b> <ul style="list-style-type: none"> <li>4.1 Remote access</li> <li>4.2 Network traffic monitoring</li> <li>4.3 Device health monitoring</li> <li>4.4 Data integrity and anomaly</li> <li>4.5 Security event logging and alerting</li> <li>4.6 Performance and latency monitoring</li> <li>4.7 Cloud and edge computing</li> </ul>                                                                                                                      |
| 5. Company policy and procedures                    | <b>May include:</b> <ul style="list-style-type: none"> <li>5.1 Monitoring</li> <li>5.2 Provision of support</li> <li>5.3 Internal protocols for documentation and reporting <ul style="list-style-type: none"> <li>• Specific equipment indicating manufacturer model</li> <li>• Methods of checking and troubleshooting</li> <li>• Results</li> <li>• Recommendations</li> <li>• Request for replacement and spare parts</li> <li>• Report to concerned personnel</li> </ul> </li> </ul>    |
| 6. IoT system Issues                                | <b>May include:</b> <ul style="list-style-type: none"> <li>6.1 Device parameters <ul style="list-style-type: none"> <li>• Duplicate IDs, outdated firmware, battery drain, weak signal</li> </ul> </li> <li>6.2 Environmental Variables <ul style="list-style-type: none"> <li>• Sensor inaccuracy, out-of-range readings, environmental interference</li> </ul> </li> <li>6.3 System Status <ul style="list-style-type: none"> <li>• Unstable connections, incorrect</li> </ul> </li> </ul> |

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|                       | <p>operational states, data transmission overload.</p> <p>6.4 Control and Actuation Variables</p> <ul style="list-style-type: none"> <li>• Delayed or failed control actions, inaccurate position/speed data.</li> </ul> <p>6.5 Network Variables</p> <ul style="list-style-type: none"> <li>• Bandwidth limits, high latency, incompatible communication protocols.</li> </ul> <p>6.6 Security Variables</p> <ul style="list-style-type: none"> <li>• Weak encryption, token misuse, poor access control settings.</li> </ul> <p>6.7 Data Variables</p> <ul style="list-style-type: none"> <li>• Data loss, incorrect thresholds, corrupted or missing historical data.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 7. Possible solutions | <p><b>May include:</b></p> <p>7.1 Device Parameters</p> <ul style="list-style-type: none"> <li>• Use unique IDs, regular firmware updates, power-efficient design, and signal boosters.</li> </ul> <p>7.2 Environmental Variables</p> <ul style="list-style-type: none"> <li>• Calibrate sensors, apply filtering algorithms, and use sensors within their rated range.</li> </ul> <p>7.3 System Status</p> <ul style="list-style-type: none"> <li>• Ensure stable connectivity, implement status monitoring, and optimize data rates.</li> </ul> <p>7.4 Control and Actuation Variables</p> <ul style="list-style-type: none"> <li>• Use real-time control systems, validate inputs, and apply fallback mechanisms.</li> </ul> <p>7.5 Network Variables</p> <ul style="list-style-type: none"> <li>• Optimize bandwidth use, reduce latency with edge computing, and standardize protocols.</li> </ul> <p>7.6 Security Variables</p> <ul style="list-style-type: none"> <li>• Apply strong encryption, secure token handling, and define strict access controls.</li> </ul> <p>7.7 Data Variables</p> <ul style="list-style-type: none"> <li>• Use data validation, dynamic thresholding, and regular data backups.</li> </ul> |

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| 8. Original Equipment Manufacturer (OEM)          | <b>May include:</b> <ul style="list-style-type: none"> <li>8.1 Hardware</li> <li>8.2 Software and firmware</li> <li>8.3 Cloud and data service</li> <li>8.4 Industrial smart infrastructure</li> <li><b>8.5</b> Communication and connectivity</li> </ul>                                                                                                                                                                                           |
| 9. Support                                        | <b>May include:</b> <ul style="list-style-type: none"> <li>9.1 Live chat Support</li> <li>9.2 Email support</li> <li>9.3 Remote desktop support</li> <li>9.4 On-site support</li> </ul>                                                                                                                                                                                                                                                             |
| 10. Internet of Things (IoT) performance criteria | <b>May include:</b> <ul style="list-style-type: none"> <li>7.1 Network efficiency</li> <li>7.2 Sensor accuracy</li> <li>7.3 Response time</li> <li>7.4 Security protocols</li> <li>7.5 System scalability</li> </ul>                                                                                                                                                                                                                                |
| 11. Adjustments                                   | <b>May include:</b> <ul style="list-style-type: none"> <li>11.1 Reconfiguration</li> <li>11.2 Technical specifications</li> <li>11.3 Calibration</li> <li>11.4 Reposition</li> <li>11.5 Modification</li> </ul>                                                                                                                                                                                                                                     |
| 12. OEM back-up guidelines                        | <b>May include:</b> <ul style="list-style-type: none"> <li>12.1 Cloud-based backup</li> <li>12.2 Edge computing backup</li> <li>12.3 Network redundancy and failover mechanism</li> <li>12.4 On premise backup and Disaster Recovery (DR)</li> <li>12.5 Blockchain-based backup</li> <li>12.6 Automated firmware and configuration backup</li> <li>12.7 Data mirroring and hot standby systems</li> <li>12.8 AI powered predicted backup</li> </ul> |
| 13. Storage media                                 | <b>May include:</b> <ul style="list-style-type: none"> <li>13.1 USB drive</li> <li>13.2 CDs</li> <li>13.3 Hard disk or hard drive</li> <li>13.4 Documents</li> <li>13.5 Micro SD card</li> <li>13.6 Personal Network Server (PNS)</li> </ul>                                                                                                                                                                                                        |

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| 14. Concerned personnel | <b>May include:</b><br>14.1 Internet of Things (IoT) Specialist<br>14.2 Internet of Things (IoT) Programmer<br>14.3 Internet of Things (IoT) Record keeper<br>14.4 Internet of Things (IoT) Manager |
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## EVIDENCE GUIDE

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|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Critical aspect of competencies | <p>Assessment requires evidence that the candidate</p> <ul style="list-style-type: none"> <li>1.1 Monitored implementation progress of network plan <ul style="list-style-type: none"> <li>1.1.1 Checked Internet of Things (IoT) systems following the 7-layer Open Systems Interconnection (OSI) model</li> <li>1.1.2 Checked performance of Internet of Things (IoT) systems based on monitoring indicators</li> <li>1.1.3 Prepared findings based on company policies and procedures in reports</li> <li>1.1.4 Prepared and shared monitoring report based on company policies and procedures</li> </ul> </li> <li>1.2. Provided guidance on installation and configuration of Internet of Things (IoT) systems <ul style="list-style-type: none"> <li>1.2.1 Analyzed Internet of Things (IoT) system issues based on monitoring findings</li> <li>1.2.2 Determined possible solutions based on Original Equipment Manufacturer (OEM)</li> <li>1.2.3 Provided clear and concise instructions on specific adjustments based on Original Equipment Manufacturer (OEM).</li> <li>1.2.4 Provided support in implementing adjustments based on company policies and procedures</li> <li>1.2.5 Verified adjustments made based on Internet of Things (IoT) performance criteria</li> </ul> </li> </ul> |
| 2. Resource Implications           | <p>The following resources should be provided:</p> <ul style="list-style-type: none"> <li>2.1 Computers/ Laptop</li> <li>2.2 Software</li> <li>2.3 Appropriate Equipment and supplies</li> <li>2.4 Designated assessment area.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 3. Methods of Assessment           | <p>Competency in this unit must be assessed through:</p> <ul style="list-style-type: none"> <li>3.1 Institutional Assessment</li> <li>3.2 Written test</li> <li>3.3 Practical/demonstration with oral questioning</li> <li>3.4 Interview</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 4. Context for Assessment          | <ul style="list-style-type: none"> <li>4.1 Competency may be assessed individually in the actual workplace or in simulated environment in TESDA accredited training institutions</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

**UNIT OF COMPETENCY : DEVELOP INTERNET OF THINGS (IOT) SYSTEM USER MANUAL**

**UNIT CODE : AB-ICT1381100252303**

**UNIT DESCRIPTOR : Things (IoT) systems integration , prepare maintenance guidelines, and prepare troubleshooting guidelines.**

| <b>ELEMENT</b>                                                         | <b>PERFORMANCE CRITERIA</b><br><i>Italicized terms</i> are elaborated in the Range of Variable                                                                                                                                                                                                                                                                                                                                                           | <b>REQUIRED KNOWLEDGE</b>                                                                                                                                                                                                             | <b>REQUIRED SKILLS</b>                                                                                                                                                                                                               |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Prepare user manual on Internet of Things (IoT) systems integration | 1.1 <b>References</b> are collated based on Internet of Things (IoT) system components<br>1.2 Components of manual are organized and categorized based on selected inputs from the references according to <b>company policy and procedures</b><br>1.3 User's guide is prepared based on <b>company format</b><br>1.4 User's guide is submitted for <b>enhancement</b> and approval to <b>concerned personnel</b> based on company policy and procedures | 1.1 Understanding the device or system<br>1.2 Target audience awareness<br>1.3 Instructional Design<br>1.4 Visual Design and Tools<br>1.5 Compliance and Safety Standards<br>1.6 Feedback and Testing<br>1.7 Organizational Structure | 1.1 Technical Writing<br>1.2 Audience Analysis Skill<br>1.3 Instructional Design Skills<br>1.4 Organization and Formatting Skills<br>1.5 Collaboration<br>1.6 Attention to details<br>1.7 Problem solving and reconfiguration skills |
| 2. Prepare maintenance guidelines                                      | 2.1 Maintenance schedule is prepared based on <b>manufacturer's guidelines</b><br>2.2 <b>Maintenance</b>                                                                                                                                                                                                                                                                                                                                                 | 2.1 Knowledgeable in equipment or system<br>2.2 Knowledgeable on types of maintenance                                                                                                                                                 | 2.1 Troubleshooting Skills<br>2.2 Problem-Solving Skills<br>2.3 Analytical                                                                                                                                                           |

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                              |
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|                                       | <p><b>activities</b> per Internet of Things (IoT) components are identified based on manufacturer's guidelines</p> <p>2.3 <b>Software/ firmware updates</b> are incorporated based on <b>maintenance schedule</b></p>                                                                                                                                                                                                                                                                                                                     | <p>2.3 Documentation and Record-Keeping</p> <p>2.4 Resource Management</p> <p>2.5 Compliance and Safety Standards</p> <p>2.6 Risk Management</p> <p>2.7 Performance Metrics and KPIs</p> <p>2.8 Communication and Collaboration</p>                                                                          | <p>Skills</p> <p>2.4 Adaptability and Continuous Learning</p> <p>2.5 Record-keeping</p> <p>2.6 Communication skills</p> <p>2.7 Technical writing</p>                                                                                                         |
| 3. Prepare troubleshooting guidelines | <p>3.1 <b>Common issues</b> are identified based on system indicators</p> <p>3.2 Underlying causes and solutions are determined based on <b>Original Equipment Manufacturer (OEM) troubleshooting guidelines</b></p> <p>3.3 <b>Original Equipment Manufacturer (OEM) assisted issues</b> are identified and referred to concerned technical support/integrator based on <b>company policy and procedures (Voice and Non-voice)</b></p> <p>3.4 Safety procedures are provided based on <b>Industry safety standards and guidelines</b></p> | <p>3.1 Problem Diagnosis Techniques</p> <p>3.2 Common Troubleshooting Frameworks</p> <p>3.3 Technical Information</p> <p>3.4 Error Handling and Safety</p> <p>3.5 User Perspective Knowledge</p> <p>3.6 Documentation Standards</p> <p>3.7 Technology-Specific Knowledge</p> <p>3.8 Feedback and Testing</p> | <p>3.1 Clear communication</p> <p>3.2 Instructional Design</p> <p>3.3 Visual Representation</p> <p>3.4 Attention to Detail</p> <p>3.5 Testing and Validation</p> <p>3.6 Technical expertise</p> <p>3.7 Communication skills</p> <p>3.8 Technical writing</p> |

## RANGE OF VARIABLES

| VARIABLE                         | RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. References                    | <b>May include:</b> <ul style="list-style-type: none"> <li>1.1 Manufacturer's documentation <ul style="list-style-type: none"> <li>1.1.1 Manual</li> <li>1.1.2 Data sheet</li> <li>1.1.3 Technical Specific sheet</li> <li>1.1.4 Firmware documentation</li> </ul> </li> <li>1.2 Communication and networking standards <ul style="list-style-type: none"> <li>1.2.1 WIFI</li> <li>1.2.2 5G</li> <li>1.2.3 LTE</li> <li>1.2.4 Bluetooth</li> <li>1.2.5 Zigbee</li> </ul> </li> <li>1.3 Regulatory and compliance standards <ul style="list-style-type: none"> <li>1.3.1 ISO</li> <li>1.3.2 CE certifications</li> <li>1.3.3 Radio Frequency (RF) compliance</li> <li>1.3.4 Electrical code</li> <li>1.3.5 Environmental</li> </ul> </li> <li>1.4 Troubleshooting and maintenance manuals <ul style="list-style-type: none"> <li>1.4.1 OEM service manuals</li> <li>1.4.2 Preventive maintenance guides</li> <li>1.4.3 Predicted maintenance</li> </ul> </li> </ul> |
| 2. Company policy and procedures | <b>May include:</b> <ul style="list-style-type: none"> <li>2.1 Safety</li> <li>2.2 Start-up</li> <li>2.3 Installation</li> <li>2.4 Operation</li> <li>2.5 Preventive maintenance</li> <li>2.6 Basic troubleshooting</li> <li>2.7 Appendices</li> <li>2.8 Glossary of terms</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

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| 3. Company format            | <b>May include:</b> <ul style="list-style-type: none"> <li>3.1 Internet of Things (IoT) System introduction</li> <li>3.2 Appearance of the system</li> <li>3.3 Platform overview</li> <li>3.4 Platform unit</li> <li>3.5 Platform components</li> <li>3.6 Internet of Things (IoT) operation (procedures per unit)</li> <li>3.7 Appendices</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                      |
| 4. Enhancement               | <b>May include:</b> <ul style="list-style-type: none"> <li>4.1 Language and readability <ul style="list-style-type: none"> <li>4.1.1 Spelling check</li> <li>4.1.2 Grammar</li> <li>4.1.3 Clarity and conciseness</li> <li>4.1.4 Consistency</li> <li>4.1.5 Translation quality</li> </ul> </li> <li>4.2 Visual and formatting <ul style="list-style-type: none"> <li>4.2.1 Image enhancement</li> <li>4.2.2 Diagram improvements</li> <li>4.2.3 Typography and lay-out</li> <li>4.2.4 Page structure and navigation</li> </ul> </li> <li>4.3 Usability and accessibility <ul style="list-style-type: none"> <li>4.3.1 Interactive elements</li> <li>4.3.2 Indexing and searchability</li> <li>4.3.3 Color contrast and readability</li> </ul> </li> </ul> |
| 5. Concerned personnel       | <b>May include</b> <ul style="list-style-type: none"> <li>5.1 Internet of Things (IoT) Specialist</li> <li>5.2 Internet of Things (IoT) Programmer</li> <li>5.3 Internet of Things (IoT) Record keeper</li> <li>5.4 Internet of Things (IoT) Manager</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 6. Manufacturer's guidelines | <b>May include:</b> <ul style="list-style-type: none"> <li>6.1 Preventive maintenance</li> <li>6.2 Periodic maintenance</li> <li>6.3 Corrective maintenance</li> <li>6.4 Predictive maintenance</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 7. Maintenance activities    | <b>May include:</b> <ul style="list-style-type: none"> <li>7.1 Regular inspection and servicing</li> <li>7.2 Maintenance based on time and usage</li> <li>7.3 Unscheduled repairs due to failures and malfunctions</li> <li>7.4 Predict failures before they occur</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

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| 8. Software/ firmware updates                                        | <b>May include:</b> <ul style="list-style-type: none"> <li>8.1 Critical updates (Emergency fixes)</li> <li>8.2 Routine software updates (Bug fixes and minor enhancement)</li> <li>8.3 Feature updates (Major software updates)</li> <li>8.4 Firmware updates (Embedded system and device-level updates)</li> <li>8.5 Security patches (Vulnerability fixes)</li> <li>8.6 Performance optimization updates</li> </ul>                                                                                                                                                                                                                                                          |
| 9. Maintenance schedule                                              | <b>May include:</b> <ul style="list-style-type: none"> <li>9.1 As needed (corrective maintenance)</li> <li>9.2 Weekly/monthly</li> <li>9.3 Quarterly/semi-annually</li> <li>9.4 Quarterly/Annually</li> <li>9.5 Periodic</li> <li>9.6 Condition-based</li> <li>9.7 Annually or as needed</li> </ul>                                                                                                                                                                                                                                                                                                                                                                            |
| 10. Common issues                                                    | <b>May include:</b> <ul style="list-style-type: none"> <li>10.1 Connectivity</li> <li>10.2 Sensor failure</li> <li>10.3 Power supply problem</li> <li>10.4 Firmware and software error</li> <li>10.5 Data integrity</li> <li>10.6 Security threats</li> <li>10.7 Overload and performance bottle neck</li> </ul>                                                                                                                                                                                                                                                                                                                                                               |
| 11. Original Equipment Manufacturer (OEM) troubleshooting guidelines | <b>May include:</b> <ul style="list-style-type: none"> <li>11.1 Hardware troubleshooting <ul style="list-style-type: none"> <li>11.1.1 Check power supply and hardware integrity</li> <li>11.1.2 Sensor and actuator diagnostics</li> <li>11.1.3 Firmware and device updates</li> <li>11.1.4 Peripheral and accessory testing</li> </ul> </li> <li>11.2 Connectivity troubleshooting <ul style="list-style-type: none"> <li>11.2.1 Network connection check</li> <li>11.2.2 Cloud and server connection check</li> <li>11.2.3 Interference and signal strength</li> <li>11.2.4 Reboot and reconnect</li> </ul> </li> <li>11.3 Software and firmware troubleshooting</li> </ul> |

|                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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|                                                           | <ul style="list-style-type: none"> <li>11.3.1 Device logs and error codes</li> <li>11.3.2 Software compatibility and integration</li> <li>11.3.3 Factory reset and reconfiguration</li> <li>11.4 Security and access control troubleshooting <ul style="list-style-type: none"> <li>11.4.1 Authentication and authorization issues</li> <li>11.4.2 Firmware and software vulnerabilities</li> <li>11.4.3 Encryption and secure communication</li> </ul> </li> <li>11.5 Performance and Latency troubleshooting <ul style="list-style-type: none"> <li>11.5.1 System latency and response time</li> <li>11.5.2 Bandwidth and data usage</li> <li>11.5.3 Overheating</li> <li>11.5.4 Device synchronization and clock drift</li> </ul> </li> </ul> |
| 12. Original Equipment Manufacturer (OEM) assisted issues | <b>May include:</b> <ul style="list-style-type: none"> <li>12.1 Critical system failures</li> <li>12.2 Escalation issues</li> <li>12.3 Non-user-resolvable issues</li> <li>12.4 OEM dependent failures</li> <li>12.5 Advance diagnostic cases</li> <li>12.6 manufacture level defects</li> <li>12.7 deep system anomalies</li> <li>12.8 high severity malfunctions</li> </ul>                                                                                                                                                                                                                                                                                                                                                                    |
| 13. Company policy and procedures (Voice and Non-voice)   | <b>May include:</b> <ul style="list-style-type: none"> <li>13.1 Chat support</li> <li>13.2 email support</li> <li>13.3 ticketing</li> <li>13.4 help desk</li> <li>13.5 voice call support</li> <li>13.6 field/onsite support</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 14. Industry safety standards and guidelines              | <b>May include:</b> <ul style="list-style-type: none"> <li>14.1 International Organization for Standardization (ISO)</li> <li>14.2 Occupational Safety and Health Administration (OSHA)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## EVIDENCE GUIDE

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|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Critical aspect of competencies</p> | <p>Assessment requires evidence that the candidate</p> <p>1.1 Prepared user manual on Internet of Things (IoT) systems integration</p> <p>1.1.1 Collated references based on Internet of Things (IoT) system components</p> <p>1.1.2 Organized and categorized components of manual based on selected inputs from the references according to company policies and procedures</p> <p>1.1.3 Prepared user's guide based on company format</p> <p>1.1.4 Submitted user's guide for enhancement and approval to concerned personnel based on company policies and procedures</p> <p>1.2 Prepared maintenance guidelines</p> <p>1.2.1 Prepared maintenance schedule based on manufacturer's guidelines</p> <p>1.2.2 Identified maintenance activities per Internet of Things (IoT) components based on manufacturer's guidelines</p> <p>1.2.3 Incorporated software/firmware updates based on maintenance schedule</p> <p>1.3 Prepared troubleshooting guidelines</p> <p>1.3.1 Identified common issues based on system indicators</p> <p>1.3.2 Determined underlying causes and solutions based on Original Equipment Manufacturer (OEM) troubleshooting guidelines</p> <p>1.3.3 Identified maintenance activities per Internet of Things (IoT) components based on manufacturer's guidelines</p> <p>1.3.4 Identified and referred Original Equipment Manufacturer (OEM) assisted issues to concerned technical support/integrator based on company policies and procedures (Voice and Non-voice)</p> <p>1.3.5 Provided safety procedures based on Industry safety standards and guidelines</p> |
| <p>2. Resource Implications</p>           | <p>The following resources should be provided:</p> <p>2.1 Computers/ Laptop</p> <p>2.2 Software</p> <p>2.3 Appropriate Equipment and supplies</p> <p>2.4 Designated assessment area.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p>3. Methods of Assessment</p>           | <p>Competency in this unit must be assessed through:</p> <p>3.1 Institutional Assessment</p> <p>3.2 Written test</p> <p>3.3 Practical/demonstration with oral questioning</p> <p>3.4 Interview</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

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| 4. Context for Assessment | 4.1 Competency may be assessed individually in the actual workplace or in simulated environment in TESDA accredited training institutions |
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## GLOSSARY OF TERMS

|                                                     |                                                                                                                                                                                         |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. 7-layer OSI (Open Systems Interconnection) model | A conceptual framework used to understand and describe network communication by dividing it into seven distinct layers, from physical transmission to application processes.            |
| 2. API (Application Programming Interface)          | A set of protocols and tools that allows different software applications to communicate with each other.                                                                                |
| 3. Bandwidth                                        | The maximum rate of data transfer across a network, measured in bits per second (bps).                                                                                                  |
| 4. Blockchain                                       | A decentralized digital ledger technology used for securing transactions, data integrity, and authentication.                                                                           |
| 5. Cloud-Based Backup                               | A backup solution where data is stored remotely in cloud servers for disaster recovery and security purposes.                                                                           |
| 6. Cloud Computing                                  | A technology that enables on-demand access to computing resources (e.g., storage, processing power) over the internet.                                                                  |
| 7. Cloud-Native Architectures                       | System architectures designed specifically for the cloud, utilizing technologies like microservices, containerization, and orchestration tools to optimize performance and scalability. |
| 8. Compliance & Regulatory Requirements             | Policies and standards that organizations must follow to ensure data security, legal obligations, and industry best practices.                                                          |
| 9. Cybersecurity                                    | The practice of protecting computer networks, systems, and data from cyber threats, hacking, and unauthorized access.                                                                   |
| 10. Data Integrity and Anomaly                      | Ensuring that data is accurate, consistent, and reliable, and detecting any unusual patterns or errors in the data.                                                                     |
| 11. Disaster Recovery & Backup                      | Strategies and processes put in place to restore data and network functionality in the event of a disaster or system failure.                                                           |
| 12. Edge Computing                                  | A distributed computing framework where data processing occurs closer to the data source (such as IoT devices) to reduce latency and improve performance.                               |
| 13. Feedback and Testing                            | The process of reviewing system performance and making adjustments based on feedback, often in the form of testing and validating system components.                                    |
| 14. Firmware                                        | Software that is embedded into hardware devices, controlling how the device operates at a basic level.                                                                                  |
| 15. Integration Constraints                         | Challenges or limitations in integrating systems, including hardware, software, and network capabilities, such as limited power, security vulnerabilities, and network latency.         |

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| 16. Integration Requirements                      | The specific needs for combining different systems or technologies, such as energy-efficient protocols, cloud computing integration, and security measures.    |
| 17. Internet of Things (IoT)                      | A network of physical devices, vehicles, appliances, and other objects embedded with sensors, software, and connectivity to exchange data.                     |
| 18. Internet of Things (IoT) Performance Criteria | Metrics used to measure the performance of Internet of Things (IoT) systems, including accuracy, response time, and system scalability.                        |
| 19. IP Addressing                                 | A system used to assign unique numerical addresses to devices on a network for identification and communication.                                               |
| 20. Latency                                       | The delay between sending and receiving data over a network, often measured in milliseconds (ms).                                                              |
| 21. LoRaWAN (Long Range Wide Area Network)        | A low-power, long-range wireless communication protocol designed for Internet of Things (IoT) applications.                                                    |
| 22. Monitoring Indicators                         | Metrics used to assess the performance, security, and reliability of network and Internet of Things (IoT) systems.                                             |
| 23. MQTT (Message Queuing Telemetry Transport)    | A lightweight messaging protocol commonly used in IoT communication for data exchange between devices.                                                         |
| 24. Network Design                                | The process of planning and structuring a network's components, topology, and security configurations to meet business or technical requirements.              |
| 25. Network Latency                               | The time delay in data transmission from one network point to another, affecting system responsiveness.                                                        |
| 26. Network Plan                                  | A detailed strategy outlining how a network will be built and managed to meet specific business needs, ensuring proper integration, security, and scalability. |
| 27. Network Security                              | Measures and protocols implemented to protect network infrastructure from threats such as hacking, malware, and unauthorized access.                           |
| 28. Original Equipment Manufacturer (OEM)         | A company that manufactures products or components that are sold by another company under its brand name.                                                      |
| 29. Performance Monitoring                        | The process of measuring and tracking the performance of network systems, including connectivity, data traffic, and overall system efficiency.                 |
| 30. Preventive Maintenance                        | Routine maintenance activities designed to prevent equipment failures before they happen, typically based on a predetermined schedule.                         |
| 31. Project Management                            | The application of knowledge, skills, tools, and techniques to meet project requirements, including managing timelines, budgets, and teams.                    |
| 32. Redundancy Mechanisms                         | Backup systems or failover processes designed to maintain system operation in case of component failure.                                                       |

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| 33. Risk Management                     | The identification, assessment, and prioritization of risks followed by the application of resources to minimize or control the probability of negative outcomes.       |
| 34. Routing & Switching                 | Networking functions responsible for directing data packets efficiently within and between networks.                                                                    |
| 35. Scalability                         | The ability of a system to grow and handle increased demand without compromising performance.                                                                           |
| 36. Security Event Logging and Alerting | The process of tracking and recording security-related activities within a network, including the use of alerts for potential threats.                                  |
| 37. Security Protocols                  | Rules or procedures designed to ensure the security of data as it is transmitted across a network.                                                                      |
| 38. Simulation                          | The process of mimicking real-world network behaviors using software or hardware tools to predict how a system will perform under different conditions.                 |
| 39. Stakeholders                        | Individuals or groups who have an interest in the network plan or Internet of Things (IoT) system, such as clients, managers, team members, or technical support staff. |
| 40. Technical Specifications            | Detailed descriptions of the technical characteristics of systems or components, including hardware, software, and network requirements.                                |
| 41. Technical Writing                   | The process of creating clear, concise, and accurate documentation to communicate technical information.                                                                |
| 42. Topology                            | The physical and logical arrangement of devices and components in a network, including how they are connected.                                                          |
| 43. Troubleshooting                     | The process of diagnosing and resolving problems or issues within a system, including identifying root causes and implementing fixes.                                   |
| 44. Troubleshooting & Monitoring        | The combined process of identifying and resolving technical problems while continuously observing the system's performance.                                             |
| 45. User Manual                         | A document providing instructions and information on how to use and maintain a system or device, often prepared for end-users.                                          |
| 46. Vendor                              | A company that supplies hardware, software, or services to another business or client.                                                                                  |
| 47. Virtualization                      | The technology that creates virtual versions of computing resources such as servers, storage, and networks to optimize resource use.                                    |
| 48. Virtual Simulation                  | A simulation conducted in a virtual environment, allowing testing of network behaviors without physical equipment.                                                      |
| 49. Zero-Trust Architecture             | A security model that assumes no device or user is trustworthy by default and requires continuous verification of access privileges.                                    |

## ACKNOWLEDGEMENTS

The Technical Education and Skills Development Authority (TESDA) would like to recognize the commitment of industry stakeholders, Area-Based and Demand Driven (ABDD) TVET Focals who provided their time and expertise for the development of these Competency Standards.

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|                                                                                                                                                                 |                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
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