# TRAINING REGULATIONS

# CABLE TV (CATV) INSTALLATION NC II

## INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) SECTOR

**TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY**
**East Service Road, South Superhighway, Taguig City, Metro Manila**

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**ELECTRONICS SECTOR**

# CABLE TV (CATV) INSTALLATION

# NATIONAL CERTIFICATE LEVEL II

# TRAINING REGULATIONS FOR
# CABLE TV (CATV) INSTALLATION NC II

## Section 1 CABLE TELEVISION (CATV) INSTALLATION NC II QUALIFICATION

The **CABLE TV (CATV) INSTALLATION NC II** Qualification consists of competencies that a person must possess to install pole hardware and accessories, lay out and install coaxial/fiber-optic cables, install active and passive devices and accessories as well as to install, disconnect and reconnect subscriber drop lines and to install all internal cables and devices for both single- and multiple-dwelling units.

This Qualification is packaged from the competency map of the Electronics Industry (Service sector) as shown in Annex A.

The units of competency comprising this qualification include the following:

| Code | BASIC COMPETENCIES |
|---|---|
| 5 00 311 1 05 | Participate in workplace communication |
| 5 00 311 1 06 | Work in team environment |
| 5 00 311 1 07 | Practice career professionalism |
| 5 00 311 1 08 | Practice occupational health and safety procedures |

| Code | COMMON COMPETENCIES |
|---|---|
| ELC724201* | Use Hand Tools |
| ELC311201* | Perform Mensuration and Calculation |
| ELC311202* | Prepare and Interpret Technical Drawing |
| ELC315202* | Apply Quality Standards |

* Imported from Electronics Sector Common Competencies

| Code | CORE COMPETENCIES |
|---|---|
| MDA724301 | Install Pole Hardware and Accessories |
| MDA724302 | Lay Out and Install Fiber-Optic/ Coaxial Cables |
| MDA724303 | Install Active and Passive Devices and Accessories |
| MDA724304 | Install Subscriber Drop Lines and CPE |
| MDA724305 | Install Cables and Devices for MDU |

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

- Cable TV Installer

## SECTION 2: COMPETENCY STANDARDS

This section gives the details of the contents of the basic, common, and core units of competency required for **CABLE TELEVISION (CATV) INSTALLATION NC II.**

### BASIC COMPETENCIES

**UNIT OF COMPETENCY : PARTICIPATE IN WORKPLACE COMMUNICATION**

**UNIT CODE : 500311105**

**UNIT DESCRIPTOR :** This unit covers the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements.

| ELEMENT | PERFORMANCE CRITERIA<br>***Italicized*** terms are elaborated in the Range of Variables |
|---|---|
| 1. Obtain and convey workplace information | 1.1 Specific and relevant information is accessed from ***appropriate sources***<br>1.2 Effective questioning , active listening and speaking skills are used to gather and convey information<br>1.3 Appropriate ***medium*** is used to transfer information and ideas<br>1.4 Appropriate non- verbal communication is used<br>1.5 Appropriate lines of communication with supervisors and colleagues are identified and followed<br>1.6 Defined workplace procedures for the location and ***storage*** of information are used<br>1.7 Personal interaction is carried out clearly and concisely |
| 2. Participate in workplace meetings and discussions | 2.1 Team meetings are attended on time<br>2.2 Own opinions are clearly expressed and those of others are listened to without interruption<br>2.3 Meeting inputs are consistent with the meeting purpose and established ***protocols***<br>2.4 ***Workplace interactions*** are conducted in a courteous manner<br>2.5 Questions about simple routine workplace procedures and matters concerning working conditions of employment are asked and responded to<br>2.6 Meetings outcomes are interpreted and implemented |
| 3. Complete relevant work related documents | 3.1 Range of ***forms*** relating to conditions of employment are completed accurately and legibly<br>3.2 Workplace data is recorded on standard workplace forms and documents<br>3.3 Basic mathematical processes are used for routine calculations<br>3.4 Errors in recording information on forms/ documents are identified and properly acted upon<br>3.5 Reporting requirements to supervisor are completed according to organizational guidelines |

## RANGE OF VARIABLES

| VARIABLE | RANGE |
|---|---|
| 1. Appropriate sources | 1.1. Team members<br>1.2. Suppliers<br>1.3. Trade personnel<br>1.4. Local government<br>1.5. Industry bodies |
| 2. Medium | 2.1. Memorandum<br>2.2. Circular<br>2.3. Notice<br>2.4. Information discussion<br>2.5. Follow-up or verbal instructions<br>2.6. Face to face communication |
| 3. Storage | 3.1. Manual filing system<br>3.2. Computer-based filing system |
| 4. Forms | 4.1. Personnel forms, telephone message forms, safety reports |
| 5. Workplace interactions | 5.1. Face to face<br>5.2. Telephone<br>5.3. Electronic and two way radio<br>5.4. Written including electronic, memos, instruction and forms, non-verbal including gestures, signals, signs and diagrams |
| 6. Protocols | 6.1. Observing meeting<br>6.2. Compliance with meeting decisions<br>6.3. Obeying meeting instructions |

## EVIDENCE GUIDE

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|---|---|
| 1. Critical aspects of Competency | Assessment requires evidence that the candidate:<br>1.1. Prepared written communication following standard format of the organization<br>1.2. Accessed information using communication equipment<br>1.3. Made use of relevant terms as an aid to transfer information effectively<br>1.4. Conveyed information effectively adopting the formal or informal communication |
| 2. Underpinning Knowledge | 2.1. Effective communication<br>2.2. Different modes of communication<br>2.3. Written communication<br>2.4. Organizational policies<br>2.5. Communication procedures and systems<br>2.6. Technology relevant to the enterprise and the individual's work responsibilities |
| 3. Underpinning Skills | 3.1. Follow simple spoken language<br>3.2. Perform routine workplace duties following simple written notices<br>3.3. Participate in workplace meetings and discussions<br>3.4. Complete work related documents<br>3.5. Estimate, calculate and record routine workplace measures<br>3.6. Basic mathematical processes of addition, subtraction, division and multiplication<br>3.7. Ability to relate to people of social range in the workplace<br>3.8. Gather and provide information in response to workplace Requirements |
| 4. Resource Implications | 4.1. Fax machine<br>4.2. Telephone<br>4.3. Writing materials<br>4.4. Internet |
| 5. Methods of Assessment | 5.1. Direct Observation<br>5.2. Oral interview<br>5.3. Written test |
| 6. Context for Assessment | 6.1. Competency may be assessed individually in the actual workplace or through accredited institution |

**UNIT OF COMPETENCY: WORK IN TEAM ENVIRONMENT**

**UNIT CODE : 500311106**

**UNIT DESCRIPTOR :** This unit covers the skills, knowledge and attitudes to identify role and responsibility as a member of a team.

| ELEMENT | PERFORMANCE CRITERIA<br>***Italicized*** terms are elaborated in the Range of Variables |
|---|---|
| 1. Describe team role and scope | 1.1. The ***role and objective of the team*** is identified from available ***sources of information***<br>1.2. Team parameters, reporting relationships and responsibilities are identified from team discussions and appropriate external sources |
| 2. Identify own role and responsibility within team | 2.1. Individual role and responsibilities within the team environment are identified<br>2.2. Roles and responsibility of other team members are identified and recognized<br>2.3. Reporting relationships within team and external to team are identified |
| 3. Work as a team member | 3.1. Effective and appropriate forms of communications used and interactions undertaken with team members who contribute to known team activities and objectives<br>3.2. Effective and appropriate contributions made to complement team activities and objectives, based on individual skills and competencies and ***workplace context***<br>3.3. Observed protocols in reporting using standard operating procedures<br>3.4. Contribute to the development of team work plans based on an understanding of team's role and objectives and individual competencies of the members. |

**RANGE OF VARIABLES**

| VARIABLE | RANGE |
|---|---|
| 1. Role and objective of team | 1.1. Work activities in a team environment with enterprise or specific sector<br>1.2. Limited discretion, initiative and judgement maybe demonstrated on the job, either individually or in a team environment |
| 2. Sources of information | 2.1. Standard operating and/or other workplace procedures<br>2.2. Job procedures<br>2.3. Machine/equipment manufacturer's specifications and instructions<br>2.4. Organizational or external personnel<br>2.5. Client/supplier instructions<br>2.6. Quality standards<br>2.7. OHS and environmental standards |
| 3. Workplace context | 3.1. Work procedures and practices<br>3.2. Conditions of work environments<br>3.3. Legislation and industrial agreements<br>3.4. Standard work practice including the storage, safe handling and disposal of chemicals<br>3.5. Safety, environmental, housekeeping and quality guidelines |

**EVIDENCE GUIDE**

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|---|---|
| 1. Critical aspects of Competency | Assessment requires evidence that the candidate:<br>1.1. Operated in a team to complete workplace activity<br>1.2. Worked effectively with others<br>1.3. Conveyed information in written or oral form<br>1.4. Selected and used appropriate workplace language<br>1.5. Followed designated work plan for the job<br>1.6. Reported outcomes |
| 2. Underpinning Knowledge and Attitude | 2.1. Communication process<br>2.2. Team structure<br>2.3. Team roles<br>2.4. Group planning and decision making |
| 3. Underpinning Skills | 3.1. Communicate appropriately, consistent with the culture of the workplace |
| 4. Resource Implications | The following resources **MUST** be provided:<br>4.1. Access to relevant workplace or appropriately simulated environment where assessment can take place<br>4.2. Materials relevant to the proposed activity or tasks |
| 5. Methods of Assessment | Competency may be assessed through:<br>5.1. Observation of the individual member in relation to the work activities of the group<br>5.2. Observation of simulation and or role play involving the participation of individual member to the attainment of organizational goal<br>5.3. Case studies and scenarios as a basis for discussion of issues and strategies in teamwork |
| 6. Context for Assessment | 6.1. Competency may be assessed in workplace or in a simulated workplace setting<br>6.2. Assessment shall be observed while task are being undertaken whether individually or in group |

**UNIT OF COMPETENCY: PRACTICE CAREER PROFESSIONALISM**

**UNIT CODE : 500311107**

**UNIT DESCRIPTOR :** This unit covers the knowledge, skills and attitudes in promoting career growth and advancement.

| ELEMENT | PERFORMANCE CRITERIA<br>***Italicized*** terms are elaborated in the Range of Variables |
|---|---|
| 1. Integrate personal objectives with organizational goals | 1.1. Personal growth and work plans are pursued towards improving the qualifications set for the profession<br>1.2. Intra- and interpersonal relationships are maintained in the course of managing oneself based on performance ***evaluation***<br>1.3. Commitment to the organization and its goal is demonstrated in the performance of duties |
| 2. Set and meet work priorities | 2.1. Competing demands are prioritized to achieve personal, team and organizational goals and objectives.<br>2.2. ***Resources*** are utilized efficiently and effectively to manage work priorities and commitments<br>2.3. Practices along economic use and maintenance of equipment and facilities are followed as per established procedures |
| 3. Maintain professional growth and development | 3.1. ***Trainings and career opportunities*** are identified and availed of based on job requirements<br>3.2 ***Recognitions*** are sought/received and demonstrated as proof of career advancement<br>3.3 ***Licenses and/or certifications*** relevant to job and career are obtained and renewed |

## RANGE OF VARIABLES

| VARIABLE | RANGE |
|---|---|
| 1. Evaluation | 1.1 Performance Appraisal<br>1.2 Psychological Profile<br>1.3 Aptitude Tests |
| 2. Resources | 2.1 Human<br>2.2 Financial<br>2.3 Technology<br>2.3.1 Hardware<br>2.3.2 Software |
| 3. Trainings and career opportunities | 3.1 Participation in training programs<br>3.1.1 Technical<br>3.1.2 Supervisory<br>3.1.3 Managerial<br>3.1.4 Continuing Education<br>3.2 Serving as Resource Persons in conferences and workshops |
| 4. Recognitions | 4.1 Recommendations<br>4.2 Citations<br>4.3 Certificate of Appreciations<br>4.4 Commendations<br>4.5 Awards<br>4.6 Tangible and Intangible Rewards |
| 5. Licenses and/or certifications | 5.1 National Certificates<br>5.2 Certificate of Competency<br>5.3 Support Level Licenses<br>5.4 Professional Licenses |

**EVIDENCE GUIDE**

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|---|---|
| 1. Critical aspects of Competency | Assessment requires evidence that the candidate:<br>1.1 Attained job targets within key result areas (KRAs)<br>1.2 Maintained intra - and interpersonal relationship in the course of managing oneself based on performance evaluation<br>1.3 Completed trainings and career opportunities which are based on the requirements of the industries<br>1.4 Acquired and maintained licenses and/or certifications according to the requirement of the qualification |
| 2. Underpinning Knowledge | 2.1 Work values and ethics (Code of Conduct, Code of Ethics, etc.)<br>2.2 Company policies<br>2.3 Company-operations, procedures and standards<br>2.4 Fundamental rights at work including gender sensitivity<br>2.5 Personal hygiene practices |
| 3. Underpinning Skills | 3.1 Appropriate practice of personal hygiene<br>3.2 Intra and Interpersonal skills<br>3.3 Communication skills |
| 4. Resource Implications | The following resources **MUST** be provided:<br>4.1 Workplace or assessment location<br>4.2 Case studies/scenarios |
| 5. Methods of Assessment | Competency may be assessed through:<br>5.1 Portfolio Assessment<br>5.2 Interview<br>5.3 Simulation/Role-plays<br>5.4 Observation<br>5.5 Third Party Reports<br>5.6 Exams and Tests |
| 6. Context for Assessment | 6.1 Competency may be assessed in the work place or in a simulated work place setting |

**UNIT OF COMPETENCY :** **PRACTICE OCCUPATIONAL HEALTH AND SAFETY PROCEDURES**

**UNIT CODE :** **500311108**

**UNIT DESCRIPTOR :** This unit covers the knowledge, skills and attitudes required to comply with regulatory and organizational requirements for occupational health and safety.

| ELEMENT | PERFORMANCE CRITERIA<br>***Italicized*** terms are elaborated in the Range of Variables |
|---|---|
| 1. Identify hazards and risks | 1.1 ***Safety regulations*** and workplace safety and hazard control practices and procedures are clarified and explained based on organization procedures<br>1.2 ***Hazards/risks*** in the workplace and their corresponding indicators are identified to minimize or eliminate risk to co-workers, workplace and environment in accordance with organization procedures<br>1.3 ***Contingency measures*** during workplace accidents, fire and other emergencies are recognized and established in accordance with organization procedures |
| 2. Evaluate hazards and risks | 2.1 Terms of maximum tolerable limits which when exceeded will result in harm or damage are identified based on threshold limit values (TLV)<br>2.2 Effects of the hazards are determined<br>2.3 OHS issues and/or concerns and identified safety hazards are reported to designated personnel in accordance with workplace requirements and relevant workplace OHS legislation |
| 3. Control hazards and risks | 3.1 Occupational Health and Safety (OHS) procedures for controlling hazards/risks in workplace are consistently followed<br>3.2 Procedures for dealing with workplace accidents, fire and emergencies are followed in accordance with organization OHS policies<br>3.3 ***Personal protective equipment (PPE)*** is correctly used in accordance with organization OHS procedures and practices<br>3.4 Appropriate assistance is provided in the event of a workplace emergency in accordance with established organization protocol |
| 4. Maintain OHS awareness | 4.1 ***Emergency-related drills and trainings*** are participated in as per established organization guidelines and procedures<br>4.2 ***OHS personal records*** are completed and updated in accordance with workplace requirements |

**RANGE OF VARIABLES**

| VARIABLE | RANGE |
|---|---|
| 1. Safety regulations | May include but are not limited to:<br>1.1 Clean Air Act<br>1.2 Building code<br>1.3 National Electrical and Fire Safety Codes<br>1.4 Waste management statutes and rules<br>1.5 Philippine Occupational Safety and Health Standards<br>1.6 DOLE regulations on safety legal requirements<br>1.7 ECC regulations |
| 2. Hazards/Risks | May include but are not limited to:<br>2.1 Physical hazards – impact, illumination, pressure, noise, vibration, temperature, radiation<br>2.2 Biological hazards- bacteria, viruses, plants, parasites, mites, molds, fungi, insects<br>2.3 Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors<br>2.4 Ergonomics<br>2.4.1 Psychological factors – over exertion/ excessive force, awkward/static positions, fatigue, direct pressure, varying metabolic cycles<br>2.4.2 Physiological factors – monotony, personal relationship, work out cycle |
| 3. Contingency measures | May include but are not limited to:<br>3.1 Evacuation<br>3.2 Isolation<br>3.3 Decontamination<br>3.4 (Calling designed) emergency personnel |
| 4. Personal Protective Equipment | May include but are not limited to:<br>4.1 Mask<br>4.2 Gloves<br>4.3 Goggles<br>4.4 Hair Net/cap/bonnet<br>4.5 Face mask/shield<br>4.6 Ear muffs<br>4.7 Apron/Gown/coverall/jump suit<br>4.8 Anti-static suits |

| VARIABLE | RANGE |
|---|---|
| 5. Emergency-related drills and training | 5.1 Fire drill<br>5.2 Earthquake drill<br>5.3 Basic life support/CPR<br>5.4 First aid<br>5.5 Spillage control<br>5.6 Decontamination of chemical and toxic<br>5.7 Disaster preparedness/management |
| 6. OHS personal records | 6.1 Medical/Health records<br>6.2 Incident reports<br>6.3 Accident reports<br>6.4 OHS-related training completed |

**EVIDENCE GUIDE**

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|---|---|
| 1. Critical aspects of Competency | Assessment requires evidence that the candidate:<br>1.1 Explained clearly established workplace safety and hazard control practices and procedures<br>1.2 Identified hazards/risks in the workplace and its corresponding indicators in accordance with company procedures<br>1.3 Recognized contingency measures during workplace accidents, fire and other emergencies<br>1.4 Identified terms of maximum tolerable limits based on threshold limit value- TLV.<br>1.5 Followed Occupational Health and Safety (OHS) procedures for controlling hazards/risks in workplace<br>1.6 Used Personal Protective Equipment (PPE) in accordance with company OHS procedures and practices<br>1.7 Completed and updated OHS personal records in accordance with workplace requirements |
| 2. Underpinning Knowledge | 2.1 OHS procedures and practices and regulations<br>2.2 PPE types and uses<br>2.3 Personal hygiene practices<br>2.4 Hazards/risks identification and control<br>2.5 Threshold Limit Value -TLV<br>2.6 OHS indicators<br>2.7 Organization safety and health protocol<br>2.8 Safety consciousness<br>2.9 Health consciousness |
| 3. Underpinning Skills | 3.1 Practice of personal hygiene<br>3.2 Hazards/risks identification and control skills<br>3.3 Interpersonal skills<br>3.4 Communication skills |
| 2. Resource Implications | The following resources must be provided:<br>4.1 Workplace or assessment location<br>4.2 OHS personal records<br>4.3 PPE<br>4.4 Health records |
| 3. Methods of Assessment | Competency may be assessed through:<br>5.1 Portfolio Assessment<br>5.2 Interview<br>5.3 Case Study/Situation |
| 4. Context for Assessment | 6.1 Competency may be assessed in the work place or in a simulated work place setting |

## COMMON COMPETENCIES

**UNIT TITLE** : **USE HAND TOOLS**
**UNIT CODE** : **ELC724201**
**UNIT DESCRIPTOR** : This unit covers the knowledge, skills and attitudes on the safe use, handling and maintenance of tools.

| ELEMENT | PERFORMANCE CRITERIA<br>***Italicized Bold*** terms are elaborated in the Range of Variables |
|---|---|
| 1. Plan and prepare for tasks to be undertaken | 1.1. Tasks to be undertaken are properly identified<br>1.2. Appropriate ***hand tools*** are identified and selected according to the task requirements |
| 2. Prepare hand tools | 2.1. Appropriate hand tools are checked for proper operation and safety<br>2.2. Unsafe or faulty tools are identified and marked for repair according to standard company procedure |
| 3. Use appropriate hand tools and test equipment | 3.1. Tools are used according to tasks undertaken<br>3.2. All safety procedures in using tools are observed at all times and appropriate ***personal protective equipment*** (PPE) are used<br>3.3. Malfunctions, unplanned or unusual events are reported to the supervisor |
| 4. Maintain hand tools | 4.1. Tools are handled without damage according to procedures<br>4.2. Routine ***maintenance*** of tools is undertaken according to standard operational procedures, principles and techniques<br>4.3. Tools are stored safely in appropriate locations in accordance with manufacturer's specifications or standard operating procedures |

**RANGE OF VARIABLES**

| VARIABLE | RANGE |
|---|---|
| 1. Hand tools | 1.1. Hand tools for adjusting, dismantling, assembling, finishing, cutting. Tool set includes the following but not limited to: screw drivers, pliers, punches, wrenches, files |
| 2. Personal Protective Equipment (PPE) | 2.1. Gloves<br>2.2. Protective eyewear<br>2.3. Apron/overall |
| 3. Maintenance | 3.1. Cleaning<br>3.2. Lubricating<br>3.3. Tightening<br>3.4. Simple tool repairs<br>3.5. Hand sharpening<br>3.6. Adjustment using correct procedures |

**EVIDENCE GUIDE**

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|---|---|
| 1. Critical aspect of competency | Assessment requires evidence that the candidate:<br><br>1.1. Demonstrated safe working practices at all times<br>1.2. Communicated information about processes, events or tasks being undertaken to ensure a safe and efficient working environment<br>1.3. Planned tasks in all situations and reviewed task requirements as appropriate<br>1.4. Performed all tasks to specification<br>1.5. Maintained and stored tools in appropriate location |
| 2. Underpinning knowledge | 2.1. Safety<br>2.1.1. Safety requirements in handling tools<br>2.2. Tools<br>2.2.1. Function, Operation, Common faults<br>2.3. Processes, Operations, Systems<br>2.3.1. Maintenance of tools<br>2.3.2. Storage of Tools |
| 3. Underpinning skills | 3.1. Reading skills required to interpret work instruction and numerical skills<br>3.2. Communication skills<br>3.3. Problem solving in emergency situation |
| 4. Method of assessment | Competency in this unit must be assessed through:<br>4.1. Observation<br>4.2. Oral questioning |
| 5. Resource Implication | 5.1. Tools may include the following but not limited to:<br>5.1.1. Screw drivers<br>5.1.2. Pliers<br>5.1.3. Punches<br>5.1.4. Wrenches, files |
| 6. Context of Assessment | 6.1. Assessment may be conducted in the workplace or in a simulated work environment |

**UNIT TITLE** : **PERFORM MENSURATION AND CALCULATION**
**UNIT CODE** : **ELC311201**
**UNIT DESCRIPTOR** : This unit covers the knowledge, skills and attitudes needed identify, care, handle and use measuring instruments

| ELEMENT | PERFORMANCE CRITERIA<br>***Italicized Bold*** terms are elaborated in the Range of Variables |
|---|---|
| 1. Select measuring instruments | 1.1. Object or component to be measured is identified according to procedures<br>1.2. Correct specifications are obtained from relevant source<br>1.3. Measuring tools are selected in line with job requirements |
| 2. Carry out measurements and calculation | 2.1. Appropriate ***measuring instrument*** is selected to achieve required outcome<br>2.2. Accurate measurements are obtained for job<br>2.3. ***Calculation*** needed to complete work tasks are performed using the four basic process of addition (+), subtraction (-), multiplication (x), and division (/)<br>2.4. Calculation involving fractions, percentages and mixed numbers are used to complete workplace tasks.<br>2.5. Numerical computation is checked and corrected for accuracy<br>2.6. Instruments are read to the limit of accuracy of the tool. |
| 3. Maintain measuring instruments | 3.1. Measuring instruments are handles without damage according to procedures<br>3.2. Measuring instruments are cleaned before and after using.<br>3.3. Proper storage of instruments are undertaken according to manufacturer's specifications and standard operating procedures. |

**RANGE OF VARIABLES**

| VARIABLE | RANGE |
|---|---|
| 1. Measuring instruments | 1.1. Straight edge<br>1.2. Torque gauge<br>1.3. Try square<br>1.4. Protractor<br>1.5. Combination gauge<br>1.6. Steel rule |
| 2. Calculation | Kinds of part mensuration includes the following but not limited to<br>2.1. Volume<br>2.2. Area<br>2.3. Displacement<br>2.4. Inside diameter<br>2.5. Circumference<br>2.6. Length<br>2.7. Thickness<br>2.8. Outside diameter<br>2.9. Taper<br>2.10. Out of roundness |

**EVIDENCE GUIDE**

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|---|---|
| 1. Critical aspect of competency | Assessment requires evidence that the candidate:<br>1.1. Selected proper measuring instruments according to tasks<br>1.2. Carried out measurement and calculations<br>1.3. Maintained and stores instruments |
| 2. Underpinning knowledge | 2.1. Types of measuring instruments and their uses<br>2.2. Safe handling procedures in using measuring instruments<br>2.3. Four fundamental operation of mathematics<br>2.4. Formula for volume, area, perimeter and other geometric figures |
| 3. Underpinning skills | 3.1. Reading skills required to interpret work instruction<br>3.2. Communication skills<br>3.3. Handling measuring instruments<br>3.4. Performing mathematical calculations using the four fundamental operations<br>3.5. Visualizing objects and shapes<br>3.6. Interpreting formulae |
| 4. Method of assessment | Competency in this unit must be assessed through:<br><br>4.1. Observation<br>4.2. Oral questioning |
| 5. Resource implication | 5.1. Place of assessment<br>5.2. Measuring instruments<br>5.3. Straight edge<br>5.4. Torque gauge<br>5.5. Try square<br>5.6. Protractor<br>5.7. Combination gauge<br>5.8. Steel rule |
| 6. Context of Assessment | 6.1. Assessment may be conducted in the workplace or in a simulated work environment |

**UNIT TITLE** : **PREPARE AND INTERPRET TECHNICAL DRAWING**
**UNIT CODE** : **ELC311202**
**UNIT DESCRIPTOR** : This unit covers the knowledge, skills and attitudes and values needed to prepare/interpret diagrams, engineering abbreviation and drawings, symbols, dimension.

| ELEMENT | PERFORMANCE CRITERIA<br>***Italicized Bold*** terms are elaborated in the Range of Variables |
|---|---|
| 1. Identify different kinds of technical drawings | 1.1. Correct ***technical drawing*** is selected according to job requirements.<br>1.2. Technical drawings are segregated in accordance with the types and kinds of drawings |
| 2. Interpret technical drawing | 2.1. Components, assemblies or objects are recognized as required.<br>2.2. ***Dimensions*** of the key features of the objects depicted in the drawing are correctly identified.<br>2.3. ***Symbols*** used in the drawing are identified and interpreted correctly.<br>2.4. Drawing is checked and validated against job requirements or equipment in accordance with standard operating procedures. |
| 3. Prepare/make changes to electrical/electronic schematics and drawings | 3.1. Electrical/electronic schematic is drawn and correctly identified.<br>3.2. Correct drawing is identified, equipment are selected and used in accordance with job requirements. |
| 4. Store technical drawings and equipment /instruments | 4.1. Care and maintenance of drawings are undertaken according to company procedures.<br>4.2. Technical drawings are recorded and inventory is prepared in accordance with company procedures.<br>4.3. Proper storage of instruments is undertaken according to company procedures. |

**RANGE OF VARIABLES**

| VARIABLE | RANGE |
|---|---|
| 1. Technical drawings | Technical drawings include the following but not limited to:<br><br>1.1. Schematic diagrams<br>1.2. Charts<br>1.3. Block diagrams<br>1.4. Lay-out plans<br>1.5. Location plans<br>1.6. Process and instrumentation diagrams<br>1.7. Loop diagrams<br>1.8. System Control Diagrams |
| 2. Dimensions | Dimensions may include but not limited to:<br><br>2.1. Length<br>2.2. Width<br>2.3. Height<br>2.4. Diameter<br>2.5. Angles |
| 3. Symbols | May include but not limited to:<br><br>3.1. NEC- National Electric Code<br>3.2. IEC -International Electrotechnical Commission<br>3.3. ASME - American Society of Mechanical Engineers<br>3.4. IEEE - Institute of Electrical and Electronics Engineers<br>3.5. ISA - Instrumentation System and Automation Society |
| 4. Instruments/Equipment | 4.1. Components/dividers<br>4.2. Drawing boards<br>4.3. Rulers<br>4.4. T-square<br>4.5. Calculator |

**EVIDENCE GUIDE**

| | |
|---|---|
| 1. Critical aspect of competencies | Assessment require evidence that the candidate:<br><br>1.1. Selected correct technical drawing in line with job requirements<br>1.2. Correctly identified the objects represented in the drawing<br>1.3. Identified and interpreted symbols used in the drawing correctly<br>1.4. Prepared/produced electrical/electronic drawings including all relevant specifications<br>1.5. Stored diagrams/equipment |
| 2. Underpinning knowledge | 2.1. Drawing conventions<br>2.2. Symbols<br>2.3. Dimensioning Conventions<br>2.4. Mark up/Notation of Drawings<br>2.5. Mathematics<br>2.5.1. Four fundamental operations<br>2.5.2. Percentage<br>2.5.3. Fraction<br>2.5.4. Trigonometric Functions<br>2.5.5. Algebra<br>2.5.6. Geometry |
| 3. Underpinning skills | 3.1. Reading skills required to interpret work instruction<br>3.2. Communication skills<br>3.3. Interpreting electrical/electronic signs and symbols |
| 4. Method of assessment | Competency in this unit must be assessed through:<br><br>4.1. Practical tasks involving interpretation of a range of technical drawings<br>4.2. Oral questioning |
| 5. Resource implication | 5.1. Drawings<br>5.2. Diagrams<br>5.3. Charts<br>5.4. Plans |
| 6. Context of Assessment | Assessment may be conducted in the workplace or in a simulated environment |

**UNIT TITLE** : **APPLY QUALITY STANDARDS**
**UNIT CODE** : **ELC315202**
**UNIT DESCRIPTOR** : This unit covers the knowledge, skills and attitudes 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>***Italicized Bold*** terms are elaborated in the Range of Variables |
|---|---|
| 1. Assess quality of received materials or components | 1.1. Work instructions are obtained and work is carried out in accordance with standard operating procedures<br>1.2. Received ***materials or component parts*** are checked against workplace standards and specifications<br>1.3. Faulty material or components related to work are identified and isolated<br>1.4. ***Faults*** and any identified causes are recorded and/or reported to the supervisor concerned in accordance with workplace procedures<br>1.5. Faulty materials or components are replaced in accordance with workplace procedures |
| 2. Assess own work | 2.1. ***Documentation*** relative to quality within the company is identified and used<br>2.2. Completed work is checked against workplace standards relevant to the task undertaken<br>2.3. Faulty pieces are identified and isolated<br>2.4. Information on the quality and other indicators of production performance is recorded in accordance with workplace procedures<br>2.5. Deviations from specified ***quality standards***, causes are documented and reported in accordance with the workplace' standards operating procedures |
| 3. Engage in quality improvement | 3.1. Process improvement procedures are participated in relation to workplace assignment<br>3.2. Work is carried out in accordance with process improvement procedures<br>3.3. Performance of operation or quality of product or service to ensure ***customer*** satisfaction is monitored |

**RANGE OF VARIABLES**

| VARIABLE | RANGE |
|---|---|
| 1. Materials/components | 1.1. Materials may include but not limited to:<br>1.1.1. Wires<br>1.1.2. Cables, soldering lead<br>1.1.3. Electrical tape<br>1.2. Components may include but not limited to:<br>1.2.1. ICs<br>1.2.2. Diodes |
| 2. Faults | Faults may include but not limited to:<br>2.1. Components/materials not according to specification<br>2.2. Components/materials contain manufacturing defects<br>2.3. Components/materials do not conform with government regulation i.e., PEC, environmental code<br>2.4. Components/materials have safety defect |
| 3. Documentation | 3.1. Organization work procedures<br>3.2. Manufacturer's instruction manual<br>3.3. Customer requirements<br>3.4. Forms |
| 4. Quality standards | 4.1. Quality standards may relate but not limited to the following:<br>4.1.1. Materials<br>4.1.2. Component parts<br>4.1.3. Final product<br>4.1.4. Production processes |
| 5. Customer | 5.1. Co-worker<br>5.2. Supplier<br>5.3. Client<br>5.4. Organization receiving the product or service |

## EVIDENCE GUIDE

| | |
|---|---|
| 1. Critical aspect of competency | Assessment requires evidence that the candidate:<br><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. Underpinning knowledge | 2.1. Relevant production processes, materials and products<br>2.2. Characteristics of materials/component parts used in electronic production processes<br>2.3. Quality checking procedures<br>2.4. Workplace procedures<br>2.5. Safety and environmental aspects of production processes<br>2.6. Fault identification and reporting<br>2.7. Quality improvement process |
| 3. Underpinning skills | 3.1. Reading skills required to interpret work instruction<br>3.2. Communication skills needed to interpret and apply defined work procedures<br>3.3. Carry out work in accordance with OHS policies and procedures |
| 4. Method of assessment | 4.1. The assessor may select at least two (2) of the following assessment methods to objectively assess the candidate:<br>4.1.1. Observation<br>4.1.2. Questioning<br>4.1.3. Practical demonstration |
| 5. Resource implication | 5.1. Materials and component parts and equipment to be used in a real or simulated electronic production situation |
| 6. Context of Assessment | 6.1. Assessment may be conducted in the workplace or in a simulated work environment. |

## CORE COMPETENCIES

UNIT OF COMPETENCY : **INSTALL POLE HARDWARE AND ACCESSORIES**

UNIT CODE : MDA724301

DESCRIPTOR : This unit covers the outcomes required for installing cable TV pole hardware and accessories. This involves working with a team.

| ELEMENT | PERFORMANCE CRITERIA (***Italicized Bold*** terms are elaborated in the range of variables) |
|---|---|
| 1. Prepare for pole hardware installation | 1.1 Necessary ***tools, materials and personal protective equipment (PPE)*** are prepared in line with job requirements.<br>1.2 Information on proposed locations and necessary approvals from ***relevant authorities*** is obtained.<br>1.3 Site is cleared and prepared to provide unrestricted access for installation works in accordance with joint pole agreement<br>1.4 Installation constraints and safety hazards are identified and suitable action determined |
| 2. Install pole hardware, accessories and cable | 2.1 Tools, equipment, clothing and safety requirements are identified and obtained for the installation.<br>2.2 Tools and equipment are checked to be in good working order and adjusted to manufacturers' specifications<br>2.3 Installation site is made safe through erection of necessary ***barriers*** in accordance with standard practices<br>2.4 ***Fixing structures*** on pole are ***installed*** securely in accordance with manufacturer's specifications and joint pole agreement (JPA)<br>2.5 ***Fixing devices*** where the support is other than a pole are installed in accordance with the JPA<br>2.6 ***Pole identifier marks*** are placed on installed poles for identification<br>2.7 Ground rods are installed and grounding wires are bonded to messenger wire of coaxial/fiber-optic cable in accordance with the industry construction standards<br>2.8 ***Guy-wire assembly*** is installed and tensioned to required specifications<br>2.9 Problems encountered are referred to ***appropriate personnel*** as per standard operating procedures (SOP).<br>2.10 ***Installation and design amendments*** are reported/ documented in accordance with job requirements |

**RANGE OF VARIABLES**

| VARIABLE | RANGE | |
|---|---|---|
| 1. Tools and equipment, materials and PPE | May include but not limited to:<br>**Tools and equipment:**<br>1.1 set of wrenches<br>1.2 set of pliers<br>1.3 extension ladder<br>1.4 bolt cutter<br>1.5 coping jack<br>1.6 come-a-long / guy grip<br>1.7 set of hammer<br>1.8 hacksaw<br>1.9 set of ropes<br>1.10 lashing machine<br>1.11 lineman boom truck<br>1.12 electric drill with different bits of various sizes<br>1.13 cable trailer<br>1.14 reel stand<br>1.15 bender board/cable form<br>1.16 cable roller block (single or multiple cable)<br>1.17 pole mount cable block (for self support cable)<br>1.18 dynamometer<br>1.19 cable guide<br>1.20 lay-up stick / cable lifter<br>1.21 multiple cable puller<br>1.22 messenger wire raising tool<br>**Materials:**<br>1.23 pole clamps of various sizes<br>1.24 set of suspension clamps<br>1.25 messengered cable<br>1.26 pole extension arm | 1.27 grounding rod<br>1.28 pole insulator<br>1.29 set of guy grips<br>1.30 guy protector<br>1.31 anchor rod<br>1.32 ground/guying insulator<br>1.33 tie wrap<br>1.34 thimble eye nut<br>1.35 stainless strap and buckle<br>1.36 machine bolts<br>1.37 sets of washer, bolts and nuts<br>1.38 guying fixtures<br>1.39 cable tag<br>1.40 pole tag<br>1.41 stainless lashing wire<br>1.42 lashing clamp<br>1.43 grounding wire<br>1.44 braces<br>1.45 color coded marked tape<br>1.46 spiral sleeve<br><br>**PPE:**<br>1.47 body belt & strap<br>1.48 hard hat/ helmet<br>1.49 set gloves<br>1.50 goggles<br>1.51 safety shoes<br>1.52 tool pouch<br>1.53 safety cones/other collapsible signs |
| 2. relevant authorities | 2.1 local government<br>2.1.1. barangay<br>2.1.2. municipality/city | 2.2 DPWH<br>2.3 homeowner's association<br>2.4 house owners |
| 3. barriers | 3.1 safety cones<br>3.2 early warning devices<br>3.3 collapsible barrier and signs | 3.4 service vehicles<br>3.5 wooden barricades<br>3.6 red flag warning signs |
| 4. Fixing structures | 4.1 pole dressing<br>4.2 anchor rod<br>4.3 anchor block | |

| | | |
|---|---|---|
| 5. Installation of fixing structures | 5.1 bury anchor block and anchor rod<br>5.2 install pole dressings | |
| 6. Fixing devices | 6.1 screw hooks<br>6.2 set of bolts, nuts and washers<br>6.3 machine bolts – straight, thimble-eye and bent types<br>6.4 lag screws<br>6.5 conduit pipes<br>6.6 messenger-wire clamps<br>6.7 messenger wire | 6.8 extension arm<br>6.9 suspension clamps<br>6.10 anchor and grounding rods<br>6.11 sidewalk guy fixture<br>6.12 bonding clamp |
| 7. Pole identifier marks | 7.1 Written or stamped on steel plate and strapped to concrete pole or nailed to wooden pole<br>7.2 Contains data on<br>7.2.1. Company markings<br>7.2.2. Pole identification | |
| 8. Guy-wire assembly | 8.1 Guy grip<br>8.2 Insulator strain<br>8.3 Guy wire<br>8.4 Guy-wire protector | |
| 9. appropriate personnel | 9.1 leadman/team leader<br>9.2 supervisor/foreman<br>9.3 pole climber assistant<br>9.4 supervisor<br>9.5 manager | |
| 10. Installation and design amendments | 10.1 cable re-routing<br>10.2 as-built plan | |

**EVIDENCE GUIDE**

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|---|---|
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:<br>1.1. Complied with job requirements and safety procedures at all times during installation<br>1.2. Installed pole hardware, accessories and messenger cables following job requirements and within agreed time frame<br>1.3. Communicated and worked with authorities and personnel concerned |
| 2. Underpinning knowledge and attitude | 2.1 Safety Practices<br>1.1.1 Work safety requirements<br>1.1.2 Proper use of tools and equipment<br>2.2 Materials, Tools and Equipment: Uses and Specifications<br>2.2.1 Identification of appropriate tools, equipment; and devices<br>2.3 Theory and Practices<br>2.3.1 Cable trailer equipment operations<br>2.2.1 Installation of anchor logs or blocks<br>2.2.2 Installation of extension arms and other pole hardware and accessories<br>2.2.3 Grounding and bonding techniques<br>2.2.4 Lashing machine operation<br>2.3 Desirable work values and attitudes (cost conscious, safety conscious, quality conscious, etc.) |
| 3. Underpinning skills | 3.1. Work efficiently and systematically<br>3.2. Observing safety precautions<br>3.3. proper handling and positioning of extension ladder<br>3.4. Proper handling, use and maintenance of tools and equipment<br>3.5. Communicate effectively<br>3.6. Interpretation of plans and symbols<br>3.7. documentation skills |
| 4. Resource implications | The following resources should be available:<br>4.1. Tools, equipment, materials and PPE (see range of variables)<br>4.2. Work area<br>4.3. Service vehicle and traffic safety equipment |
| 5. Method of assessment | 5.1. Direct observation/demonstration with oral questioning<br>5.2. Third Party Report<br>5.3. Portfolio |
| 6. Context of assessment | 6.1. Competency maybe assessed in the workplace or in a simulated workplace setting<br>6.2. Assessment shall be undertaken either individually or part of team under limited supervision |

UNIT OF COMPETENCY : **LAY OUT AND INSTALL FIBER-OPTIC/ COAXIAL CABLES**

UNIT CODE : MDA724302

DESCRIPTOR : This unit covers the outcomes required for laying out and installing cable television cables. Cable types may be fiber-optic or co-axial. This involves working with a team.

| ELEMENT | PERFORMANCE CRITERIA<br>(***Italicized Bold*** terms are elaborated in the range of variables) |
|---|---|
| 1. Prepare for cable lay out and installation | 1.1. Necessary ***tools, equipment, materials and personal protective equipment (PPE)*** are prepared in line with job requirements.<br>1.2. Cable lay out and installation requirements and constraints from plan and site inspection are identified as per job requirements<br>1.3. Cable lay out and installation equipment is set up in accordance with manufacturer's and job requirements<br>1.4. Site is made safe and secure for cable installation<br>1.5. Suitable protective clothing is selected and required safety devices used<br>1.6. ***Support structure*** is assessed as safe for normal working conditions<br>1.7. Support structure is assessed to be sound for cable support as per job requirements<br>1.8. Cable route is checked for ***obstructions*** and vertical clearances from street level and are made clear using ***suitable methods*** and in coordination with authorities concerned.<br>1.9. Where necessary, obstructing cables, lines and pole attachments of other carriers are requested to be fixed or corrected to facilitate work of laying out and installing new cables |
| 2. Lay out and Install cable | 2.1 Tools, equipment, clothing and safety requirements are identified and obtained for the lay out and installation.<br>2.2 Messengered cable is laid out, ***installed*** and tensioned to required specifications<br>2.3 Cable is secured permanently to support structure in accordance with standard installation procedures<br>2.4 Bending radius tolerance is observed for cable materials at all times<br>2.5 Problems encountered are referred to ***appropriate personnel*** as per standard operating procedures (SOP). |

**RANGE OF VARIABLES**

| VARIABLE | RANGE | |
|---|---|---|
| 1. Tools, equipment and materials and PPE | May include but not limited to:<br>**Tools and Equipment:**<br>1.1 hammers<br>1.2 aerial handline<br>1.3 extension ladders (24 ft. length)<br>1.4 adjustable wrench<br>1.5 fixing brackets/clamps<br>1.6 cable tensioner/rachet/ coping jack<br>1.7 come-a-long / guy grip<br>1.8 drill/electric drill<br>1.9 wire/lashing wire<br>1.10 raising tool (insulated)<br>1.11 tape linen/steel tape<br>1.12 height measuring stick/pole stick for clearances.<br>**Tools for fiber-optics:**<br>1.13 Fusion splice<br>1.14 Fiber cleaver<br>1.15 OTDR<br>1.16 Power Meter<br>1.17 Fiber scope<br>1.18 Buffer Tube Stripper<br>1.19 Cable slitter<br>1.20 Fiber stripper<br>1.21 Kevlar cutter<br>1.22 Alcohol dispenser<br>1.23 Tissue paper/cotton buds<br>1.24 Alcohol 99.9% Isopropyl<br>1.25 Diagonal side cutter<br>1.26 Bolt cutter<br>1.27 Safety goggles<br>1.28 NT cutter<br>1.29 Messenger Grip M118<br>**Materials:**<br>1.30 cable clip<br>1.31 grounding wire<br>1.32 lashing wire<br>1.33 lashing wire clamps<br>1.34 cable support<br>1.35 cable spacer<br>1.36 adhesive tape<br>1.37 strand clamps | 1.38 cable roller<br>1.39 standard rope<br>1.40 tie wrap<br>1.41 cable-loop form / X-frame<br>1.42 ground/guying insulator<br>1.43 thimble eye nut<br>1.44 sets of washer, bolts and nuts, machine bolts<br>1.45 guying fixtures<br>1.46 conduit pipes<br>1.47 cable tag<br>1.48 pole tag<br>1.49 braces<br>1.50 color coded marked tape<br>1.51 spiral sleeve<br>**Materials for Fiber-optics:**<br>1.52 Optical closure<br>1.53 X-Frame Fiber Management<br>1.54 Patch cord<br>1.55 Pigtail<br>1.56 Optical Adapter<br>1.57 Preformed Wire ¼<br>1.58 Fusion Sleeves<br>1.59 Optical Distribution Frame (Patch Panel)<br>1.60 3-bolt suspension clamp<br>1.61 Pole clamp<br>**Equipment:**<br>1.62 lashing machine<br>1.63 tensioning machine<br>1.64 cable trailer<br>1.65 lineman's truck<br>**PPE:**<br>1.66 body belt & strap<br>1.67 hard hat/ helmet<br>1.68 set gloves<br>1.69 goggles<br>1.70 safety shoes<br>1.71 tool pouch<br>1.72 safety cones/traffic safety devices |

| | | |
|---|---|---|
| 2. Support structure | 2.1 | Electric pole |
| | 2.2 | Guy wire |
| | 2.3 | Pole dressing |
| 3. Obstructions | 3.1 | Trees |
| | 3.2 | Structures such as arcs, billboards, etc. |
| | 3.3 | Parts of buildings and houses such as roof extensions/overhangs |
| | 3.4 | Traffic lights, street lights, etc. |
| | 3.5 | Power lines |
| 4. Suitable methods for removing obstructions | 4.1 | Trimming of tree branches |
| | 4.2 | Installation of ten-pin alley arm |
| | 4.3 | Installation of high-tension insulation materials |
| 5. Installation procedures | 5.1 | Stringing of cable between suspension clamps |
| | 5.2 | Tensioning of cable |
| 6. appropriate personnel | 6.1 | leadman/team leader |
| | 6.2 | supervisor/foreman |

**EVIDENCE GUIDE**

| | |
|---|---|
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:<br>1.1. Complied with standard installation practices and safety procedures at all times during installation<br>1.2. Laid out and installed fiber-optic/coaxial cables following job and quality requirements and within agreed time frame<br>1.3. Communicated and worked with authorities and personnel concerned |
| 2. Underpinning knowledge and attitude | 2.1 Safety Practices<br>1.1.3 Work safety requirements<br>1.1.4 Proper use of tools and equipment<br>2.2 Materials, Tools and Equipment: Uses and Specifications<br>2.3.2 Identification of appropriate tools, equipment; and devices and proper usage<br>2.3 Theory and Practices<br>2.3.1 Cable TV systems overview<br>2.3.2 Basic electricity<br>2.3.3 Map reading and identification of CATV symbols and diagrams<br>2.3.4 Handling of coaxial and fiber-optic cables<br>2.3.5 Lay out and installation of fiber-optic/coaxial cables<br>2.3.6 Cable trailer equipment operations<br>2.3.7 Installation of anchor logs or blocks<br>2.3.8 Installation of extension arms and other pole hardware and accessories<br>2.3.9 Lashing machine operation<br>2.4 Desirable work values and attitudes (cost conscious, safety conscious, quality conscious, etc.) |
| 3. Underpinning skills | 3.1. Work efficiently and systematically<br>3.2. Observing safety precautions<br>3.3. STP in pole climbing & proper handling of extension ladder<br>3.4. Proper handling, use and maintenance of tools and equipment.<br>3.5. Proper handling of coaxial and fiber-optic cables<br>3.6. Communicating effectively<br>3.7. Interpreting plans and symbols |
| 4. Resource implications | The following resources should be available:<br>4.1. Tools, equipment, materials and PPE (see range of variables)<br>4.2. Work area with pole/s installed<br>4.3. Service vehicle and traffic safety devices |
| 5. Method of assessment | 5.1. Direct observation/demonstration with oral questioning<br>5.2. Third Party Report<br>5.3. Portfolio |
| 6. Context of assessment | 6.1. Competency maybe assessed in the workplace or in a simulated workplace setting<br>6.2. Assessment shall be undertaken either individually or part of team under limited supervision |

UNIT OF COMPETENCY : **INSTALL ACTIVE AND PASSIVE DEVICES AND ACCESSORIES**

UNIT CODE : MDA724303

DESCRIPTOR : This unit covers the outcomes required for installing active and passive devices and accessories, such as trunk and line extender amplifiers, splitters, directional couplers, power inserter, connectors, etc., for the outside plant (OSP) cable television systems.

| ELEMENT | PERFORMANCE CRITERIA<br>(***Italicized Bold*** terms are elaborated in the range of variables) |
|---|---|
| 1. Prepare for installation of devices | 1.1. Necessary ***tools, equipment, materials and personal protective equipment (PPE)*** are identified and prepared in line with job requirements.<br>1.2. Cable preparation and connectorization is performed in accordance with manufacturer's specifications and as per design plan |
| 2. Install devices | 2.1. Tools, equipment, materials and PPE requirements are obtained for the ***installation of devices***.<br>2.2. Installation plan is read and interpreted as per job requirements<br>2.3. ***Devices*** are installed in accordance with manufacturer's specification and industry standards<br>2.4. Problems encountered are referred to ***appropriate personnel*** as per standard operating procedures (SOP). |
| 3. Seal, water-proof and terminate devices | 3.1. Installed devices are sealed in accordance with job requirements<br>3.2. Connectors are water-proofed in accordance with specified industry standards<br>3.3. All open ports are terminated in accordance with manufacturers' specifications<br>3.4. Accomplishment reports are accurately reported/ documented in accordance with job requirements |

**RANGE OF VARIABLES**

| VARIABLE | RANGE | |
|---|---|---|
| 1. Tools, equipment, materials and PPE | May include but not limited to:<br>**Tools:**<br>1.1 Cable cutter<br>1.2 Bolt cutter<br>1.3 Coring tools<br>1.4 Center conductor's stripper<br>1.5 Technician's knife<br>1.6 Screwdrivers<br>1.7 Socket / adjustable wrench<br>1.8 Torque wrench<br>1.9 Blow torch<br>1.10 extension ladders (24 feet length)<br>**Materials:**<br>1.11 cable clip<br>1.12 heat shrink<br>1.13 silicon gel<br>1.14 tie wrap<br>1.15 cable-loop form<br>1.16 color coded marked tape<br>1.17 terminators<br>1.18 tap-off bracket<br>1.19 conduit / GI pipes | 1.20 electric meter<br>1.21 circuit breaker<br>1.22 grounding wire (gauge 12, stranded)<br>1.23 TW wire (gauge 12, stranded or solid)<br>**Equipment:**<br>1.24 Power supply<br>1.25 Trunk amplifier<br>1.26 Line extended<br>1.27 Node<br>1.28 Power inserter/splitter/ directional coupler/ tap-offs<br>1.29 Service vehicle<br>**PPE:**<br>1.30 body belt & strap<br>1.31 hard hat/ helmet<br>1.32 set gloves<br>1.33 goggles<br>1.34 safety shoes<br>1.35 tool pouch / holster<br>1.36 safety cones/traffic safety devices |
| 2. Installation of devices | 2.1 Clamping/Attachment of devices to messenger wire<br>2.2 Cable preparation and connectorization<br>2.3 Forming of proper drift loop observing the bending radius specified by the cable manufacturers<br>2.4 Attaching/Linking/Connecting the devices to the coaxial cable<br>2.5 Sealing and water-proofing of all inter-phase devices or connectors<br>2.6 Termination of all open ports | |
| 3. Devices and accessories | 3.1 Passive<br>3.1.1. splitter<br>3.1.2. directional coupler<br>3.1.3. power inserter<br>3.1.4. directional taps<br>3.2 Active<br>3.2.1. trunk amplifiers<br>3.2.2. line extender amplifiers | 3.2.3. nodes<br>3.2.4. power supplies<br>3.3 Accessories<br>3.3.1. connectors<br>3.3.2. terminators<br>3.3.3. heat shrink |
| 4. appropriate personnel | 4.1 leadman/team leader<br>4.2 supervisor/foreman | |

**EVIDENCE GUIDE**

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|---|---|
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:<br>1.1. Complied with standard installation practices and safety procedures at all times during installation<br>1.2. Installed active and passive devices following job and quality requirements and within agreed time frame<br>1.3. Communicated and worked with authorities and personnel concerned |
| 2. Underpinning knowledge and attitude | 2.1 Safety Practices<br>2.1.1 Work safety requirements<br>2.1.2 Proper use of tools and equipment<br>2.2 Materials, Tools and Equipment: Uses and Specifications<br>2.2.1 Identification of appropriate tools, equipment; and devices and proper usage<br>2.3 Theory and Practices<br>2.3.1 Basic Electricity<br>2.3.2 Identification and usage of active and passive devices<br>2.3.3 Aerial cable practices and installations<br>2.3.4 Sealing, waterproofing and termination of CATV devices<br>2.3.5 Pole climbing techniques<br>2.4 Desirable work values and attitudes (cost conscious, safety conscious, quality conscious, etc.) |
| 3. Underpinning skills | 3.1. Work efficiently and systematically<br>3.2. Observing safety precautions<br>3.3. proper handling of extension ladder<br>3.4. Proper handling, use and maintenance of tools and equipment.<br>3.5. Proper handling of coaxial and fiber-optic cables<br>3.6. Communicating effectively<br>3.7. Interpreting plans and symbols |
| 4. Resource implications | The following resources should be available:<br>4.1. Tools, equipment, materials and PPE (see range of variables)<br>4.2. Work area with pole/s installed<br>4.3. Service vehicle and traffic safety devices |
| 5. Method of assessment | 5.1. Direct observation/demonstration with oral questioning<br>5.2. Third Party Report<br>5.3. Portfolio |
| 6. Context of assessment | 6.1. Competency maybe assessed in the workplace or in a simulated workplace setting<br>6.2. Assessment shall be undertaken either individually or part of team under limited supervision |

UNIT OF COMPETENCY : **INSTALL SUBSCRIBER DROP LINES AND CPE**

UNIT CODE : MDA724304

DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to install subscriber drop lines to both Single Dwelling Unit (SDU) and Multiple Dwelling Unit (MDU). This also includes the connection of customers' personal equipment (CPE) to SDU.

| ELEMENT | PERFORMANCE CRITERIA<br>(***Italicized Bold*** terms are elaborated in the range of variables) |
|---|---|
| 1. Prepare for installation of subscriber drop lines | 1.1 Job order and other documentation are received and interpreted in accordance with enterprise procedures<br>1.2 Necessary ***tools, equipment, materials and personal protective equipment (PPE)*** are identified and prepared in line with job requirements.<br>1.3 Cable preparation and connectorization is performed in accordance with standard industry practices. |
| 2. Install subscriber drop lines | 2.1 All tools and equipment are checked to ensure safe working order and adjusted to manufacturer's specifications<br>2.2 Installation plan is read and interpreted as per job requirements<br>2.3 Drop lines are ***installed*** to SDU or MDU in accordance with standard industry practices<br>2.4 Problems encountered are referred to ***appropriate personnel*** as per standard operating procedures (SOP).<br>2.5 Installation is properly documented according to SOP. |
| 3. Connect CPE devices | 3.1 Interconnecting cables are prepared and terminated to the ***CPE*** in accordance with manufacturer's installation manual<br>3.2 CPE are tested and adjusted in accordance with the manufacturer's operation manual<br>3.3 ***Problems encountered*** are referred to appropriate personnel as per standard operating procedures (SOP). |
| 4. Wrap up job | 4.1 Tools, equipment and materials are gathered and stored back to the service vehicle<br>4.2 Waste and debris are removed from work place and disposed off in accordance with |

| | |
|---|---|
| | government regulations and environmental requirements<br>4.3 Changes made are restored to the work area during installation, disconnection and reconnection to the customer's satisfaction |

**RANGE OF VARIABLES**

| VARIABLE | RANGE | |
|---|---|---|
| 1. Tools, equipment, materials and PPE | May include but not limited to:<br>**Tools:**<br>1.1 Cable cutter<br>1.2 Cable prep tool<br>1.3 Crimping / compression tool<br>1.4 NT cutter / blade cutter<br>1.5 Staple gun<br>1.6 Set of pliers<br>1.7 Set of screwdrivers<br>1.8 F-open wrench<br>1.9 Extension ladders (24 feet length)<br>**Materials:**<br>1.10 Drop cable<br>1.11 F-connectors (crimped or compression type)<br>1.12 cable tie<br>1.13 silicon gel<br>1.14 rubber boots<br>1.15 cable tag<br>1.16 terminators<br>1.17 grounding wire (gauge 12, stranded) | 1.18 grounding rod (1/4' by 4' with clamp)<br>1.19 grounding block<br>1.20 P-hook<br>**Equipment:**<br>1.21 F.I. meter<br>1.22 VOM<br>1.23 Addressable box/converter<br>1.24 Cable modem<br>1.25 In-house amplifier<br>1.26 Service vehicle<br>**PPE:**<br>1.27 body belt & strap<br>1.28 hard hat/ helmet<br>1.29 set gloves<br>1.30 goggles<br>1.31 safety shoes<br>1.32 tool pouch / holster<br>1.33 safety cones/traffic safety devices |
| 2. Installation of drop lines | 2.1 Connect of drop cable to tap-off device<br>2.2 Provide drip loop<br>2.3 Test signal quality in drop cable<br>2.4 Extend cable to subscriber residence observing 14 ft. clearance from the ground<br>2.5 Detach messenger wire and attach to P-hook attached to the wall of the building<br>2.6 Provide drip loop and attach the cable properly to the wall of the building either through conduit or staple wire<br>2.7 Install grounding block nearest to ground and provide drip loop before inserting the cable inside the building<br>2.8 Extend drop cable to TV receiver | |
| 3. appropriate personnel | 3.1 cable installer / lead man<br>3.2 ground man / helper | |
| 4. problems encountered | 4.1 for CPE connections<br>4.1.1. failure of equipment / factory defects<br>4.1.2. incompatibility of CPE standards<br>4.1.3. power failure/interruptions | |

**EVIDENCE GUIDE**

| | |
|---|---|
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:<br>1.1 Complied with standard industry practices and safety procedures at all times during implementation<br>1.2 Installed SDU or MDU drop lines following quality procedures and industry standards<br>1.3 Demonstrated interpersonal skills in dealing with subscriber concerns |
| 2. Underpinning knowledge and attitude | 2.1 Safety Practices<br>2.1.1 Work safety requirements<br>2.1.2 Proper handling and use of tools and equipment<br>2.2 Materials, Tools and Equipment: Uses and Specifications<br>2.2.2 Identification of appropriate tools, equipment; and devices and proper usage<br>2.3 Theory and Practices<br>2.3.1 Cable TV systems overview<br>2.3.2 Basic Electricity<br>2.3.3 Pole climbing techniques<br>2.3.4 Identification and usage of pole hardware<br>2.3.5 Coaxial cable handling<br>2.3.6 SDU and MDU drop lines installation<br>2.4 Desirable work values and attitudes (cost conscious, safety conscious, quality conscious, etc.) |
| 3. Underpinning skills | 3.1 Work efficiently and systematically<br>3.2 Observing safety precautions<br>3.3 Map reading skills<br>3.4 Drop line installation skills<br>3.5 Proper handling of tools, equipment and proper maintenance.<br>3.6 Communicating effectively<br>3.7 Interpreting plans and diagrams |
| 4. Resource implications | The following resources must be available:<br>4.1 Tools and test instruments and PPE (see range of variables)<br>4.2 Work area with OSP cable network and provision fpr subscriber lines<br>4.3 Distribution point<br>4.4 Extension ladder<br>4.5 Service vehicle |
| 5. Method of assessment | 5.1 Direct observation/demonstration with oral questioning<br>5.2 Third Party Report<br>5.3 Portfolio |
| 6. Context of assessment | 6.1 Competency may be assessed in the workplace or in a simulated workplace setting<br>6.2 Assessment shall be undertaken either individually or part of team under limited supervision |

UNIT OF COMPETENCY : **INSTALL CABLES AND DEVICES FOR MDU**

UNIT CODE : MDA724305

DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to install cables and devices for Multiple Dwelling Unit (MDU). This also includes the connection of customers' personal equipment (CPE) to MDU.

| ELEMENT | PERFORMANCE CRITERIA<br>(***Italicized Bold*** terms are elaborated in the range of variables) |
|---|---|
| 1. Prepare for cable installation | 1.1 Ocular inspection and ***system designs*** are interpreted and confirmed in accordance with job requirements<br>1.2 Necessary ***tools, equipment, materials and personal protective equipment (PPE)*** are identified and prepared in line with job requirements. |
| 2. Lay out cables | 2.1 Cable are inserted and pulled in the conduits through the pull wire in accordance with the design plan<br>2.2 Problems encountered are referred to ***appropriate personnel*** as per standard operating procedures (SOP).<br>2.3 Laying out of cables is properly documented according to SOP |
| 3. Connect all devices | 3.1 Preparation and ***connectorization*** of all cable ends is performed<br>3.2 ***Devices*** are installed and connected to the cable ends in accordance with the system design and good engineering practice<br>3.3 Concerned personnel are notified of the completion of work with proper documentation |
| 4. Connect CPE | 4.1 Interconnecting cables are prepared and terminated to the ***CPE*** in accordance with manufacturer's installation manual<br>4.2 CPE are tested and adjusted in accordance with the manufacturer's operation manual<br>4.3 ***Problems encountered*** are referred to appropriate personnel as per standard operating procedures (SOP). |
| 5. Wrap up job | 5.1 Tools, equipment and materials are gathered and stored back to the service vehicle<br>5.2 Waste and debris are removed from work place and disposed off in accordance with government regulations and environmental requirements<br>5.3 Changes made are restored to the work area during installation, disconnection and reconnection to the customer's satisfaction |

**RANGE OF VARIABLES**

| VARIABLE | RANGE |
|---|---|
| 1. System design | 1.1 head-end location<br>1.1.1. Vertical and/or horizontal riser<br>1.2 types of distribution cable<br>1.2.1. RG 11<br>1.2.2. RG 6<br>1.2.3. RG 59<br>1.3 values of passive devices<br>1.4 active and passive devices<br>1.4.1. broadband cable TV amplifiers<br>1.4.2. splitters/couplers |
| 2. Tools, equipment, materials and PPE | May include but not limited to:<br>**Tools:**<br>2.1 Cable cutter<br>2.2 Cable prep tool<br>2.3 Crimping / compression tool<br>2.4 NT cutter / blade cutter<br>2.5 Staple gun<br>2.6 Set of pliers<br>2.7 Set of screwdrivers<br>2.8 F-open wrench<br>2.9 Step ladder<br>**Materials:**<br>2.10 Interconnecting cable (Audio/Video)<br>2.11 F-connectors (crimped or compression type)<br>2.12 RCA connectors<br>2.13 DIN connectors<br>2.14 silicon gel<br>2.15 terminators<br>2.16 wall taps<br>2.17 indoor amplifiers<br>2.18 splitters<br>2.19 directional couplers<br>2.20 grounding wires<br>2.21 grounding clamps<br>**Equipment:**<br>2.22 F.I. meter<br>2.23 VOM<br>2.24 Addressable box/converter<br>2.25 Cable modem<br>**PPE:**<br>2.26 set gloves<br>2.27 goggles<br>2.28 tool pouch / holster |

| | |
|---|---|
| 3. connectorization | 3.1 prepare cable ends<br>3.1.1. use cable preparation tools<br>3.1.2. remove kinks from cable ends<br>3.2 insert appropriate connectors<br>3.3 crimp or compress connectors accordingly |
| 4. appropriate personnel | 4.1 supervisor / lead man<br>4.2 cable installer<br>4.3 helpers |
| 5. devices | 5.1 Active devices<br>5.2 Passive devices |
| 6. CPE | May include:<br>6.1 TV set<br>6.2 LCD / plasma monitor with or without tuner<br>6.3 Addressable box/converter<br>6.4 Cable modem / router<br>6.5 DVD /VCD /MP3 players<br>6.6 Play station /DVX players<br>6.7 VHS players<br>6.8 Home theater equipment<br>6.9 Personal computers / internet / VoIP |
| 7. problems encountered | 7.1 for cable lay out<br>7.1.1. clogged conduit vertical/horizontal risers<br>7.1.2. absence of pull wire in conduits<br>7.1.3. other contractors problem related to the assigned job<br>7.2 for CPE connections<br>7.2.1. failure of equipment / factory defects<br>7.2.2. incompatibility of CPE standards |

**EVIDENCE GUIDE**

| | |
|---|---|
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:<br>1.1 Complied with standard industry practices and safety procedures at all times during implementation<br>1.2 Installed SDU or MDU drop lines following quality procedures and industry standards<br>1.3 Disconnect and reconnect drop lines as per job order requirements<br>1.4 Demonstrated interpersonal skills in dealing with subscriber concerns |
| 2. Underpinning knowledge and attitude | 2.1 Safety Practices<br>2.1.1 Work safety requirements<br>2.1.2 Proper handling and use of tools and equipment<br>2.2 Materials, Tools and Equipment: Uses and Specifications<br>2.2.1 Identification of appropriate tools, equipment; and devices and proper usage<br>2.3 Theory and Practices<br>2.3.1 Cable TV systems overview<br>2.3.2 Basic Electricity<br>2.3.3 Coaxial cable handling<br>2.3.4 MDU interconnecting cable preparation and installation<br>2.3.5 TV set up<br>2.4 Desirable work values and attitudes (cost conscious, safety conscious, quality conscious, etc.) |
| 3. Underpinning skills | 3.1 Work efficiently and systematically<br>3.2 Observing safety precautions<br>3.3 Map reading skills<br>3.4 Drop line installation skills<br>3.5 Proper handling of tools, equipment and proper maintenance.<br>3.6 Communicating effectively<br>3.7 Interpreting plans and diagrams |
| 4. Resource implications | The following resources must be available:<br>4.1 Tools and test instruments and PPE (see range of variables)<br>4.2 Work area with OSP cable network and provision for subscriber lines<br>4.3 Distribution point<br>4.4 Extension ladder<br>4.5 Service vehicle |
| 5. Method of assessment | 5.1 Direct observation/demonstration with oral questioning<br>5.2 Third Party Report<br>5.3 Portfolio |
| 6. Context of assessment | 6.1 Competency may be assessed in the workplace or in a simulated workplace setting<br>6.2 Assessment shall be undertaken either individually or part of team under limited supervision |

## SECTION 3 TRAINING STANDARDS

### 3.1 CURRICULUM DESIGN

**Course Title:** CABLE TV (CATV) INSTALLATION **NC Level:** NC II

**Nominal Training Duration:** 18 hrs – Basic Competencies
44 hrs – Common Competencies
300 hrs – Core Competencies

**Course Description:**

This course is designed to develop & enhance the knowledge, skills, & attitudes of a cable TV installer, in accordance with industry standards. It covers the basic and common competencies in addition to the core competencies such as installing pole hardware and accessories, laying out and installing coaxial/fiber-optic cables, installing active and passive devices and accessories as well as installing, disconnecting and reconnecting subscriber drop lines and installing all internal cables and devices for both single- and multiple-dwelling units.

**BASIC COMPETENCIES**
18 hrs

| Unit of Competency | Learning Outcome | Methodology | Assessment Approach |
|---|---|---|---|
| 1. Participate in Workplace Communication | 1.1 Access specific and relevant information from appropriate sources<br>1.2 Use effective questioning, active listening and speaking skills to gather and convey information<br>1.3 Use appropriate form and lines of communication<br>1.4 Conduct meeting according to established purpose and protocols<br>1.5 Use appropriate forms in recording and transmitting information<br>1.6 Complete reports according to organizational guidelines and requirements | • Group discussion<br>• Interaction | • Demonstration<br>• Observation<br>• Interviews/ questioning |

| | | | |
|---|---|---|---|
| 2. Work in a Team Environment | 2.1 Identify the role and objective of the team and individual members<br>2.2 Specify reporting relationships within and outside the team<br>2.3 Use appropriate forms of communication and interaction with team members<br>2.4 Observe protocols in reporting<br>2.5 Contribute to the development of the team work plans and activities | • Discussion<br>• Interaction | • Demonstration<br>• Observation<br>• Interviews/ questioning |
| 3. Practice Career Professionalism | 3.1 Identify growth areas and prepare a work plan towards improving oneself<br>3.2 Identify inter and intra personal relationships<br>3.3 Prioritize goals according to personal, team and organizational goals and objectives<br>3.4 Identify training and career opportunities | • Discussion<br>• Interaction | • Demonstration<br>• Observation<br>• Interviews/ questioning |
| 4. Practice Occupational Health and Safety Procedures | 4.1 Explain safety regulations according to organizational procedures<br>4.2 Identify possible work hazards and explain contingency measures in case of workplace accidents<br>4.3 Determine effects of hazards and risks and explain how to control them | • Discussion<br>• Plant tour<br>• Symposium | • Observation<br>• Interview |

**COMMON COMPETENCIES**
44 hrs

| Unit of Competency | Learning Outcomes | Methodology | Assessment Approach |
|---|---|---|---|
| 1. Apply Quality Standards | 1.1 Check materials and replace faulty ones in accordance with workplace standards and requirements<br>1.2 Carry out work assignments in accordance with standard operating procedures<br>1.3 Check completed work against standards and specifications<br>1.4 Document and prepare a report on deviations from specific quality standards | ▪ Field trip<br>▪ Symposium<br>▪ Film showing<br>▪ Simulation<br>▪ On-the-job training | ▪ Demonstration & questioning<br>▪ Observation & questioning<br>▪ Third party report |
| 2. Use Hand Tools | 2.1 Identify tasks to be undertaken and the appropriate tools to perform the task<br>2.2 Prepare and check the required hand tools and use them properly<br>2.3 Use appropriate hand tools and test equipment in accordance with safety rules and procedure<br>2.4 Perform basic maintenance procedures on hand tools and test equipment | ▪ Lecture / Demonstration<br>▪ Distance learning<br>▪ Film Showing | ▪ Written/Oral examination<br>▪ Practical demonstration<br>▪ Observation and questioning |
| 3 Perform Mensuration and Calculation | 3.1 Identify tasks to be performed and the appropriate measuring instruments required<br>3.2 Perform measurement and calculation tasks according to specifications and requirements<br>3.3 Perform basic maintenance tasks on measuring instruments according to established rules and procedure | ▪ Self- paced/ modular<br>▪ Lecture/ Demonstration<br>▪ Small group discussion<br>▪ Distance learning | ▪ Written/Oral examination<br>▪ Practical demonstration |

| | | | |
|---|---|---|---|
| 4 Prepare and Interpret Technical Drawings | 4.1 Identify and select the appropriate technical drawing required<br>4.2 Identify symbols and Interpret the technical drawing properly<br>4.3 Check and validate drawing requirements and prepare/make changes on electrical/electronic schematics and drawings<br>4.4 Explain how to record and store technical drawings, equipment and instruments properly | ▪ Lecture/ demonstration<br>▪ Dualized training<br>▪ Distance learning | ▪ Written /oral<br>▪ examinations<br>▪ Direct<br>▪ observation<br>▪ Project method<br>▪ interview |

## CORE COMPETENCIES

300 hrs

| Unit of Competency | Learning Outcomes | Methodology | Assessment Approach |
|---|---|---|---|
| 1. Install Pole Hardware and Accessories | 1.1 Read & interpret work instructions as per plan<br>1.2 Identify the tools, equipment, testing devices, & materials needed for installation<br>1.3 Identify the PPE & OHS policies & procedures required for the installation job<br>1.4 Install pole hardware, accessories and cable<br>1.5 Conduct final inspection of the installed pole hardware, accessories and cable<br>1.6 Prepare an installation & testing report | ▪ Lecture<br>▪ Discussion<br>▪ Demonstration<br>▪ Viewing multimedia<br>▪ Hands on practice | ▪ Observation in workplace<br>▪ Demonstration<br>▪ Oral questioning<br>▪ Third Party Report<br>▪ Portfolio |
| 2. Lay Out and Install Coaxial / Fiber-Optic Cables | 2.1 Read & interpret work instructions as per plan<br>2.2 Identify the tools, equipment, testing devices, & materials needed for installation<br>2.3 Identify the PPE & OHS policies & procedures required for the lay out job<br>2.4 Lay out and install coaxial/ fiber-optic cables<br>2.5 Conduct final inspection of the installed aerial and underground cable | ▪ Lecture<br>▪ Discussion<br>▪ Demonstration<br>▪ Viewing multimedia<br>▪ Hands on practice / Simulation | ▪ Observation in workplace<br>▪ Demonstration<br>▪ Oral questioning<br>▪ Third Party Report<br>▪ Portfolio |
| 3. Install Active and Passive Devices and Accessories | 3.1 Read & interpret work instructions as per plan<br>3.2 Identify the tools, equipment, testing devices, materials & PPE needed for installation<br>3.3 Install active and passive devices & accessories<br>3.4 Seal, waterproof and terminate devices & accessories<br>3.5 Conduct final inspection of the installed devices<br>3.6 Prepare an installation & testing report | ▪ Lecture<br>▪ Discussion<br>▪ Demonstration<br>▪ Viewing multimedia<br>▪ Hands on practice/ Simulation | ▪ Observation in workplace<br>▪ Demonstration<br>▪ Oral questioning<br>▪ Third Party Report<br>▪ Portfolio |

| Unit of Competency | Learning Outcomes | Methodology | Assessment Approach |
|---|---|---|---|
| 4. Install Subscriber Drop Lines and CPE | 4.1 Read & interpret work instructions as per plan<br>4.2 Identify the tools, equipment, testing devices, & materials needed for installation<br>4.3 Identify the PPE & OHS policies & procedures required for the installation job<br>4.4 Install subscriber drop lines<br>4.5 Connect , test and adjust customer premises equipment (CPE)<br>4.6 Prepare an installation report | ▪ Lecture<br>▪ Discussion<br>▪ Demonstration<br>▪ Viewing multimedia<br>▪ Hands on practice/ Simulation | ▪ Observation in workplace<br>▪ Demonstration<br>▪ Oral questioning<br>▪ Third Party Report<br>▪ Portfolio |
| 5. Install Cables and Devices for MDU | 5.1 Read & interpret work instructions as per plan<br>5.2 Identify the tools, equipment, testing devices, materials & PPE needed for installation<br>5.3 Lay out cables as per design<br>5.4 Install and connect devices<br>5.5 Conduct final inspection of the installed cable and devices<br>5.6 Prepare an installation & testing report | ▪ Lecture<br>▪ Discussion<br>▪ Demonstration<br>▪ Viewing multimedia<br>▪ Hands on practice/ Simulation | ▪ Observation in workplace<br>▪ Demonstration<br>▪ Oral questioning<br>▪ Third Party Report<br>▪ Portfolio |

## 3.2 TRAINING DELIVERY

The delivery of training should adhere to the design of the curriculum. Delivery should be guided by the 10 basic principles of the competency-based TVET.

- The training is based on curriculum developed from the competency standards;
- Learning is modular in its structure;
- Training delivery is individualized and self-paced;
- Training is based on work that must be performed;
- Training materials are directly related to the competency standards and the curriculum modules;
- Assessment is based in the collection of evidence of the performance of work to the industry required standard;
- Training is based both on and off-the-job components;
- Allows for recognition of prior learning (RPL) or current competencies;
- Training allows for multiple entry and exit; and
- Approved training programs are nationally accredited.

The competency-based TVET system recognizes various types of delivery modes, both on and off-the-job as long as the learning is driven by the competency standards specified by the industry. The following training modalities may be adopted when designing training programs:

- The dualized mode of training delivery is preferred and recommended. Thus programs would contain both in-school and in-industry training or fieldwork components. Details can be referred to the Dual Training System (DTS) Implementing Rules and Regulations.
- Modular/self-paced learning is a competency-based training modality wherein the trainee is allowed to progress at his own pace. The trainer only facilitates the training delivery.
- Peer teaching/mentoring is a training modality wherein fast learners are given the opportunity to assist the slow learners.
- Supervised industry training or on-the-job training is an approach in training designed to enhance the knowledge and skills of the trainee through actual experience in the workplace to acquire a specific competencies prescribed in the training regulations.
- Distance learning is a formal education process in which majority of the instruction occurs when the students and instructors are not in the same place. Distance learning may employ correspondence study, or audio, video or computer technologies.

## 3.3 TRAINEE ENTRY REQUIREMENTS

The trainees who wish to enter the course should possess the following requirements:

- Can communicate in oral and written language
- Can perform basic mathematical computations
- Must be physically and mentally fit to undergo training

This list does not include specific institutional requirements such as educational attainment, appropriate work experience and others that may be required from the trainees by the school or training center delivering the TVET program.

## 3.4 LIST OF TOOLS, EQUIPMENT AND MATERIALS (Institution-based)

Recommended list of tools, equipment and materials required for a class size of 25 trainees for Cable TV (CATV) Installation NC II:

| TOOLS | | EQUIPMENT | | MATERIALS | |
|---|---|---|---|---|---|
| Qty. | Description | Qty. | Description | Qty. | Description |
| 3 | set of wrenches | | | | messengered cable |
| 3 | Set of screwdrivers | 3 | VOM | | set of suspension clamps |
| 3 | torque wrench | 1 | lineman boom truck* | | pole extension arm |
| 3 | F-open wrench | 1 | cable trailer* | | cable-loop form / X-frame |
| 1 | bolt cutter | 1 | reel stand* | | pole insulator |
| 3 | cable cutter | 1 | lashing machine* | | ground/guying insulator |
| 3 | NT cutter / blade cutter | 1 | Addressable box/converter | | pole clamps of various sizes |
| 3 | Staple gun | 1 | Power supply | | guy protector |
| 3 | Technician's knife | 1 | Trunk amplifier | | set of guy grips |
| 3 | Cable prep tool | 1 | Line extender | | braces |
| 2 | set of hammer | 1 | Node | | tie wrap |
| 3 | set of pliers | 1 | F.I. meter | | cable clip |
| 2 | Coring tools | 1 | In-house amplifier | | pole tag |
| 2 | Blow torch | 1 | Cable modem | | cable tag |
| 2 | Center conductor's stripper | 1 | cable roller block (single or multiple cable) | | sets of washer, bolts and nuts |
| 2 | hacksaw | 1 | Service vehicle* | | guying fixtures |
| 1 | cable tensioner/ rachet/ coping jack | 1 | Power inserter | | sets of washer, bolts and nuts, machine bolts |
| 3 | Crimping/ compression tool | 1 | Splitter (2-way) | | machine bolts – straight, thimble-eye and bent types |
| 1 | cable guide | 1 | directional coupler | | stainless lashing wire |
| 1 | aerial handline | 3 | tap-offs (2-, 4-,8-ways) | | lashing wire clamps |
| 1 | set of ropes | | | | messenger-wire clamps |
| 1 | tape linen/steel tape | | | | thimble eye nut |
| 1 | multiple cable puller | | | | stainless strap and buckle |
| 1 | come-a-long/guy grip | | | | cable roller |
| 1 | Step ladder | | | | spiral sleeve |

| TOOLS | | EQUIPMENT | | MATERIALS | |
|---|---|---|---|---|---|
| 1 | fixing brackets/ clamps | | **Customer premises equipment:** | | standard rope |
| | | | | | color coded marked tape |
| 1 | lay-up stick / cable lifter | 1 | TV set | | extension arm |
| 1 | drill/electric drill (w/ bits of various sizes) | 1 | LCD / plasma monitor with or without tuner** | | F-connectors (crimped or compression type) |
| 3 | adjustable wrench | 1 | Addressable box/ converter | | grounding wire (gauge 12, stranded) |
| 1 | extension ladders (24 ft. length) | 1 | Home theater equipment** | | grounding rod (1/4' by 4' with clamp) |
| 1 | bender board/cable form | 1 | DVD /VCD /MP3 players | | TW wire (gauge 12, stranded or solid) |
| 1 | messenger wire raising tool | 1 | Personal computers/ internet / VoIP | | screw hooks |
| | | | | | lag screws |
| | | 1 | Cable modem / router | | terminators |
| | | | | | sidewalk guy fixture |
| | | | | | bonding clamp |
| | **Tools for fiber-optics:** | | **PPE:** | | anchor and grounding rods |
| | | | | | cable support |
| | | | | | cable spacer |
| 1 | Power Meter | | body belt & strap | | adhesive tape |
| 1 | Buffer Tube Stripper | | hard hat/ helmet | | strand clamps |
| 1 | Cable slitter | | set gloves | | heat shrink |
| 1 | Fiber stripper | | safety shoes | | silicon gel |
| 1 | Kevlar cutter | | Safety goggles | | tap-off bracket |
| 3 | Alcohol dispenser | | tool pouch/holster | | conduit / GI pipes |
| 3 | Diagonal side cutter | | safety cones/other collapsible signs | | electric meter |
| | | | | | circuit breaker |
| | | | | | Drop cable |
| | | | | | cable tie |
| | | | | | rubber boots |
| | | | | | grounding block |
| | | | | | P-hook |
| | | | | | |
| | | | | | **Materials for Fiber-optics:** |
| | | | | | Optical closure |
| | | | | | Patchcord |
| | | | | | Pigtail |
| | | | | | Pole clamp |
| | | | | | X-Frame Fiber Management |
| | | | | | |
| | | | | | Preformed Wire ¼ |
| | | | | | Optical Adapter |
| | | | | | Optical Distribution Frame (Patch Panel) |
| | | | | | |
| | | | | | Fusion Sleeves |
| | | | | | 3-bolt suspension clamp |
| | | | | | Alcohol 99.9% Isopropyl |
| | | | | | Tissue paper |
| | | | | | |

* ***as per MOA with CATV companies***

** ***optional***

## 3.5 TRAINING FACILITIES

Recommended space requirements for the various teaching/learning areas are as follows:

| TEACHING/LEARNING AREAS | SIZE IN METERS (M) | AREA IN SQ. M | QTY | TOTAL AREA IN SQ. M |
|---|---|---|---|---|
| Lecture Area | 6 x 5 | 30 | 1 | 30 |
| Laboratory Area | 6 X 5 | 30 | 1 | 30 |
| Learning Resource Area | 4 x 5 | 20 | 1 | 20 |
| Tool Room/Storage Area | 4 x 4 | 16 | 1 | 16 |
| Wash ,Toilet & Locker Room | 2 x 5 | 10 | 2 | 20 |
| **Total** | | | | 116 |
| Facilities / Equipment / Circulation* | | | | 35 |
| **Total Area** | | | | **151** |

***Area requirement is equivalent to 30% of the total teaching/learning areas***

## 3.6 TRAINERS QUALIFICATIONS

**Cable TV Installation NC II**
**Trainer's Qualification TQ II**

- Must be a holder of TESDA Cable TV (CATV) Installation NCII or equivalent
- Must have completed Training Methodology II (TM II) course or equivalent
- * Must have at least 5-years relevant industry experience.
- Must be physically & mentally fit.

* Optional: Only when required by the hiring institution.

## 3.7 INSTITUTIONAL ASSESSMENT

Institutional assessment is undertaken by trainees to determine their achievement of units of competency. A certificate of achievement is issued for each unit of competency.

## SECTION 4: NATIONAL ASSESSMENT AND CERTIFICATION ARRANGEMENTS

4.1 To attain the National Qualification of **Cable TV (CATV) Installation NC II**, the candidate must demonstrate competency in all the units listed in Section 1. Successful candidates shall be awarded a **National Certificate II** signed by the TESDA Director General.

4.2 The qualification of **Cable TV (CATV) Installation NC II** may be attained through demonstration of competence through a single comprehensive project-type assessment covering all required units of competency of the qualification.

4.3 Assessment shall focus on the core units of competency. The basic and common units shall be integrated or assessed concurrently with the core units.

4.4 The following are qualified to apply for assessment and certification:

4.4.1. Graduate of formal, non-formal, and informal, including enterprise-based, training programs.

4.4.2. Experienced workers (wage employed or self employed)

4.5 The guidelines on assessment and certification are discussed in detail in the "Procedures Manual on Assessment and Certification" and "Guidelines on the Implementation of the Philippine TVET Qualification and Certification System (PTQCS)".

## DEFINITION OF TERMS

## GENERAL

1) **Certification -** is the process of verifying and validating the competencies of a person through assessment

2) **Certificate of Competency (COC)** – is a certification issued to individuals who pass the assessment for a single unit or cluster of units of competency

3) **Common Competencies** - are the skills and knowledge needed by all people working in a particular industry

4) **Competency** - is the possession and application of knowledge, skills and attitudes to perform work activities to the standard expected in the workplace

5) **Competency Assessment -** is the process of collecting evidence and making judgments on whether competency has been achieved

6) **Competency Standard (CS)** - is the industry-determined specification of competencies required for effective work performance

7) **Context of Assessment** - refers to the place where assessment is to be conducted or carried out

8) **Core Competencies -** are the specific skills and knowledge needed in a particular area of work - industry sector/occupation/job role

9) **Critical aspects of competency -** refers to the evidence that is essential for successful performance of the unit of competency

10) **Elective Competencies -** are the additional skills and knowledge required by the individual or enterprise for work

11) **Elements** - are the building blocks of a unit of competency. They describe in outcome terms the functions that a person performs in the workplace.

12) **Evidence Guide** - is a component of the unit of competency that defines or identifies the evidences required to determine the competence of the individual. It provides information on critical aspects of competency, underpinning knowledge, underpinning skills, resource implications, assessment method and context of assessment

13) **Level -** refers to the category of skills and knowledge required to do a job

14) **Method of Assessment** - refers to the ways of collecting evidence and when, evidence should be collected

15) **National Certificate (NC)** – is a certification issued to individuals who achieve all the required units of competency for a national qualification defined under the Training Regulations. NCs are aligned to specific levels within the PTQF

16) **Performance Criteria** - are evaluative statements that specify what is to be assessed and the required level of performance

17) **Qualification** - is a cluster of units of competencies that meets job roles and is significant in the workplace. It is also a certification awarded to a person on successful completion of a course in recognition of having demonstrated competencies in an industry sector

18) **Range of Variables** - describes the circumstances or context in which the work is to be performed

19) **Recognition of Prior Learning (RPL)** – is the acknowledgement of an individual's skills, knowledge and attitudes gained from life and work experiences outside registered training programs

20) **Resource Implications -** refers to the resources needed for the successful performance of the work activity described in the unit of competency. It includes work environment and conditions, materials, tools and equipment

21) **Basic Competencies -** are the skills and knowledge that everyone needs for work

22) **Training Regulations (TR)** – refers to the document promulgated and issued by TESDA consisting of competency standards, national qualifications and training guidelines for specific sectors/occupations. The TR serves as basis for establishment of qualification and certification under the PTQF. It also serves as guide for development of competency-based curricula and instructional materials including registration of TVET programs offered by TVET providers

23) **Underpinning Knowledge -** refers to the competency that involves in applying knowledge to perform work activities. It includes specific knowledge that is essential to the performance of the competency

24) **Underpinning Skills** - refers to the list of the skills needed to achieve the elements and performance criteria in the unit of competency. It includes generic and industry specific skills

25) **Unit of Competency** – is a component of the competency standards stating a specific key function or role in a particular job or occupation; it is the smallest component of achievement that can be assessed and certified under the PTQF

## SECTOR SPECIFIC

1. **Amplifier** – an electronic device used to increase the strength of a signal.

2. **Audio/visual equipment -** includes televisions, radios, monitors, cameras, closed circuit television, mono and stereo sound systems, gaming machines, electronic display panels, cassette recorders, video cassette recorders, CDROM players, sound and video duplication equipment, digital versatile discs, professional and domestic speaker systems, mixer desks.

3. **Bridger amplifier** – a device which extracts a portion of the signal from the trunk, amplifies it to a higher level, and feeds it to the distribution system.

4. **Cable** – is used for the distribution of television signals from the headend to the subscribers. The nominal characteristic impedance used in CATV system must be 75-ohms.

5. **CATV** – any facility that, in whole or in part, receives directly or indirectly over the air, and amplifies or otherwise modifies (improves) the signals transmitting programs broadcast by one or more television, satellite or radio stations and distributes such signals by wire or cable to subscribing members of the public who pay for such service or services.

6. **Component -** That portion of a unit of equipment, which has been designed as a discrete unit and that can be identified as such.

7. **Connectorization** – proper preparation of cable for installation of appropriate type of connectors.

8. **Directional couplers** – is a device used to divide the power unequally into two paths.

9. **Drop cable** – a small-diameter cable leading from the tap-off in the cable plant to the subscribers' TV receivers. A drop cable used by the CATV system should be either RG-59 or RG-6, 75-ohms coaxial cable (foam).

10. **Environment -** The area surrounding the work site which can be directly or indirectly affected by occurrences at the work site. It includes the atmosphere, soils, drains, underground water tables, and the ecosystem. Protection of the environment would require the proper disposal of waste materials, restriction of burning off, the correct handling of toxic substances, the containment of CFCs and the like.

11. **Established procedures -** Formal arrangements of an organization, enterprise or statutory authority of how work is to be done.

12. **Hazardous materials -** Flammable gases and vapors and combustible dusts.

13. **Headend** – is the main site at which all the signals from the various program sources are received, assembled, processed and combined for transmission through the distribution network. It is the originating point for all services carried on a cable television system

14. **Line extender amplifier** – extends further the feederline from the trunk bridger.

15. **Modifications -** To make changes to the physical parameters or operational function of a device, component or piece of equipment or apparatus.

16. **Notification (notified) -** Can include verbal, written, electronic or recorded information at completion of work which may be required to be completed in accordance with established procedures.

17. **OH&S policies and procedures -** Arrangements of an organization or enterprise to meet their legal and ethical obligations of ensuring the workplace is safe and without risk to health.

18. **Outside Plant (OSP)** – is a part of CATV system that provides for the distribution of television signals from the headend to the paying subscribers.

19. **Requirements -** That to which equipment and procedures and their outcomes must conform and includes statutory obligations and regulations and standards called-up by legislation or regulations.

20. **Servicing -** Undertaking routine inspection, repair and maintenance of circuits, systems or apparatus. Maintaining, fault finding and repair of equipment, plant and machinery.

21. **Splitter** – is a passive device used to divide the power equally into two path.

22. **Standards -** Technical documents, which set out specifications and other criteria for equipment, materials, and methods to ensure them consistently, perform as intended.

23. **Subscriber** – a person who pays a fee for cable services.

24. **Subscriber terminal** – the cable television system terminal to which a subscriber's equipment is connected.

25. **System -** A group or combination of inter-related, inter-dependent or interlocking elements forming a collective entity. Includes circuits, apparatus, equipment and the like.

26. **Tap-off** – is a device that extracts a small portion of the signal from the feeder cable and provides signal to the subscriber's TV set.

27. **Termination -** The act by means of which an electrical connection to an apparatus is established; specifically a prepared joint or connection between a cable, cord or conductor and a point in an electrical circuit such as a terminal or connection point. Such terminations include soldering, crimping, clamping, wire wrapping, insulation piercing/compression.

28. **Testing devices -** Devices and instruments used to ensure safety requirements and operational functions are met, and to diagnose faults in apparatus, circuits or systems.

29. **Trunk amplifier** – a low distortion amplifier that amplifies RF signals for long distance transport.

30. **UHF** – Ultrahigh frequency. The band of frequencies extending from 470 to 890 MHz as designated by the Federal Communications Commission.

31. **VHF** – Very high frequency. The band extending from 30 to 300 MHz.

32. **Wiring systems -** Permitted cables, enclosures, supports and accessories for power, measurement, control or communications purposes.

## ANNEX A - COMPETENCY MAP - CABLE TV (CATV) INSTALLATION NC II

### BASIC COMPETENCIES

| | | | | |
|---|---|---|---|---|
| Receive and Respond to Workplace Communication | Work with Others | Demonstrate work values | Practice basic housekeeping procedures | **Participate in Workplace Communication** |
| **Work in a Team Environment** | **Practice career professionalism** | **Practice occupational health and safety procedures** | Lead Workplace Communication | Lead Small Team |
| Develop and practice negotiation skills | Solve Problems Related to Work Activities | Use mathematical concepts and techniques | Use relevant technologies | Utilize Specialist Communication Skills |
| Develop Team and Individuals | Apply Problem Solving Techniques in the Workplace | Collect, analyze and organize information | Plan and Organize Work | Promote environmental protection |

### COMMON COMPETENCIES

| | | | | |
|---|---|---|---|---|
| **Use Hand Tools** | **Perform Mensuration and Calculation** | **Prepare and Interpret Technical Drawing** | **Apply Quality Standards** | Perform Computer Operations |
| Terminate and Connect Electrical Wiring and Electronic Circuits | | | | |

### CORE COMPETENCIES

| | | | | |
|---|---|---|---|---|
| **Install Pole Hardware and Accessories** | **Lay Out and Install Fiber-Optic/ Coaxial Cables** | **Install Active and Passive Devices and Accessories** | **Install Subscriber Drop Lines and CPE** | **Install Cables and Devices for MDU** |
| Operate CATV system | Implement preventive maintenance of CATV system | Perform CATV system troubleshooting and repair | Commission CATV system | Perform CATV outside plant expansion works |

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