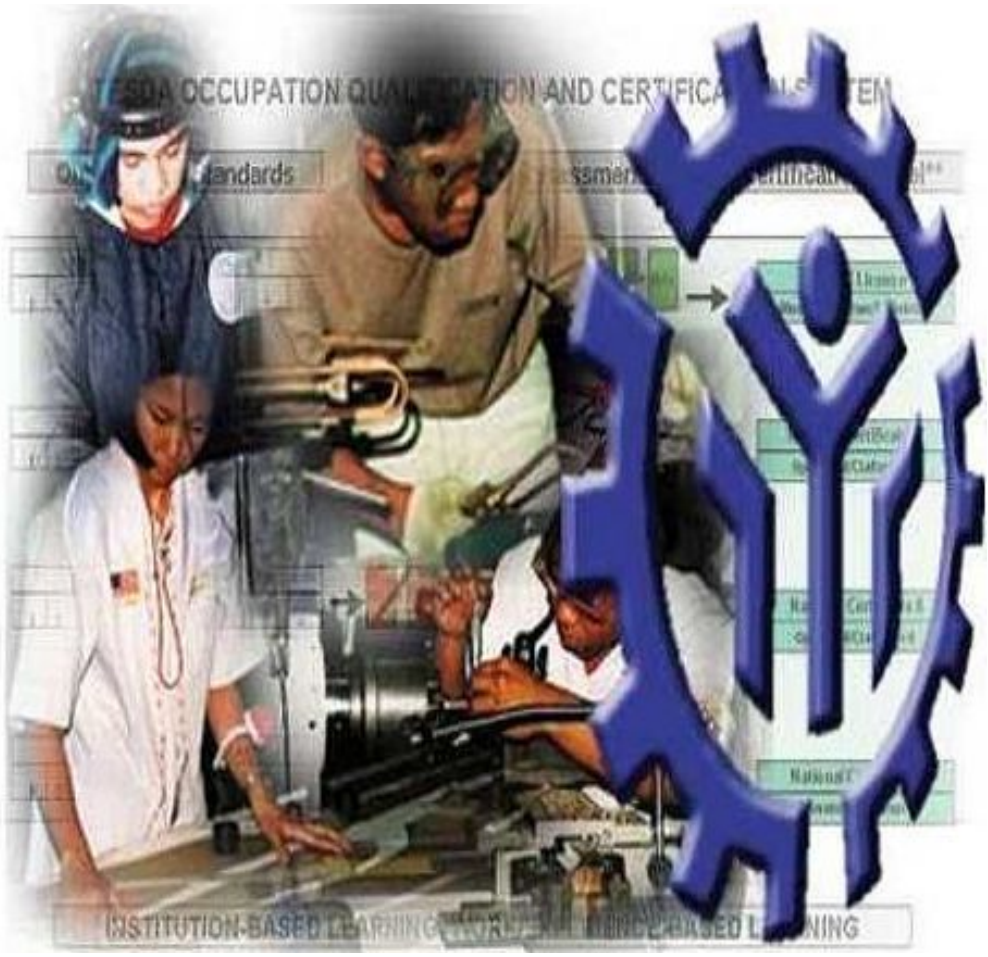
TRAINING REGULATIONS



CABLE TV OPERATION AND MAINTENANCE NC III

MEDIA SECTOR

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

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ICT (BROADCAST MEDIA) SECTOR

CABLE TELEVISION (CATV) OPERATION AND MAINTENANCE

NATIONAL CERTIFICATE LEVEL III

TRAINING REGULATIONS FOR
CABLE TELEVISION (CATV) OPERATION AND MAINTENANCE NC III

Section 1 CATV OPERATION AND MAINTENANCE NC III QUALIFICATION

The **CATV OPERATION AND MAINTENANCE NC III** Qualification consists of competencies that a person must possess to supervise installation of CATV system, commission and operate CATV system, implement preventive maintenance and perform troubleshooting and repair in both headend and outside plant cable television systems.

This Qualification is packaged from the competency map of the Media sector) as shown in Annex A.

The units of competency comprising this qualification include the following:

Code	BASIC COMPETENCIES
5 00 311 1 09	Lead workplace communication
5 00 311 1 10	Lead small teams
5 00 311 1 11	Develop and practice negotiation skills
5 00 311 1 12	Solve problems related to work activities
5 00 311 1 13	Use mathematical concepts and techniques
5 00 311 1 14	Use relevant technologies

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

Code	CORE COMPETENCIES
MDA311301	Supervise installation of CATV system
MDA311302	Commission CATV system
MDA311303	Operate CATV system
MDA311304	Implement preventive maintenance of CATV system
MDA311305	Perform CATV system troubleshooting and repair

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

- CATV System Supervisor
- CATV Systems Technician
- CATV Headend Technician
- CATV Outside Plant Technician
- CATV System Operator

SECTION 2: COMPETENCY STANDARDS

This section gives the details of the contents of the basic, common, and core units of competency required for **CATV OPERATION & MAINTENANCE NC III.**

BASIC COMPETENCIES

UNIT OF COMPETENCY : LEAD WORKPLACE COMMUNICATION

UNIT CODE : 500311109

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to lead in the dissemination and discussion of ideas, information and issues in the workplace.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
1. Communicate information about workplace processes	1.1. Appropriate ***communication method*** is selected 1.2. Multiple operations involving several topics areas are communicated accordingly 1.3. Questions are used to gain extra information 1.4. Correct sources of information are identified 1.5. Information is selected and organized correctly 1.6. Verbal and written reporting is undertaken when required 1.7. Communication skills are maintained in all situations
2. Lead workplace discussions	2.1. Response to workplace issues are sought 2.2. Response to workplace issues are provided immediately 2.3. Constructive contributions are made to workplace discussions on such issues as production, quality and safety 2.4. Goals/objectives and action plan are undertaken in the workplace are communicated
3. Identify and communicate issues arising in the workplace	3.1. Issues and problems are identified as they arise 3.2. Information regarding problems and issues are organized coherently to ensure clear and effective communication 3.3. Dialogue is initiated with appropriate personnel 3.4. Communication problems and issues are raised as they arise

RANGE OF VARIABLES

VARIABLE	RANGE
1. Methods of communication	1.1. Non-verbal gestures 1.2. Verbal 1.3. Face to face 1.4. Two-way radio 1.5. Speaking to groups 1.6. Using telephone 1.7. Written 1.8. Internet

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1. Dealt with a range of communication/information at one time 1.2. Made constructive contributions in workplace issues 1.3. Sought workplace issues effectively 1.4. Responded to workplace issues promptly 1.5. Presented information clearly and effectively written form 1.6. Used appropriate sources of information 1.7. Asked appropriate questions 1.8. Provided accurate information
2. Underpinning knowledge	2.1. Organization requirements for written and electronic communication methods 2.2. Effective verbal communication methods
3. Underpinning Skills	3.1. Organize information 3.2. Understand and convey intended meaning 3.3. Participate in variety of workplace discussions 3.4. Comply with organization requirements for the use of written and electronic communication methods
4. Resource Implications	The following resources **MUST** be provided: 4.1. Variety of Information 4.2. Communication tools 4.3. Simulated workplace
5. Methods of Assessment	Competency may be assessed through: 5.1. Competency in this unit must be assessed through 5.2. Direct Observation 5.3. Interview
6. Context for Assessment	6.1. Competency may be assessed in the workplace or in simulated workplace work environment

UNIT OF COMPETENCY : LEAD SMALL TEAMS

UNIT CODE : 500311110

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

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
1. Provide team leadership	1.1. ***Work requirements*** are identified and presented to team members 1.2. Reasons for instructions and requirements are communicated to team members 1.3. ***Team members' queries and concerns*** are recognized, discussed and dealt with
2. Assign responsibilities	2.1. Duties, and responsibilities are allocated having regard to the skills, knowledge and aptitude required to properly undertake the assigned task and according to company policy 2.2. Duties are allocated having regard to individual preference, domestic and personal considerations, whenever possible
3. Set performance expectations for team members	3.1. Performance expectations are established based on client needs and according to assignment requirements 3.2. Performance expectations are based on individual team members duties and area of responsibility 3.3. Performance expectations are discussed and disseminated to individual team members
4. Supervised team performance	4.1. ***Monitoring of performance*** takes place against defined performance criteria and/or assignment instructions and corrective action taken if required 4.2. Team members are provided with ***feedback***, positive support and advice on strategies to overcome any deficiencies 4.3. ***Performance issues*** which cannot be rectified or addressed within the team are referenced to appropriate personnel according to employer policy 4.4. Team members are kept informed of any changes in the priority allocated to assignments or tasks which might impact on client/customer needs and satisfaction 4.5. Team operations are monitored to ensure that employer/client needs and requirements are met 4.6. Follow-up communication is provided on all issues affecting the team 4.7. All relevant documentation is completed in accordance with company procedures

RANGE OF VARIABLES

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

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1. Maintained or improved individuals and/or team performance given a variety of possible scenario 1.2. Assessed and monitored team and individual performance against set criteria 1.3. Represented concerns of a team and individual to next level of management or appropriate specialist and to negotiate on their behalf 1.4. Allocated duties and responsibilities, having regard to individual's knowledge, skills and aptitude and the needs of the tasks to be performed 1.5. Set and communicated performance expectations for a range of tasks and duties within the team and provided feedback to team members
2. Underpinning Knowledge	2.1. Company policies and procedures 2.2. Relevant legal requirements 2.3. How performance expectations are set 2.4. Methods of Monitoring Performance 2.5. Client expectations 2.6. Team member's duties and responsibilities
3. Underpinning Skills	3.1. Communication skills required for leading teams 3.2. Informal performance counseling skills 3.3. Team building skills 3.4. Negotiating skills
4. Resource Implications	The following resources **MUST** be provided: 4.1. Access to relevant workplace or appropriately simulated environment where assessment can take place 4.2. Materials relevant to the proposed activity or task
5. Methods of Assessment	Competency may be assessed through: 5.1. Direct observations of work activities of the individual member in relation to the work activities of the group 5.2. Observation of simulation and/or role play involving the participation of individual member to the attainment of organizational goal 5.3. Case studies and scenarios as a basis for discussion of issues and strategies in teamwork
6. Context for Assessment	6.1. Competency assessment may occur in workplace or any appropriately simulated work environment 6.2. Assessment shall be observed while task are being undertaken whether individually or in-group

UNIT OF COMPETENCY: DEVELOP AND PRACTICE NEGOTIATION SKILLS

UNIT CODE : 500311111

UNIT DESCRIPTOR : This unit covers the skills, knowledge and attitudes required to collect information in order to negotiate to a desired outcome and participate in the negotiation.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
1. Plan negotiations	1.1 Information on ***preparing for negotiation*** is identified and included in the plan 1.2 Information on creating ***non verbal environments*** for positive negotiating is identified and included in the plan 1.3 Information on ***active listening*** is identified and included in the plan 1.4 Information on different ***questioning techniques*** is identified and included in the plan 1.5 Information is checked to ensure it is correct and up-to- date
2. Participate in negotiations	2.1 Criteria for successful outcome are agreed upon by all parties 2.2 Desired outcome of all parties are considered 2.3 Appropriate language is used throughout the negotiation A variety of questioning techniques are used 2.4 The issues and processes are documented and agreed upon by all parties 2.5 Possible solutions are discussed and their viability assessed 2.6 Areas for agreement are confirmed and recorded Follow-up action is agreed upon by all parties

RANGE OF VARIABLES

VARIABLE	RANGE
1. Preparing for negotiation	1.1 Background information on other parties to the negotiation 1.2 Good understanding of topic to be negotiated 1.3 Clear understanding of desired outcome/s 1.4 Personal attributes 1.4.1 Self awareness 1.4.2 Self esteem 1.4.3 Objectivity 1.4.4 Empathy 1.4.5 Respect for others 1.5 Interpersonal skills 1.5.1 Listening/reflecting 1.5.2 Non-verbal communication 1.5.3 Assertiveness 1.5.4 Behavior labeling 1.5.5 Testing understanding 1.5.6 Seeking information 1.5.7 self disclosing 1.6 Analytic skills 1.6.1 Observing differences between content and process 1.6.2 Identifying bargaining information 1.6.3 Applying strategies to manage process 1.6.4 Applying steps in negotiating process 1.6.5 Strategies to manage conflict 1.6.6 Steps in negotiating process 1.6.7 Options within organization and externally for resolving conflict
2. Non verbal environments	2.1 Friendly reception 2.2 Warm and welcoming room 2.3 Refreshments offered 2.4 Lead in conversation before negotiation begins
3. Active listening	3.1 Attentive 3.2 Don't interrupt 3.3 Good posture 3.4 Maintain eye contact 3.5 Reflective listening
4. Questioning techniques	4.1 Direct 4.2 Indirect 4.3 Open-ended

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Demonstrated sufficient knowledge of the factors influencing negotiation to achieve agreed outcome 1.2 Participated in negotiation with at least one person to achieve an agreed outcome
2. Underpinning Knowledge and Attitude	2.1 Codes of practice and guidelines for the organization 2.2 Organizations policy and procedures for negotiations 2.3 Decision making and conflict resolution strategies procedures 2.4 Problem solving strategies on how to deal with unexpected questions and attitudes during negotiation 2.5 Flexibility 2.6 Empathy
3. Underpinning Skills	3.1 Interpersonal skills to develop rapport with other parties 3.2 Communication skills (verbal and listening) 3.3 Observation skills 3.1 Negotiation skills
4. Resource Implications	The following resources **MUST** be provided: 4.1 Room with facilities necessary for the negotiation process 4.2 Human resources (negotiators)
5. Methods of Assessment	Competency may be assessed through: 5.1 Observation/demonstration and questioning 5.2 Portfolio assessment 5.3 Oral and written questioning 5.4 Third party report
6. Context for Assessment	6.1 Competency to be assessed in real work environment or in a simulated workplace setting.

UNIT OF COMPETENCY : SOLVE PROBLEMS RELATED TO WORK ACTIVITIES

UNIT CODE : 500311112

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

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
1. Identify the problem	1.1. Variances are identified from normal operating parameters; and product quality 1.2. Extent, cause and nature of the problem are defined through observation, investigation and ***analytical techniques*** 1.3. ***Problems*** are clearly stated and specified
2. Determine fundamental causes of the problem	2.1. Possible causes are identified based on experience and the use of problem solving tools / analytical techniques. 2.2. Possible cause statements are developed based on findings 2.3. Fundamental causes are identified per results of investigation conducted
3. Determine corrective action	3.1. All possible options are considered for resolution of the problem 3.2. Strengths and weaknesses of possible options are considered 3.3. Corrective actions are determined to resolve the problem and possible future causes 3.4. **Action *plans*** are developed identifying measurable objectives, resource needs and timelines in accordance with safety and operating procedures
4. Provide recommendation/s to manager	4.1. Report on recommendations are prepared according to procedures 4.2. Recommendations are presented to appropriate personnel. 4.3. Recommendations are followed-up, if required

RANGE OF VARIABLES

VARIABLE	RANGE
1. Analytical techniques	1.1. Brainstorming 1.2. Intuitions/Logic 1.3. Cause and effect diagrams 1.4. Pareto analysis 1.5. SWOT analysis 1.6. Gant chart, Pert CPM and graphs 1.7. Scattergrams
2. Problem	2.1. Non – routine process and quality problems 2.2. Equipment selection, availability and failure 2.3. Teamwork and work allocation problem 2.4. Safety and emergency situations and incidents
3. Action plans	3.1. Priority requirements 3.2. Measurable objectives 3.3. Resource requirements 3.4. Timelines 3.5. Co-ordination and feedback requirements 3.6. Safety requirements 3.7. Risk assessment 3.8. Environmental requirements

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1. Identified the problem 1.2. Determined the fundamental causes of the problem 1.3. Determined the correct / preventive action 1.4. Provided recommendation to manager These aspects may be best assessed using a range of scenarios / case studies / what ifs as a stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations that may have happened.
2. Underpinning Knowledge	2.1. Competence includes a thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognize non-standard situations 2.2. Competence to include the ability to apply and explain, sufficient for the identification of fundamental cause, determining the corrective action and provision of recommendations 2.2.1. Relevant equipment and operational processes 2.2.2. Enterprise goals, targets and measures 2.2.3. Enterprise quality, OHS and environmental requirement 2.2.4. Principles of decision making strategies and techniques 2.2.5. Enterprise information systems and data collation 2.2.6. Industry codes and standards
3. Underpinning Skills	3.1. Using range of formal problem solving techniques 3.2. Identifying and clarifying the nature of the problem 3.3. Devising the best solution 3.4. Evaluating the solution 3.5. Implementation of a developed plan to rectify the problem
4. Resource Implications	4.1. Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios / case studies / what ifs will be required as well as bank of questions which will be used to probe the reason behind the observable action.

5. Methods of Assessment	Competency may be assessed through: 5.1. Case studies on solving problems in the workplace 5.2. Observation The unit will be assessed in a holistic manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk through of the relevant competency components.
6. Context for Assessment	6.1. In all workplace, it may be appropriate to assess this unit concurrently with relevant teamwork or operation units.

UNIT OF COMPETENCY: **USE MATHEMATICAL CONCEPTS AND TECHNIQUES**

UNIT CODE : **500311113**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required in the application of mathematical concepts and techniques.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
1. Identify mathematical tools and techniques to solve problem	1.1 Problem areas are identified based on given condition 1.2 ***Mathematical techniques*** are selected based on the given problem
2. Apply mathematical procedure/solution	2.1 Mathematical techniques are applied based on the problem identified 2.2 Mathematical computations are performed to the level of accuracy required for the problem 2.3 Results of mathematical computation is determined and verified based on job requirements
3. Analyze results	3.1 Result of application is reviewed based on expected and required specifications and outcome 3.2 ***Appropriate action*** is applied in case of error

RANGE OF VARIABLES

VARIABLE	RANGE
1. Mathematical techniques	May include but are not limited to: 1.1 Four fundamental operations 1.2 Measurements 1.3 Use/Conversion of units of measurements 1.4 Use of standard formulas
2. Appropriate action	2.1 Review in the use of mathematical techniques (e.g. recalculation, re-modeling) 2.2 Report error to immediate superior for proper action

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Identified, applied and reviewed the use of mathematical concepts and techniques to workplace problems
2. Underpinning Knowledge	2.1 Fundamental operation (addition, subtraction, division, multiplication) 2.2 Measurement system 2.3 Precision and accuracy 2.4 Basic measuring tools/devices
3. Underpinning Skills	3.1 Applying mathematical computations 3.2 Using calculator 3.3 Using different measuring tools
4. Resource Implications	The following resources **MUST** be provided: 4.1 Calculator 4.2 Basic measuring tools 4.3 Case Problems
5. Methods of Assessment	Competency may be assessed through: 5.1 Authenticated portfolio 5.2 Written Test 5.3 Interview/Oral Questioning 5.4 Demonstration
6. Context for Assessment	6.1 Competency may be assessed in the work place or in a simulated work place setting

UNIT OF COMPETENCY: USE RELEVANT TECHNOLOGIES

UNIT CODE : 500311114

UNIT DESCRIPTOR : This unit of competency covers the knowledge, skills, and attitude required in selecting, sourcing and applying appropriate and affordable technologies in the workplace.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
1. Study/select appropriate technology	1.1 Usage of different ***technologies*** is determined based on job requirements 1.2 Appropriate technology is selected as per work specification
2. Apply relevant technology	2.1 Relevant technology is effectively used in carrying out function 2.2 Applicable software and hardware are used as per task requirement 2.3 ***Management concepts*** are observed and practiced as per established industry practices
3. Maintain/enhance ~~of~~ relevant technology	3.1 Maintenance of technology is applied in accordance with the ***industry standard operating procedure***, ***manufacturer's operating guidelines*** and ***occupational health and safety procedure*** to ensure its operative ability 3.2 Updating of technology is maintained through continuing education or training in accordance with job requirement 3.3 Technology failure/ defect is immediately reported to the concern/responsible person or section for ***appropriate action***

RANGE OF VARIABLES

VARIABLE	RANGE
1. Technology	May include but are not limited to: 1.1 Office technology 1.2 Industrial technology 1.3 System technology 1.4 Information technology 1.5 Training technology
2. Management concepts	May include but not limited to: 2.1 Real Time Management 2.2 KAIZEN or continuous improvement 2.3 5s 2.4 Total Quality Management 2.5 Other management/productivity tools
3. Industry standard operating procedure	3.1 Written guidelines relative to the usage of office technology/equipment 3.2 Verbal advise/instruction from the co-worker
4. Manufacturer's operating guidelines/ instructions	4.1 Written instruction/manuals of specific technology/ equipment 4.2 General instruction manual 4.3 Verbal advise from manufacturer relative to the operation of equipment
5. Occupational health and safety procedure	5.1 Relevant statutes on OHS 5.2 Company guidelines in using technology/equipment
6. Appropriate action	6.1 Implementing preventive maintenance schedule 6.2 Coordinating with manufacturer's technician

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Studied and selected appropriate technology consistent with work requirements 1.2 Applied relevant technology 1.3 Maintained and enhanced operative ability of relevant technology
2. Underpinning Knowledge	2.1 Awareness on technology and its function 2.2 Repair and maintenance procedure 2.3 Operating instructions 2.4 Applicable software 2.5 Communication techniques 2.6 Health and safety procedure 2.7 Company policy in relation to relevant technology 2.8 Different management concepts 2.9 Technology adaptability
3. Underpinning Skills	3.1 Relevant technology application/implementation 3.2 Basic communication skills 3.3 Software applications skills 3.4 Basic troubleshooting skills
4. Resource Implications	The following resources **MUST** be provided: 4.1 Relevant technology 4.2 Interview and demonstration questionnaires 4.3 Assessment packages
5. Methods of Assessment	Competency must be assessed through: 5.1 Interview 5.2 Actual demonstration 5.3 Authenticated portfolio (related certificates of training/seminar)
6. Context for Assessment	6.1 Competency may be assessed in actual workplace or simulated environment

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 ***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 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 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 3.2. All safety procedures in using tools are observed at all times and appropriate ***personal protective equipment*** (PPE) are used 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 4.2. Routine ***maintenance*** of tools undertaken according to standard operational procedures, principles and techniques 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 2.2. Protective eyewear 2.3. Apron/overall
3. Maintenance	3.1. Cleaning 3.2. Lubricating 3.3. Tightening 3.4. Simple tool repairs 3.5. Hand sharpening 3.6. Adjustment using correct procedures

EVIDENCE GUIDE

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

ELEMENT	PERFORMANCE CRITERIA ***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 1.2. Correct specifications are obtained from relevant source 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 2.2. Accurate measurements are obtained for job 2.3. ***Calculation*** needed to complete work tasks are performed using the four basic process of addition (+), subtraction (-), multiplication (x), and division (/) 2.4. Calculation involving fractions, percentages and mixed numbers are used to complete workplace tasks. 2.5. Numerical computation is checked and corrected for accuracy 2.6. Instruments are read to the limit of accuracy of the tool.
3. Maintain measuring instruments	3.1. Measuring instruments are handled without damage according to procedures 3.2. Measuring instruments are cleaned before and after using. 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 1.2. Torque gauge 1.3. Try square 1.4. Protractor 1.5. Combination gauge 1.6. Steel rule
2. Calculation	Kinds of part mensuration includes the following but not limited to 2.1. Volume 2.2. Area 2.3. Displacement 2.4. Inside diameter 2.5. Circumference 2.6. Length 2.7. Thickness 2.8. Outside diameter 2.9. Taper 2.10. Out of roundness

EVIDENCE GUIDE

1. Critical aspect of competency	Assessment requires evidence that the candidate: 1.1. Selected proper measuring instruments according to tasks 1.2. Carried out measurement and calculations 1.3. Maintained and stores instruments
2. Underpinning knowledge	2.1. Types of measuring instruments and their uses 2.2. Safe handling procedures in using measuring instruments 2.3. Four fundamental operation of mathematics 2.4. Formula for volume, area, perimeter and other geometric figures
3. Underpinning skills	3.1. Reading skills required to interpret work instruction 3.2. Communication skills 3.3. Handling measuring instruments 3.4. Performing mathematical calculations using the four fundamental operations 3.5. Visualizing objects and shapes 3.6. Interpreting formulae
4. Method of assessment	Competency in this unit must be assessed through: 4.1. Observation 4.2. Oral questioning
5. Resource implication	5.1. Place of assessment 5.2. Measuring instruments 5.3. Straight edge 5.4. Torque gauge 5.5. Try square 5.6. Protractor 5.7. Combination gauge 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 ***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. 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. 2.2. ***Dimensions*** of the key features of the objects depicted in the drawing are correctly identified. 2.3. ***Symbols*** used in the drawing are identified and interpreted correctly. 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. 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. 4.2. Technical drawings are recorded and inventory is prepared in accordance with company procedures. 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: 1.1. Schematic diagrams 1.2. Charts 1.3. Block diagrams 1.4. Lay-out plans 1.5. Location plans 1.6. Process and instrumentation diagrams 1.7. Loop diagrams 1.8. System Control Diagrams
2. Dimensions	Dimensions may include but not limited to: 2.1. Length 2.2. Width 2.3. Height 2.4. Diameter 2.5. Angles
3. Symbols	May include but not limited to: 3.1. NEC- National Electric Code 3.2. IEC -International Electrotechnical Commission 3.3. ASME - American Society of Mechanical Engineers 3.4. IEEE - Institute of Electrical and Electronics Engineers 3.5. ISA - Instrumentation System and Automation Society
4. Instruments/Equipment	4.1. Components/dividers 4.2. Drawing boards 4.3. Rulers 4.4. T-square 4.5. Calculator

EVIDENCE GUIDE

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

UNIT TITLE : **APPLY QUALITY STANDARDS**
UNIT CODE : **ELC315202**
UNIT DESCRIPTOR : This unit covers the knowledge, skills, (and) attitudes and values needed to apply quality standards in the workplace. The unit also includes the application of relevant safety procedures and regulations, organization procedures and customer requirements

ELEMENT	PERFORMANCE CRITERIA ***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 1.2. Received ***materials or component parts*** are checked against workplace standards and specifications 1.3. Faulty material or components related to work are identified and isolated 1.4. ***Faults*** and any identified causes are recorded and/or reported to the supervisor concerned in accordance with workplace procedures 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 2.2. Completed work is checked against workplace standards relevant to the task undertaken 2.3. Faulty pieces are identified and isolated 2.4. Information on the quality and other indicators of production performance is recorded in accordance with workplace procedures 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 3.2. Work is carried out in accordance with process improvement procedures 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: 1.1.1. Wires 1.1.2. Cables, soldering lead 1.1.3. Electrical tape 1.2. Components may include but not limited to: 1.2.1. ICs 1.2.2. Diodes
2. Faults	Faults may include but not limited to: 2.1. Components/materials not according to specification 2.2. Components/materials contain manufacturing defects 2.3. Components/materials do not conform with government regulation i.e., PEC, environmental code 2.4. Components/materials have safety defect
3. Documentation	3.1. Organization work procedures 3.2. Manufacturer's instruction manual 3.3. Customer requirements 3.4. Forms
4. Quality standards	4.1. Quality standards may relate but not limited to the following: 4.1.1. Materials 4.1.2. Component parts 4.1.3. Final product 4.1.4. Production processes
5. Customer	5.1. Co-worker 5.2. Supplier 5.3. Client 5.4. Organization receiving the product or service

EVIDENCE GUIDE

1. Critical aspect of competency	Assessment requires evidence that the candidate: 1.1. Carried out work in accordance with the company's standard operating procedures 1.2. Performed task according to specifications 1.3. Reported defects detected in accordance with standard operating procedures 1.4. Carried out work in accordance with the process improvement procedures
2. Underpinning knowledge	2.1. Relevant production processes, materials and products 2.2. Characteristics of materials/component parts used in electronic production processes 2.3. Quality checking procedures 2.4. Workplace procedures 2.5. Safety and environmental aspects of production processes 2.6. Fault identification and reporting 2.7. Quality improvement process
3. Underpinning skills	3.1. Reading skills required to interpret work instruction 3.2. Communication skills needed to interpret and apply defined work procedures 3.3. Carry out work in accordance with OHS policies and procedures
4. Method of assessment	4.1. The assessor may select two (2) of the following assessment methods to objectively assess the candidate: 4.1.1. Observation 4.1.2. Questioning 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 environment.

CORE COMPETENCIES

UNIT OF COMPETENCY : **SUPERVISE INSTALLATION OF CATV SYSTEM**

UNIT CODE : **MDA311301**

DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to supervise installation of CATV systems requiring planning, implementation and evaluation of the job performed.

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ELEMENT	PERFORMANCE CRITERIA (***Italicized Bold*** terms are elaborated in the range of variables)
1. Plan and prepare CATV system installation	1.1 ***Installation procedures*** are planned and prepared based on industry standards. 1.2 ***Appropriate personnel*** are consulted to ensure the work is coordinated effectively with others involved in the work site. 1.3 Installation plan and materials are checked against requirements 1.4 Tools, equipment and testing devices needed to carry out the installation work are obtained in accordance with ***established procedures*** and checked for correct operation and safety
2 Oversee installation of CATV system	2.1 OH&S policies and procedures are followed 2.2 Materials, devices and equipment are checked, segregated and arranged for ease of installation. 2.3 Installation activities are directed in accordance with the plan. 2.4 CATV installers are provided with clear instructions on the work to be done and the respective responsibilities associated with the work and others who are involved 2.5 CATV installers are guided/mentored and stage check is made at a level appropriate to the stage of development in accordance with industry standards 2.6 ***Unplanned events or conditions*** are responded to in accordance with established procedures and approval is obtained from appropriate personnel before any contingencies are implemented
3 Inspect and document completion of work	3.1 Final inspections and performance checks are undertaken to ensure that the installation procedures of devices, materials and equipment conforms to industry standards 3.2 Joint-pole agreement is strictly observed and provisions stipulated on the NTC provisional authority is complied 3.3 Work completion is documented and reported to personnel concerned in accordance with established procedures

RANGE OF VARIABLES

1. Installation procedures	Installation procedures may include but not limited to: 1.1 Installation of pole hardware 1.2 Installation and layout of cables 1.3 Installation of active and passive devices 1.4 Installation of subscriber drop lines 1.5 Installation of devices for SDU and MDU 1.6 Installation of headend equipment and auxiliary devices
2. Appropriate person	May include: 2.1 System Manager 2.2 Project engineer 2.3 Technical supervisor 2.4 Technicians 2.5 Installers 2.6 Other personnel designated by an organization or enterprise
3. Established procedures	Formal arrangements of an organization, enterprise or statutory authority on task performances. 4.1 Quality assurance systems incorporating, for example: 4.1.1 Specifications, requirements and procedures 4.1.2 Work orders / instructions 4.1.3 Reporting procedures 4.1.4 Improvement mechanisms 4.1.5 Compliance requirements 4.1.6 Safety management 4.2 Work clearance systems incorporating, for example: 4.2.1 Work permits 4.2.2 Monitoring and clearance procedures 4.2.3 Isolation procedures 4.3 Joint Pole Agreement 4.4 OH&S practices 4.5 Procedures for operating safety systems, operating plant and equipment and reporting work activities 4.6 Maintenance, modification or supply of relevant schematic drawings and technical data 4.7 Arrangements for dealing with emergency situations.
4. Unplanned events or conditions	May include but not limited to: 5.1 Accidents/incidents 5.2 Brownout 5.3 Equipment breakdown 5.4 Force majeure e.g., earthquake, fire, typhoon

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Planned installation procedures in line with job requirements 1.2 Prepared/obtained materials, PPE, tools, equipment and testing devices in line with established procedures 1.3 Demonstrated compliance with safety regulations applicable to worksite operations 1.4 Directed installation activities in line with established procedures and job requirements 1.5 Performed final inspection to ensure installation of CATV system meet job requirements 1.6 Communicated effectively with others to ensure safe and effective work operations
2. Underpinning knowledge and attitude	2.1. Design plan interpretation 2.2. Appropriate knowledge in procedure on: 2.2.1. Installation of pole hardware 2.2.2. Installation and layout of cables 2.2.3. Installation of active and passive devices 2.2.4. Installation of subscriber drop lines 2.2.5. Installation of devices for SDU and MDU 2.2.6. Installation of headend equipment and auxiliary devices 2.3. System and processes 2.3.1. Headend assembly and practices 2.3.2. Antenna system installation procedures 2.3.3. Facility grounding and bonding practices 2.4. Safety 2.4.1. Work safety requirements and economy of materials with durability 2.4.2. Knowledge in 5S application and observation of required timeframe 2.5. Materials, Tools and Equipment: Uses and Specifications 2.5.1. Identification of appropriate tools, equipment and devices 2.6. Laws and regulations 2.6.1. NTC Memorandum Circulars 2.6.2. Local Ordinance 2.6.3. DTI Regulations 2.6.4. RA 9292 2.6.5. Philippine Electrical code 2.6.6. Philippine Electronic code

3. Underpinning skills	3.1. Work efficiency 3.2. Communication skills in interpreting service manual and dealing with the client 3.3. Skills in the installation procedures 3.4. Supervisory skills 3.5. Applying work safety practices and time management 3.6. Interpreting design plan in relation to job requirements
4. Resource implications	Includes but not limited to: 4.1. Work area 4.2. Design plan, technical manuals, schematic diagrams 4.3. Tools, equipment and test instruments and devices 4.4. Materials 4.5. Personal protective equipment (PPE) 4.6. Service vehicle (as needed)
5. Method of assessment	The assessor must select at least two of the following assessment methods to objectively assess the candidate: 5.1. Case study/ Written Report 5.2. Portfolio 5.3. Third Party Report
6. Context of assessment	6.1. Competency maybe assessed in the workplace or in a simulated workplace setting 6.2. Assessment shall be undertaken either individually or part of team under limited supervision

UNIT OF COMPETENCY : **COMMISSION CATV SYSTEM**

UNIT CODE : MDA311301

DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to perform commissioning of CATV system which may include headend and outside plant system. This covers the activation of headend equipment, cable powering, energizing and adjustment of proper signal level.

ELEMENT	PERFORMANCE CRITERIA (***Italicized Bold*** terms are elaborated in the range of variables)
1. Test-run headend equipment	1.1 ***Test instruments and equipment*** are prepared and checked prior to test run. 1.2 Signal levels are measured and set per channel based on ***standard headend parameters*** 1.3 Signals are combined/mixed in such a way that signal levels are at the same prescribed level to properly drive the launching amplifier. 1.4 Re-adjustments/re-alignments of questionable channels and equipment diagnosis are performed in case of ***abnormal test results*** 1.5 Results of tests and measurements per channel are documented in accordance with company requirements.
2. Test-run auxiliary equipment	2.1 Operation of air-conditioning system is tested and compared with required ambient temperature for headend equipment operation. 2.2 Standby generator is test-run for proper voltage and frequency regulation. 2.3 Test results are recorded and documented in accordance with job requirements. 2.4 ***Problems encountered*** in operation of equipment accessories are documented and referred to concerned personnel in accordance with company procedures.
3. Activate OSP power supplies	3.1 Appropriate ***tools, test instrument, equipment, materials and PPE*** are prepared and checked prior to activation of power. 3.2 Power switch is switched on and input and output voltages are ***measured*** and recorded.
4 Energize OSP distribution system	4.1 Trunk amplifiers are ***activated and energized*** to the correct signal level as per design plan 4.2 Line extender amplifiers are activated and energized to deliver proper signal level as per design plan 4.3 Safety precautions are observed and followed in climbing poles and powering of each amplifier. 4.4 Measurements and results of tests are recorded and documented in accordance with established procedures

RANGE OF VARIABLES

1 Test instruments and equipment	This may include: 1.1 Signal-level meter (SLM) 1.2 Volt-ohm meter (VOM) 1.3 spectrum analyzer 1.4 power meter
2 Standard headend parameters	This may include: 2.1 aural signal level (10 – 17 db below adjacent visual signal level) 2.2 carrier-to-noise ratio (43 db) 2.3 carrier-to-cross modulation (46 db) 2.4 carrier-to-composite triple bit (46 db) 2.5 hum modulation (1%) 2.6 broadband frequency response (flat) 2.7 percentage modulation (87%)
3 Abnormal test results	3.1 Difference between audio and video carrier 3.2 Difference in output signal level of each modulator
4 Problems encountered	4.1 Insufficient cooling temperature of air-conditioning system 4.2 Hard starting characteristic of auxiliary generator 4.3 Inability of auxiliary generator to operate for longer period of time 4.4 Insufficient backup power of UPS
5 Tools, test instruments, equipment, materials and PPE	May include but not limited to: Tools, test instrument and equipment: 5.1 set of screw drivers 5.2 electrical pliers 5.3 set of wrenches 5.4 digital VOM (rms) 5.5 safety ladder Materials: 5.6 electrical tapes 5.7 fuses 5.8 technical manuals PPE: 5.9 safety belt 5.10 rubber gloves 5.11 safety shoes 5.12 safety goggles 5.13 hard hat/helmet 5.14 proper working clothes

6	Measured voltages	6.1 input voltage ~ (220 V, sine wave) 6.2 output voltage ~ (60 V, quasi-square wave)
7	Activation and energization	Activation and energization procedures are as follows: 7.1 Trunk amplifiers and line extenders are powered up and input voltage are measured and recorded 7.2 DC output voltage is measured at test point of the power pack supplying the active modules of the trunk and line extender amplifiers and is recorded. 7.3 Setting and alignment of trunk and line extender amplifiers input and output signal level are performed, observing the proper signal tilt. using input pad and line equalizer are performed as needed.

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1. Complied with job requirements and safety procedures at all times during commissioning activity 1.2. Performed test-run on headend equipment and accessories prior to interconnection to the CATV outside plant system for commercial operation 1.3. Activated and energized OSP power supplies and distribution systems 1.4. Communicated and worked with relevant personnel concerned
2. Underpinning knowledge and attitude	2.1 Safety Practices 2.1.1 Work safety requirements 2.1.2 Proper use of tools and equipment 2.2 Materials, Tools and Equipment: 2.2.1 Uses and Specifications 2.2.2 Identification of appropriate tools, equipment; and devices 2.3 Theory and Practices 2.3.1 Commissioning concepts and procedures 2.3.2 Signal level measurement and adjustment 2.3.3 CATV system standard parameters 2.3.4 CATV Headend equipment operation 2.3.4.1 signal processors 2.3.4.2 system converters 2.3.4.3 modulators 2.3.4.4 signal mixer 2.3.4.5 audio equalizer 2.3.4.6 automatic voltage regulators (AVR) 2.3.4.7 antenna pre-amps (LNB/LNA and VHF/UHF pre-amps) 2.3.4.8 Cable harness 2.3.4.9 security alarm systems (optional) 2.3.5 CATV OSP System 2.3.5.1 Coaxial/fiber optic cable characteristics 2.3.5.2 active and passive devices parameters 2.3.5.3 Pole hardware 2.3.5.4 Facility grounding and bonding 2.3.5.5 System alignment and balancing 2.4 Desirable work values and attitudes (cost conscious, safety conscious, quality conscious, etc.)
3. Underpinning skills	3.1. Working efficiently and systematically 3.2. Observing safety precautions 3.3. Proper handling and use of tools, test instruments and equipment 3.4. interpreting measurement and test results 3.5. documentation skills

4. Resource implications	The following resources should be available: 4.1. Design plan 4.2. Tools, test equipment, materials and PPE 4.3. Work area 4.4. Technical data
5. Method of assessment	5.1. Direct observation/demonstration with oral questioning 5.2. Third Party Report 5.3. Portfolio
6. Context of assessment	6.1. Competency maybe assessed in the workplace or in a simulated workplace setting 6.2. Assessment shall be undertaken either individually or part of team under limited supervision

UNIT OF COMPETENCY : **OPERATE CATV SYSTEM**

UNIT CODE : MDA311302

DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to monitor, interpret/analyze, adjust and calibrate CATV system's performance in the day-to-day operation as well as monitoring and attending to subscribers/customers' complaints.

ELEMENT	PERFORMANCE CRITERIA (***Italicized Bold*** terms are elaborated in the range of variables)
1 Monitor headend site facilities	1.1 Emergency generator, antenna tower/TVRO, facility grounding, air-con systems, security system and head-end building are checked and documented. 1.2 Identified abnormal findings are documented and reported in accordance with company procedures. 1.3 Where applicable, immediate remedies are made for the problems encountered.
2 Monitor CATV system performance	2.1 Appropriate PPE are selected and used in the performance of the job. 2.2 Equipment signal-levels are monitored for normal readings based on established ***reference parameters***. 2.3 Normal and abnormal operations/readings are recorded and noted. 2.4 Where applicable, ***immediate remedies*** are made to sustain normal operation. 2.5 Action taken are logged and documented in accordance with established procedures.
3 Monitor customers' complaints	3.1 Customer complaints on technical problems are received and scheduled for implementation. 3.2 Suspected area at fault is verified and specific device is pinpointed as per customer complaint. 3.3 Where applicable, immediate remedies are made to sustain normal operation. 3.4 Job accomplishment is acknowledged and signed by each affected customer. 3.5 Action taken are logged and documented in accordance with established procedures.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Immediate remedies	May include: 1.1 Adjustment of signal levels at particular channel/s 1.2 Replacement with spare unit 1.3 Tightening loose connections, cables/cords, plugs, switches 1.4 Cleaning dirty surfaces and parts 1.5 Cutting in of emergency power 1.6 Splicing cable cuts 1.7 Replacement of corroded connectors 1.8 Replacement of slow-blow fuses 1.9 Resetting of circuit breakers
2. Reference parameters	2.1 Normal signal levels per channel (output side) 2.2 Normal output composite signal level of satellite receiver 2.3 Normal output signal levels of all VHF/UHF antenna pre-amps (broadband/narrowband) 2.4 Difference between video and audio carrier signal levels (audio carrier should be lower by 15 dB than video carrier) 2.5 Input and output signal levels of active devices 2.6 End-of-line performance 2.7 Normal supply voltages of active devices 2.8 Proof of performance (e. g., carrier-to-noise ratios, composite triple beat, hum modulation, composite second-order harmonic (CSO)) 2.9 Open-circuit voltages of standby batteries

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1. Maintained trouble-free continuous operation of CATV system and facilities 1.2. Monitored and documented technical troubles encountered 1.3. Delivered quick response/remedies for troubles encountered 1.4.
2. Underpinning knowledge and attitude	2.1 Safety Practices 2.1.1 Work safety requirements 2.1.2 Proper use of tools and equipment 2.2 Materials, Tools and Equipment: 2.2.1 Uses and Specifications 2.2.2 Identification of appropriate tools, equipment; and devices and proper usage 2.3 Theory and Practices 2.3.1 Cable TV systems overview 2.3.2 CATV system performance and monitoring 2.3.3 CATV equipment and instrumentation 2.3.4 Basic Electricity 2.3.5 Coaxial cable handling 2.3.6 TV set up 2.4 Customer service procedures 2.4.1 Handling and prioritizing service requests 2.5 Desirable work values and attitudes (cost conscious, safety conscious, quality conscious, etc.)
3. Underpinning skills	3.1. Working efficiently and systematically 3.2. Observing safety precautions 3.3. Proper handling and scheduling of customer requests and service jobs 3.4. Proper handling, use and maintenance of tools and equipment 3.5. Communicating effectively 3.6. Interpretation of plans and symbols 3.7. Documentation skills
4. Resource implications	The following resources should be available: 4.1. Access to CATV headend equipment, OSP equipment and associated devices/facilities 4.2. Test equipment 4.3. Work area 4.4. Service vehicle and traffic safety equipment
5. Method of assessment	5.1. Direct observation/demonstration with oral questioning 5.2. Written examinations 5.3. Third-Party Report 5.4. Portfolio
6. Context of assessment	6.1. Competency maybe assessed in the workplace or in a simulated workplace setting 6.2. Assessment shall be undertaken either individually or part of team under limited supervision

UNIT OF COMPETENCY : **IMPLEMENT PREVENTIVE MAINTENANCE OF CATV SYSTEM**

UNIT CODE : MDA311303

DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to perform/implement preventive maintenance of cable television headend and outside plant.

ELEMENT	PERFORMANCE CRITERIA (***Italicized Bold*** terms are elaborated in the range of variables)
1 Plan and prepare schedules for maintenance	1.1 Preventive maintenance ***checks*** are identified and documented based on established plan and procedures. 1.2 Appropriate materials, tools, test instruments and equipment are identified and selected based on job requirements. 1.3 Inventory of ***spare equipment and materials*** are identified and listed in accordance with job requirements.
2 Carry out preventive maintenance	2.1 Appropriate ***personal protective equipment*** (PPE) is used in accordance with OHS requirements. 2.2 Scheduled ***preventive maintenance activities*** are strictly followed and implemented as per plan. 2.3 Identified equipment and accessories that will cause ***potential problems*** are scheduled for repair and/or replacement. 2.4 Inventory of spare equipment and materials are maintained in accordance with established industry practices. 2.5 ***Unusual problems*** encountered are noted and referred to ***concerned personnel*** for appropriate action.
3 Prepare preventive maintenance report	3.1 Preventive maintenance log book is properly accomplished. 3.2 Inventory stock levels are recorded in the stock cards as per company policy. 3.3 Recommendations for preventive maintenance are prepared and referred to concerned personnel.

RANGE OF VARIABLES

VARIABLE	RANGE
1. preventive maintenance checks	Preventive maintenance checks may include: <u>HEADEND:</u> 1.1 Mechanical 1.1.1. air-conditioning units 1.1.2. emergency generator 1.1.3. antenna tower structures 1.1.4. building structures 1.1.5. facility grounding and bonding 1.1.6. lightning arresters 1.1.7. satellite dish structures 1.2 Electrical/Electronics 1.2.1. signal processing equipment 1.2.2. satellite receivers 1.2.3. modulators 1.2.4. systems converters 1.2.5. automatic voltage regulators (AVR) 1.2.6. antenna pre-amps, LNB/LNA and downleads 1.2.7. equipment interconnecting cables 1.2.8. electrical wirings and lightings 1.2.9. security alarm systems (optional) <u>OUTSIDE PLANT:</u> 1.1 Mechanical 1.1.1. equipment attachments 1.1.2. cable attachments 1.1.3. guying and bonding 1.1.4. connectorization 1.2 Electrical/electronics 1.2.1. power supplies 1.2.2. active and passive devices 1.2.3. grounding
2. spare equipment and materials	This may include: 2.1 Equipment 2.1.1. agile modulator 2.1.2. agile demodulator 2.1.3. satellite receiver 2.1.4. signal processor 2.1.5. super heterodyne processor 2.1.6. low-noise block down converter (LNB) 2.1.7. power divider 2.1.8. AVR 2.2 Materials 2.2.1. RG-6 coaxial cable 2.2.2. connectors 2.2.3. hardware, supplies and spare parts 2.2.4. heat shrink 2.2.5. silicon gel

3. PPE	PPE may include: 3.1 safety belt 3.2 rubber gloves 3.3 safety shoes 3.4 safety ladder 3.5 hard hat 3.6 safety goggles
4. preventive maintenance activities	Activities may include: 4.1 Pest control activities (insects, rodents, birds, termites) 4.2 Grass trimming/cutting 4.3 Tree branch trimming 4.4 Cleaning/sweeping/vacuum-cleaning of floors and equipment surfaces and air-con filters 4.5 Lubrication of satellite dish mechanism and emergency generator 4.6 Anti-corrosion on grounding facilities 4.7 Adjustments of output levels of processors, modulators, and satellite receivers 4.8 Check standby power supplies for the following: 4.8.1. Corrosion on battery terminals and power-supply housing 4.8.2. Float and charging voltage of standby power supplies 4.8.3. Open-circuit voltage of each standby battery (difference with each battery in the series should not be more than 0.5 VDC and each battery should not be less than 10.5 VDC); replace batteries if more than 0.5 VDC difference 4.8.4. Physical condition of AC capacitor [(oil leaks and deformed appearance) CAUTION: Beware of high voltages on the AC capacitor]; recommend replacement of leaky capacitors. 4.9 Signal test and voltage check of trunk amplifiers and line-extender amplifiers
5. potential problems	Potential problems may include: <u>Headend</u>: 5.1 tree branches blocking satellite signal path 5.2 corroded/rusty antenna structure 5.3 loose antenna guy wires 5.4 eroded/loose antenna foundation 5.5 warped or dirty satellite dish 5.6 bird droppings on satellite dish 5.7 bird's nest on feed-horn throat or harness 5.8 leaking roofs 5.9 flooding on floor of equipment room <u>OSP</u>: 5.10 broken lashing wire 5.11 tree branches in contact with cables 5.12 dirty equipment 5.13 corroded structures 5.14 loose antenna structure 5.15 sagging power lines and/or communication cables 5.16 loose messenger wires

6. unusual problems	Unusual problems may include: 6.1 conflict with other parties: 6.1.1. government national and local regulations 6.1.2. owner of subject vegetation that needs to be trimmed 6.1.3. installation of other utility companies affecting the CATV cable lines 6.2 accidents and unforeseen incidents 6.3 Situations arising from poor peace and order conditions 6.4 Poles that needs to be replaced or relocated
7. concerned personnel	This may include: 7.1 supervisors and/or owner of CATV facilities 7.2 town/barangay officials 7.3 homeowner association officials

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1. Complied with job requirements and safety procedures at all times during preventive maintenance implementation 1.2. Implemented and strictly followed schedule of preventive maintenance activities as per plan 1.3. Communicated and worked with relevant personnel
2. Underpinning knowledge and attitude	The candidate must be able to demonstrate knowledge on the following: 2.1 Safety Practices 2.1.1 Work safety requirements 2.1.2 Proper use of tools and equipment 2.2 Materials, Tools and Equipment: 2.2.1 Uses and Specifications 2.2.2 Identification of appropriate tools, equipment; and devices 2.3 Theory and Practices 2.3.1 Preventive maintenance concepts and procedures 2.3.2 System sweeping 2.3.3 CATV Headend technology 2.3.3.1 Signal sources 2.3.3.2 Signal processing 2.3.3.3 Signal mixing 2.3.3.4 Facility grounding 2.3.3.5 Air-conditioning system 2.3.3.6 Power sources 2.3.4 CATV Outside Plant 2.3.4.1 Distribution cables 2.3.4.2 Active devices 2.3.4.3 Passive devices 2.3.4.4 Pole hardware 2.3.4.5 Grounding and bonding 2.3.4.6 System alignment and balancing 2.4 Desirable work values and attitudes (cost conscious, safety conscious, quality conscious, etc.)
3. Underpinning skills	3.1. Working efficiently and systematically 3.2. Observing safety precautions 3.3. Proper handling, use and maintenance of tools and equipment 3.4. Analytical skills 3.5. Communicate effectively 3.6. documentation skills
4. Resource implications	The following resources should be available: 4.1. Tools, test instruments, equipment, materials and PPE 4.2. Work area 4.3. Maintenance log 4.4. Reference/Historical data (*for work area or simulated CATV system*) 4.5. Technical manuals (*optional*)
5. Method of assessment	5.1. Direct observation/demonstration with oral questioning 5.2. Third Party Report 5.3. Portfolio
6. Context of assessment	6.1. Competency maybe assessed in the workplace or in a simulated workplace setting 6.2. Assessment shall be undertaken either individually or part of team under limited supervision

UNIT OF COMPETENCY : **PERFORM CATV SYSTEM TROUBLESHOOTING AND REPAIR**

UNIT CODE : MDA311304

DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to perform corrective maintenance for CATV systems which includes scheduling of works, analyzing and identifying trouble/defect and implementing appropriate repair or correction.

ELEMENT	PERFORMANCE CRITERIA (***Italicized Bold*** terms are elaborated in the range of variables)
1 Receive and acknowledge service-request job orders	1.1 Sort out the received job orders, arrange and plan effective/efficient route to implement the required job. 1.2 Service requests are prioritized according to urgency of request and volume of complaints per service area. 1.3 ***Necessary equipment, tools and materials*** are requested from stock room in accordance with company policies and procedures.
2 Access location of problem and rectify faults	2.1 Where necessary, signal-strength measurements are made to locate trouble source. 2.2 Subject ***trouble/defect*** is analyzed, identified and appropriate ***repair or correction*** is implemented in accordance with good engineering practices. 2.3 Appropriate ***PPE*** are selected and used in the performance of the job order. 2.4 Work is completed in accordance with safety procedures for both subscriber and service personnel. 2.5 Where necessary, additional information on trouble is requested from subscriber. 2.6 Work/Repairs performed are documented and tested/verified with subscriber/s concerned and signed by both parties. 2.7 ***Unusual situations/problems*** encountered are noted and reported to concerned personnel.
3 Perform post-service procedures per company policy	3.1 At the end of the day, all accomplished job orders are summarized on the daily job accomplishment report form and submitted to technical supervisor/office manager. 3.2 Unused/pulled-out equipment and/or materials are documented and returned to the stock man for acknowledgment.

RANGE OF VARIABLES

VARIABLE	RANGE
1. Necessary equipment, tools and materials	May include but not limited to: 1.1 Field intensity meter 1.2 Digital voltmeter 1.3 TV receiver/monitor 1.4 Set of hand tools 1.4.1. long nose pliers 1.4.2. diagonal side cutter 1.4.3. screwdrivers 1.4.4. wrenches 1.5 Spare active and passive devices 1.6 Coaxial cables 1.7 Connectors 1.8 Weatherproofing materials 1.9 Spare power supply module
2. Trouble/defect	May include but is not limited to: 2.1 Poor or no reception 2.2 Cross modulation 2.3 Intermittent reception 2.4 Poor or no signal on some channels 2.5 Clear picture but no sound or vice versa 2.6 Black-and-white picture in color TV set
3. Repair/correction	3.1 Restoration of electric power to subscriber's residence 3.2 Repair/replacement of subscriber's TV receiver 3.3 Amplifier alignment 3.4 Replacement of defective equipment and materials (e. g., corroded connectors, defective tap-offs, coaxial cable, CATV system power supply, trunk/feeder amplifier)
4. PPE	4.1 safety belt 4.2 rubber gloves 4.3 safety shoes 4.4 safety ladder 4.5 hard hat 4.6 safety goggles
5. Unusual situations/ problems	Unusual problems may include: 5.1 Accidents and unforeseen incidents 5.2 Situations arising from poor peace and order conditions 5.3 Poles that needs to be replaced or rehabilitated 5.4 Fallen trees/branches 5.5 Wild fires

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1. Complied with job requirements and safety procedures at all times during corrective maintenance activity 1.2. Analyzed, identified and implemented appropriate repair and adjustment to troubles/defects accordingly 1.3. Documented work done and submitted to appropriate personnel.
2. Underpinning knowledge and attitude	The candidate must be able to demonstrate knowledge on the following: 2.1 Safety Practices 2.1.3 Work safety requirements 2.1.4 Proper use of tools and equipment 2.2 Materials, Tools and Equipment: 2.2.1 Uses and Specifications 2.2.2 Identification of appropriate tools, equipment; and devices 2.3 Theory and Practices 2.3.1 CATV system operation 2.3.2 Corrective maintenance concepts and procedures 2.3.3 Troubleshooting and repair techniques 2.3.4 Test and measurements 2.4 Desirable work values and attitudes (cost conscious, safety conscious, quality conscious, etc.)
3. Underpinning skills	3.1. Working efficiently and systematically 3.2. Observing safety precautions 3.3. Proper handling and use of tools, test instruments and equipment 3.4. Analytical skills 3.5. Communicate effectively 3.6. Documentation skills
4. Resource implications	The following resources should be available: 4.1. Spare equipment modules 4.2. Tools, test instruments, materials and PPE 4.3. Work area 4.4. Reference signal and supply voltage level
5. Method of assessment	5.1. Direct observation/demonstration with oral questioning 5.2. Third Party Report 5.3. Portfolio
6. Context of assessment	6.1. Competency maybe assessed in the workplace or in a simulated workplace setting 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: CATV Operation & Maintenance **NC Level:** NC III

Nominal Training Duration: **36** hrs – Basic Competencies
44 hrs – Common Competencies
612 hrs – Core Competencies

Course Description:

This course is designed to develop & enhance the knowledge, skills, & attitudes of a CATV Technician, in accordance with industry standards. It covers the basic & common competencies in addition to the core competencies such as commissioning consumer electronic products and systems, developing servicing system for consumer electronic products and training service technicians. The nominal duration of 176 hours covers the required units at Cable Television Operation & Maintenance NC III. TVET providers can however, offer a longer, ladderized course covering both NC II and NC III basic, common and core units.

BASIC COMPETENCIES
36 hrs

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Lead workplace communication	1.1 Communicate information about workplace processes. 1.2 Lead workplace discussions. 1.3 Identify and communicate issues arising in the workplace	• Group discussion • Role Play • Brainstorming	• Observation • Interviews
2. Lead small teams	2.1 Provide team leadership. 2.2 Assign responsibilities among members. 2.3 Set performance expectation for team members. 2.4 Supervise team performance	• Lecture • Demonstration • Self-paced (modular)	• Demonstration • Case studies

3. Develop and practice negotiation skills	3.1 Identify relevant information in planning negotiations 3.2 Participate in negotiations 3.3 Document areas for agreement	• Direct observation • Simulation/role playing • Case studies	• Written test • Practical/ performance test
4. Solve workplace problem related to work activities	4.1 Explain the analytical techniques. 4.2 Identify the problem. 4.3 Determine the possible cause/s of the problem	• Direct observation • Simulation/role playing • Case studies	• Written test • Practical/ performance test
5. Use mathematical concepts and techniques	5.1 Identify mathematical tools and techniques to solve problem 5.2 Apply mathematical procedures/solution 5.3 Analyze results	• Direct observation • Simulation/role playing • Case studies	• Written test • Practical/ performance test
6. Use relevant technologies	6.1 Identify appropriate technology 6.2 Apply relevant technology 6.3 Maintain/enhance relevant technology	• Direct observation • Simulation/role playing • Case studies	• Written test • Practical/ performance test

COMMON COMPETENCIES

44 hrs

Note: *Those who have completed the course on CATV Installation NC II or have acquired the CATV Installation NC II qualification can skip this portion on common competencies*

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 1.2 Carry out work assignments in accordance with standard operating procedures 1.3 Check completed work against standards and specifications 1.4 Document and prepare a report on deviations from specific quality standards	▪ Field trip ▪ Symposium ▪ Film showing ▪ Simulation ▪ On-the-job training	▪ Demonstration & questioning ▪ Observation & questioning ▪ Third party report

2 Use Hand Tools	2.1 Identify tasks to be undertaken and the appropriate tools to perform the task 2.2 Prepare and check the required hand tools and use them properly 2.3 Use appropriate hand tools and test equipment in accordance with safety rules and procedure 2.4 Perform basic maintenance procedures on hand tools and test equipment	▪ Lecture / Demonstration ▪ Distance learning ▪ Film Showing	▪ Written/Oral examination ▪ Practical demonstration ▪ Observation and questioning
3 Perform Mensuration and Calculation	3.1 Identify tasks to be performed and the appropriate measuring instruments required 3.2 Perform measurement and calculation tasks according to specifications and requirements 3.3 Perform basic maintenance tasks on measuring instruments according to established rules and procedure	▪ Self- paced/ modular ▪ Lecture/ Demonstration ▪ Small group discussion ▪ Distance learning	▪ Written/Oral examination ▪ Practical demonstration
4 Prepare and Interpret Technical Drawings	4.1 Identify and select the appropriate technical drawing required 4.2 Identify symbols and Interpret the technical drawing properly 4.3 Check and validate drawing requirements and prepare/make changes on electrical/electronic schematics and drawings 4.4 Explain how to record and store technical drawings, equipment and instruments properly	▪ Lecture/ demonstration ▪ Dualized training ▪ Distance learning	▪ Written /oral ▪ examinations ▪ Direct ▪ observation ▪ Project method ▪ interview

CORE COMPETENCIES

612 hrs

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1 Supervise installation of CATV systems	1.1 Plan and prepare CATV system installation 1.2 Oversee installation of CATV system 1.3 Inspect and document completion of work	• Lecture • Discussion • Demonstration • Practicum • Viewing multimedia	• Written exam • Practical exam Observation in workplace • Interviews/ questioning
2 Operate CATV System	2.1 Identify functions, uses and specifications of equipment, testing instruments, materials & tools and PPE needed for CATV system operation 2.2 Monitor signal quality and make adjustments as needed at headend 2.3 Monitor end-of-line performance of outside plant 2.4 Monitor CATV system performance 2.5 Provide quick response to subscribers' complaints	• Lecture • Discussion • Demonstration • Practicum • Viewing multimedia	• Written exam • Practical exam Observation in workplace • Interviews/ questioning
3 Implement preventive maintenance of CATV system	3.1 Identify the tools, equipment, test instruments, materials and PPE needed for maintenance. 3.2 Perform preventive maintenance procedures 3.3 Document PM activities	• Lecture • Discussion • Demonstration • Practicum • Viewing multimedia	• Written exam • Practical exam Observation in workplace • Interviews/ questioning
4 Perform CATV system troubleshooting and repair	4.1 Interpret/Analyze service requests and subscriber complaints 4.2 Locate and rectify faults at headend 4.3 Locate and rectify outside-plant faults 4.4 Document repair work done	• Lecture • Discussion • Demonstration • Practicum • Viewing multimedia	• Written exam • Practical exam Observation in workplace • Interviews/ questioning
5 Commission CATV system	5.1 Perform test run of headend equipment for each channel 5.2 Perform adjustments and alignments of headend system output 5.3 Test-run auxiliary systems 5.4 Activate OSP power supplies 5.5 Energize OSP distribution system	• Lecture • Discussion • Demonstration • Viewing multimedia	• Written exam • Practical exam Observation in workplace • Interviews/ questioning

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:

- Must have completed Cable TV Installation NCII program or equivalent
- can communicate either oral or written;
- must be physically and mentally fit to undergo training
- high school graduate or equivalent
- with basic computer skills; and

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

Recommended list of tools, equipment and materials for the training of 25 trainees for Cable TV Operation & Maintenance NC III.

TEST INSTRUMENTS/TOOLS		EQUIPMENT		MATERIALS	
Qty.	Description	Qty.	Description	Qty.	Description
units					
5 5 1 2 5 5 5 pcs. 5 pcs. 2 pcs. 5 pcs. 5 pcs. 5 pcs. 5 pcs. 5 pcs. 5 pcs.	***Test Instruments*** • Signal-level meter (SLM) • digital VOM • spectrum analyzer • power meter • TV receiver/monitor ***Tools*** • set of screw drivers • electrical pliers • set of wrenches • safety ladder • long nose plier • diagonal side cutter • cable cutter • crimping tools • cable prep tools • NT cutter	1 5 5 3 1 1 1 1 5 5 1 1 2 1 2 1 set 2 5 25 25 25 5	• agile modulator • agile demodulator • fixed modulator • signal processor • signal combiner/mixer • audio equalizer • superheterodyne processor • power divider • splitter • directional couplers • power inserter • line equalizer • AVR • Spare power supply module • Yagi antenna • TVRO system equipment • Antenna preamps PPE • safety belt • rubber gloves • safety shoes • hard hat/helmet • safety goggles		• RG-6 coaxial cable • connectors • hardwares, supplies and spare parts • heat shrink • silicon gel • electrical tapes • fuses • technical manuals • Spare active and passive devices • Coaxial cables • Weatherproofing materials

3.5 TRAINING FACILITIES

Based on class size of 25 students/trainees the space requirements for the teaching/learning and circulation areas are as follows:

TEACHING/LEARNING AREAS	SIZE IN METERS	AREA IN SQ. METERS	QTY	TOTAL AREA IN SQ. METERS
Lecture Area	5 x 8	40	1	40
Laboratoty/Simulation Area	6 x 8	48	1	48
Learning Resource Area	4 x 5	20	1	20
Wash ,Toilet & Locker Room	2 x 5	10	2	20
Total				128
Facilities / Equipment / Circulation**				37
Total Area				**165**

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

3.6 TRAINERS QUALIFICATIONS

CATV Operation and Maintenance Technician NC III
Trainer's Qualification TQ III

- Must be a holder of TESDA Cable Television Operation & Maintenance NCIII or equivalent
- Must have completed Training Methodology III (TM III) course or equivalent
- * Must have at least 5-years minimum 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 **CATV Operation & Maintenance NC III**, the candidate must demonstrate competence in all the units listed in Section 1. Successful candidates shall be awarded a **National Certificate III** signed by the TESDA Director General.

4.2 The qualification of **CATV Operation & Maintenance NC III** 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 Accumulation and submission of all COCs acquired for the relevant units of competency comprising a qualification, an individual shall be issued the corresponding National Certificate.

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

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

4.5.2. Experienced workers (wage employed or self employed)

4.6 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 - ICT (BROADCAST MEDIA) COMPETENCY MAP

CATV OPERATION AND MAINTENANCE NC III

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
Supervise installation of CATV system	**Commission CATV system**	**Operate CATV system**	**Implement preventive maintenance of CATV system**	**Perform CATV system troubleshooting and repair**

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