TRAINING REGULATIONS

CONSUMER ELECTRONICS SERVICING NC III

ELECTRONICS SECTOR

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

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ELECTRONICS SECTOR

CONSUMER ELECTRONICS SERVICING

NATIONAL CERTIFICATE LEVEL III

TRAINING REGULATIONS FOR
CONSUMER ELECTRONICS EQUIPMENT SERVICING NC III

Section 1 CONSUMER ELECTRONICS SERVICING NC III QUALIFICATIONS

The **CONSUMER ELECTRONICS SERVICING NC III** Qualification consists of competencies that a person must possess to commission consumer electronic products and systems, train service technician and develop servicing system for consumer electronic products and systems.

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

The units of competency comprising this qualification include the following:

Code	BASIC COMPETENCIES
5 00 311 1 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
ELC311203	Perform Computer Operations
ELC724202	Terminate and Connect Electrical Wiring and Electronic Circuits

Code	CORE COMPETENCIES
	All core units in NC II, plus
ELC724326	Commission consumer electronic products and systems
ELC724327	Develop servicing systems for consumer electronic products and systems
ELC724328	Train Service Technicians

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

- Consumer Electronics Products Assembly Supervisor
- Domestic Appliance Senior Technician
- Cellular Phone Senior Technician
- Audio-Video Senior Technician

SECTION 2: COMPETENCY STANDARDS

This section gives the details of the contents of the basic, common, and core units of competency required for **CONSUMER ELECTRONICS SERVICING 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.

UNIT TITLE : **PERFORM COMPUTER OPERATIONS**
UNIT CODE : **ELC311203**
UNIT DESCRIPTOR : This unit covers the knowledge, skills, (and) attitudes and values needed to perform computer operations which include inputting, accessing, producing and transferring data using the appropriate hardware and software

ELEMENT	PERFORMANCE CRITERIA ***Italicized Bold*** terms are elaborated in the Range of Variables
1. Plan and prepare for task to be undertaken	1.1. Requirements of task are determined according to job specifications 1.2. Appropriate ***hardware*** and ***software*** are selected according to task assigned and required outcome 1.3. Task is planned to ensure ***OH & S guidelines*** and procedures are followed
2. Input data into computer	2.1. Data are entered into the computer using appropriate program/application in accordance with company procedures 2.2. Accuracy of information is checked and information is saved in accordance with standard operating procedures 2.3. Inputted data are stored in ***storage media*** according to requirements 2.4. Work is performed within ***ergonomic guidelines***
3. Access information using computer	3.1. Correct program/application is selected based on job requirements 3.2. Program/application containing the information required is accessed according to company procedures 3.3. ***Desktop icons*** are correctly selected, opened and closed for navigation purposes 3.4. Keyboard techniques are carried out in line with OH & S requirements for safe use of keyboards
4. Produce/output data using computer system	4.1. Entered data are processed using appropriate software commands 4.2. Data printed out as required using computer hardware/peripheral devices in accordance with standard operating procedures 4.3. Files, data are transferred between compatible systems using computer software, hardware/ peripheral devices in accordance with standard operating procedures
5. Maintain computer equipment and systems	5.1. Systems for cleaning, minor ***maintenance*** and replacement of consumables are implemented 5.2. Procedures for ensuring security of data, including regular back-ups and virus checks are implemented in accordance with standard operating procedures 5.3. Basic file maintenance procedures are implemented in line with the standard operating procedures

RANGE OF VARIABLES

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

EVIDENCE GUIDE

1. Critical aspect of competency	Assessment requires evidence that the candidate: 1.1. Selected and used hardware components correctly and according to the task requirement 1.2. Identified and explained the functions of both hardware and software used, their general features and capabilities 1.3. Produced accurate and complete data in accordance with the requirements 1.4. Used appropriate devices and procedures to transfer files/data accurately 1.5. Maintained computer system
2. Underpinning knowledge	2.1. Basic ergonomics of keyboard and computer use 2.2. Main types of computers and basic features of different operating systems 2.3. Main parts of a computer 2.4. Storage devices and basic categories of memory 2.5. Relevant types of software 2.6. General security 2.7. Viruses 2.8. OH & S principles and responsibilities 2.9. Calculating computer capacity
3. Underpinning skills	3.1. Reading skills required to interpret work instruction 3.2. Communication skills
4. Method of assessment	4.1. The assessor may select two 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. Computer hardware with peripherals 5.2. Appropriate software
6. Context of Assessment	6.1. Assessment may be conducted in the workplace or in a simulated environment

UNIT TITLE : **TERMINATE AND CONNECT ELECTRICAL WIRING AND ELECTRONICS CIRCUIT**
UNIT CODE : **ELC724202**
UNIT DESCRIPTOR : This unit covers the knowledge, skills, attitudes and values needed to terminate and connect electrical wiring and electronic circuits

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables
1. Plan and prepare for termination/connection of electrical wiring/electronics circuits	1.1. ***Materials*** are checked according to specifications and tasks 1.2. Appropriate ***tools and equipment*** are selected according to tasks requirements 1.3. Task is planned to ensure OH & S guidelines and procedures are followed 1.4. Electrical wiring/electronic circuits are correctly prepared for connecting/termination in accordance with instructions and work site procedures
2. Terminate/connect electrical wiring/electronic circuits	2.1. Safety procedures in using tools are observed at all times and appropriate ***personal protective equipment*** are used 2.2. Work is undertaken safely in accordance with the workplace and standard procedures 2.3. Appropriate range of ***methods*** in termination/connection are used according to specifications, manufacturer's requirements and safety 2.4. Correct sequence of operation is followed according to job specifications 2.5. ***Accessories*** used are adjusted, if necessary 2.6. Confirm termination/connection undertaken successfully in accordance with job specification
3. Test termination/connections of electrical wiring/electronics circuits	3.1. Testing of all completed termination/ connections of electric wiring/electronic circuits is conducted for compliance with specifications and regulations using appropriate procedures and equipment 3.2. Wiring and circuits are checked using specified testing procedures 3.3. Unplanned events or conditions are responded to in accordance with established procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Materials	1.1 Materials included the following but not limited to: 1.1.1 Soldering lead 1.1.2 Cables 1.1.3 Wires
2. Tools and equipment	2.1 Tools for measuring, cutting, drilling, assembling/disassembling. Tool set includes the following but not limited to: 2.1.1 Pliers 2.1.2 Cutters 2.1.3 Screw drivers 2.2 Equipment 2.2.1 Soldering gun 2.2.2 Multi-tester
3. Personal protective equipment	3.1 Goggles 3.2 Gloves 3.3 Apron/overall
4. Methods	4.1 Clamping 4.2 Pin connection 4.3 Soldered joints 4.4 Plugs
5. Accessories	5.1 Accessories may include the following but not limited to: 5.1.1 Brackets 5.1.2 Clamps

EVIDENCE GUIDE

1. Critical aspect of competency	Assessment requires evidence that the candidate: 1.1. Undertook work safely and according to workplace and standard procedures 1.2. Used appropriate termination/ connection methods 1.3. Followed correct sequence in termination / connection process 1.4. Conducted testing of terminated connected electrical wiring/electronic circuits using appropriate procedures and standards
2. Underpinning knowledge	2.1. Use of tools 2.2. Use of test instruments/equipment 2.3. Electrical theory 2.4. Single phase AC principles 2.5. Wiring techniques 2.6. DC power supplies 2.7. Soldering
3. Underpinning skills	3.1. Reading skills required to interpret work instruction 3.2. Communication skills 3.3. Soldering techniques
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. Oral Questioning 4.1.3. Practical demonstration
5. Resource implication	5.1. Tools for measuring, cutting, drilling, assembling/disassembling, connecting. Tool set includes the following but not limited to: 5.1.1. Screw drivers 5.1.2. Pliers 5.1.3. Cutters
6. Context of Assessment	6.1. Assessment may be conducted in the workplace or in a simulated environment

CORE COMPETENCIES

UNIT OF COMPETENCY : **COMMISSION CONSUMER ELECTRONIC PRODUCTS AND SYSTEMS**

UNIT CODE : **ELC724326**

DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to undertake commissioning of consumer electronic product systems and associated basic circuits, components to comply with predetermined parameters and standards.

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ELEMENT	PERFORMANCE CRITERIA (***Italicized Bold*** terms are elaborated in the range of variables)
1. Plan and prepare consumer electronic products and systems for commissioning	1.1 ***Commissioning procedures*** are planned and prepared based on ***OH&S policies and procedures*** and duplicate work is appropriately sequenced in accordance with requirements 1.2 ***Appropriate personnel*** are consulted to ensure the work is coordinated effectively with others involved in the work site 1.3 Commissioning procedures are checked against requirements 1.4 Materials necessary to complete the work are obtained in accordance with ***established procedures*** and checked against requirements 1.5 Tools, equipment and testing devices needed to carry out the commissioning work are obtained in accordance with established procedures and checked for correct operation and safety 1.6 Preparatory work is checked to ensure no unnecessary damage will occurred and process complies with requirements
2 Commission consumer electronic products and system	2.1 OH&S policies and procedures are followed 2.2 Circuits are checked and isolated where necessary using specified testing procedures 2.3 Commissioning activities are performed in accordance with requirements, without damage or distortion to the surrounding environment or components 2.4 ***Unplanned events or conditions*** are responded to in accordance with established procedures 2.5 Approval is obtained from appropriate personnel in accordance with established procedures, from appropriate personnel before any contingencies are implemented 2.6 On-going checks of the quality of the work are undertaken in accordance with established procedure*s*
3 Inspect and document completion of work	3.1 Final inspections and performance checks are undertaken to ensure that the commissioning procedures of apparatus, associated circuits and components conforms to ***requirements*** 3.2 Work completion is documented and reported to personnel concerned in accordance with established procedures

RANGE OF VARIABLES

1. Commissioning procedures	May include but not limited to: 1.1 Inspection 1.2 Testing
2. OH&S policies and procedures	Arrangements of an organization or enterprise to meet their legal and ethical obligations of ensuring that the workplace is safe and without risk to health. This may include: 2.1 Hazard and risk assessment mechanisms 2.2 Implementation of safety regulations 2.3 Safety training 2.4 Safety systems incorporating, 2.4.1 Work clearance procedures 2.4.2 Isolation procedures 2.4.3 Gas and vapor 2.4.4 Monitoring/testing procedures 2.4.5 Use of protective equipment and clothing 2.5 Use of codes of practice
3. Appropriate person	Individuals with responsibilities for co-ordination, design installation, maintenance, production, or servicing activities may include: 3.1 Site managers 3.2 Project managers 3.3 Engineers and technicians 3.4 Technical experts 3.5 Line managers/supervisors 3.6 Regulatory personnel 3.7 Team leaders 3.8 Other personnel designated by an organization or enterprise
4. 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 OH&S practices 4.4 Procedures for operating safety systems, operating plant and equipment and reporting work activities 4.5 Maintenance, modification or supply of relevant schematic drawings and technical data 4.6 Arrangements for dealing with emergency situations.

5. 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
6. Requirements	Requirements may include: 6.1 Statutory regulations 6.2 Codes of practice 6.3 Job specifications 6.4 Procedures and work instructions 6.5 Quality assurance systems 6.6 Manufacturers' specifications 6.7 Maintenance manuals, schedules and specifications/ standards 6.8 Circuit/cable schedules 6.9 Design specifications 6.10 Customer/client requirements and specifications 6.11 National and State guidelines , policies and imperatives relating to the environment
7. Environmental Requirements	7.1 Proper disposal of chemicals equipment and components shall be based on existing requirements of the law and chemicals waste management 7.2 Non-biodegradable parts of materials shall be packed and labeled properly for disposal.

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Planned commissioning 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 Performed commissioning activities in line with established procedures and job requirements 1.5 Performed final inspection to ensure commissioning electrical system meet job requirements 1.6 Documented and reported completion of work to supervisor in line with established procedures 1.7 Communicated effectively with others to ensure safe and effective work operations
2. Underpinning knowledge and attitude	2.1. Blueprint diagram reading 2.2. Use of schematic diagram and interpreting schematic symbols 2.3. System and processes 2.3.1. Troubleshooting analysis 2.3.2. Fundamentals of electronics 2.3.3. Fundamentals of Computer operation 2.3.4. Fundamentals of microprocessors/microcontroller 2.3.5. Fundamentals of building wiring 2.3.6. Fundamentals of electromagnetic compatibility 2.4. Operation of different consumer electronic products and systems and accessories 2.5. Safety 2.5.1. Work safety requirements and economy of materials with durability 2.5.2. Knowledge in 5S application and observation of required timeframe 2.6. Materials, Tools and Equipment: Uses and Specifications 2.6.1. Soldering materials adhesives and insulation 2.6.2. Identification of appropriate tools, equipment and devices 2.7. Applied mathematics 2.8. Laws and regulations 2.8.1. RA 9292 2.8.2. NTC Memorandum Circulars 2.8.3. Local Ordinance 2.8.4. DTI Regulations 2.8.5. Philippine Electrical code 2.8.6. 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. Troubleshooting technique and applied solutions in repairing consumer electronic product and system 3.4. Skills in the use and maintenance of test instruments, tools and equipment 3.5. Applying work safety practices and time management 3.6. Skills in operation of basic computer software application 3.7. Interpreting schematic diagrams in relation to job requirements
4. Resource implications	Includes but not limited to: 4.1. Tools, equipment and test instruments 4.2. Working table/bench 4.3. Electronic supplies 4.4. Diagram/manuals and other repair references of consumer electronic product and systems 4.5. Personal protective equipment (PPE)
5. Method of assessment	The assessor must select at least two of the following assessment methods to objectively assess the candidate: 5.1. Direct observation of application to tasks and questions related to underpinning knowledge 5.2. Interview/ Oral questioning 5.3. Case study/ Written Report 5.4. Portfolio 5.5. Third Party Report
6. Context of assessment	6.1. Competency maybe assessed in the workplace or in a simulated workplace setting

UNIT OF COMPETENCY : **DEVELOP SERVICING SYSTEMS FOR CONSUMER ELECTRONIC PRODUCTS**

UNIT CODE : **ELC724327**

DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to develop servicing systems for consumer electronic products and associated circuits, including service schedules.

ELEMENTS	PERFORMANCE CRITERIA (***Italicized Bold*** terms are elaborated in the range of variables)
1. Plan and prepare servicing system	1.1 ***OH&S policies and procedures*** to be followed are planned and prepared, and work is sequence in accordance with ***requirements*** 1.2 ***Appropriate personnel*** are consulted to ensure the programs for servicing and maintenance are coordinated effectively with others involved in the work site 1.3 Programs to be developed for servicing and maintenance are checked against job requirements 1.4 Materials necessary to complete the work are identified and detailed in accordance with ***established procedures*** and checked against job requirements 1.5 Tools, equipment and testing instruments needed to carry out the work are identified and detailed in accordance with established procedures
2. Implement servicing system	2.1 Normal function of ***consumer electronics products*** and associated circuits are ascertained and detailed in accordance with requirements 2.2 Circuits isolation and specified testing procedures are detailed where necessary 2.3 Servicing system on a trial basis is implemented 2.4 Response to ***unplanned events or conditions*** in accordance with established procedures are detailed 2.5 Approval to implement contingencies in accordance with established procedures from appropriate personnel are detailed 2.6 Consumer electronic products and associated circuit servicing and maintenance is implemented in accordance with requirements 2.7 Identify and organize technique and approached for maintenance of servicing
3. Evaluate and document servicing system	3.1 Adjustments are made in accordance with established procedures, where necessary, to return apparatus and associated circuits to normal operating conditions 3.2 Faulty component(s) are rectified or replaced, without damage or distortion to the surrounding environment 3.3 On-going checks of the quality of the work are undertaken in accordance with established procedures 3.4 Consumer electronic products and associated circuits are tested to ensure safety of the installation 3.5 Consumer electronic products and associated circuits are serviced in accordance with established procedures

RANGE OF VARIABLES

1. OH&S policies and procedures	Arrangements of an organization or enterprise to meet the legal and ethical obligations of ensuring that the workplace is safe and without risk to health. This may include: 1.1 Hazardous and risk assessment mechanisms 1.2 Implementation of safety regulations 1.3 Safety training 1.4 Safety systems incorporating, 1.4.1 Work clearance procedures 1.4.2 Isolation procedures 1.4.3 Gas and vapor 1.4.4 Monitoring/testing procedures 1.4.5 Use of protective equipment and clothing 1.5 Use of codes of practice
2 Requirements	Requirements may include: 2.1 Statutory regulations 2.2 Codes of practice 2.3 Job specifications 2.4 Transport documentation 2.5 Standards called-up in specifications 2.6 Procedures and work instructions 2.7 Quality assurance systems 2.8 Manufacturers' specifications 2.9 Maintenance manuals, schedules and specifications/standards 2.10 Circuit/cable schedules 2.11 Design specifications 2.12 Customer/client requirements and specifications 2.13 specified underpinning knowledge (specified in units' Evidence Guides) 2.14 National and State guidelines , policies and imperatives relating to the environment
3 Appropriate personnel	Individuals with responsibilities for co-ordination, design installation, maintenance, production, or servicing activities may include: 3.1 Site managers 3.2 Project managers 3.3 Engineers and technicians 3.4 Technical experts 3.5 Line managers/supervisors 3.6 Regulatory personnel 3.7 Team leaders 3.8 Other personnel designated by an organization or enterprise

4	Established procedures	Formal arrangements of an organization, enterprise or statutory authority of how work is to be done. These may include, for example: 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 OH&S practices 4.4 Procedures for operating safety systems, operating plant and equipment and reporting work activities 4.5 Maintenance, modification or supply of relevant schematic drawings and technical data 4.6 Arrangements for dealing with emergency situations.
5	Consumer electronics products	5.1 Audio/Video products and systems 5.2 Cellular phones 5.3 Electrically controlled domestic appliances
6	Unplanned events or conditions	May include but not limited to: 6.1 Accidents/incidents 6.2 Brownout 6.3 Equipment breakdown 6.4 Force majeure e.g., earthquake, fire, typhoon

EVIDENCE GUIDE

1 Critical aspects of competency	Assessment requires evidence that the candidate: 1.1. Planned and prepared the servicing and maintenance system in accordance with OH&S policies and procedures 1.2. Checked programs to be developed for servicing and maintenance according to job requirements 1.3. Identified and detailed tools, equipment and materials needed to carry out work as specified in the user's manual and established procedures 1.4. Implemented consumer electronic products and associated circuit servicing and maintenance in accordance with requirements 1.5. Maintained records and documentation of servicing and maintenance activities 1.6. Reported quality management issues and responses in accordance with established procedures
2 Underpinning knowledge and attitude	2.1. Read blueprint diagram block diagram 2.2. Use of schematic diagram and interpreting schematic symbols and process flow 2.3. System and process 2.3.1. Fundamentals of maintaining and servicing Audio-Video products and systems 2.3.2. Fundamentals of maintaining in electronically controlled domestic appliances 2.3.3. Fundamentals of maintaining cellular phones 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. Materials soldering adhesives and insulation 2.5.2. Identification of appropriate tools, equipment and devices 2.6. Applied mathematics 2.7. Laws and regulations 2.7.1. RA 9292 2.7.2. NTC Memorandum Circulars 2.7.3. Local Ordinance 2.7.4. DTI Regulations 2.7.5. Philippine Electronics code 2.7.6. Philippine Electrical code

3	Underpinning skills	3.1. Work efficiency 3.2. Communication skills in interpreting service manual and dealing with the client 3.3. Troubleshooting techniques and applied solutions in repairing consumer electronic products and systems 3.4. Skills in the use and maintenance of test instruments, tools and equipment 3.5. Application of work safety practices and time management 3.6. Skills in operation of basic computer software application 3.7. Drawing and interpreting schematic block diagrams and flowcharts relative to work flow
4	Resource implications	Includes but not limited to: 4.1. Working table/bench 4.2. Sufficient lighting and ventilation system 4.3. Electronic supplies 4.4. Diagram/manuals and other repair references of different cellular phone models
5	Method of assessment	The assessor must select at least two of the following assessment methods to objectively assess the candidate: 5.1. Direct observation of application to tasks and questions related to underpinning knowledge 5.2. Case study/written report 5.3. Portfolio 5.4. Third Party Report
6	Context of assessment	6.1. Competency maybe assessed in the workplace or in a simulated workplace setting

UNIT OF COMPETENCY : **TRAIN SERVICE TECHNICIANS**

UNIT CODE : **ELC724328**

DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to train service technicians and apprentices.

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ELEMENTS	PERFORMANCE CRITERIA (***Italicized Bold*** terms are elaborated in the range of variables)
1. Plan and prepare training activities	1.1 Required tools, materials and equipment are prepared in the worksite. 1.2 Stage of development is determined from discussion with the service technician, observation of the service technician and/or a formal assessment being carried out 1.3 Measures are taken to ensure that the service technician understands ***OH&S requirements*** **and safe working** ***procedures*** and practices for the particular worksite and the activities to be undertaken 1.4 Preparation for particular ***training*** includes deciding which activities are to be undertaken by the service technician and the level of supervision is planned 1.5 Confirmation from the service technician is sought regarding the level of understanding of the training activity to be performed
2. Guide/mentor service technicians	2.1 Service technician is provided with clear instructions on the work to be done and the respective responsibilities associated with the work and others who are involved 2.2 Service technician is ***guided/mentored*** and stage check is made at a level appropriate to the stage of development in accordance with industry standards 2.3 Measures are taken to ensure that the service technician completes relevant documentation of the work performed in accordance with established procedures
3 Document and provide feedback	3.1 Service technician's progress is monitored in accordance with ***established procedures*** *and* ***documentation requirements*** 3.2 Work activities and assessment undertaken are documented and verified in accordance with established procedures 3.3 Assessment feedback is provided to service technician and training evaluation report is submitted to responsible person

RANGE OF VARIABLES

1 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. This may include: 1.1 Hazardous and risk assessment mechanisms 1.2 Implementation of safety regulations 1.3 Safety training 1.4 Safety systems incorporating, 1.4.1 Work clearance procedures 1.4.2 Isolation procedures 1.4.3 Gas and vapor 1.4.4 Monitoring/testing procedures 1.4.5 Use of protective equipment and clothing 1.5 Use of codes of practice
2 Training	2.1 Knowledge training 2.2 Skills training 2.3 Attitudinal & work value training
3 Measures	3.1 Coaching 3.2 Instructions 3.3 Demonstrating 3.4 Assessing
4 Established procedures	Formal arrangements of an organization, enterprise or statutory authority of how work is to be done. These may include: 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 OH&S practices 4.4 Procedures for operating safety systems, operating plant and equipment and reporting work activities 4.5 Maintenance, modification or supply of relevant schematic drawings and technical data 4.6 Arrangements for dealing with emergency situations.

5	Documentation requirements	Requirements may include: 5.1 GANTT chart 5.2 Progress chart/report 5.3 Training evaluation report 5.4 Training plan

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1. Planned and prepared the training activities 1.2. Guided/mentored the service technician 1.3. Monitored and checked the performance of the service technician 1.4. Document the performance of the service technician 1.5. Provided feedback to the service technician and training evaluation report is submitted to the responsible person
2. Underpinning knowledge and attitude	2.1. Fundamentals of maintaining and servicing audio-video products and systems 2.2. Fundamentals of maintaining and servicing cellular phones 2.3. Fundamentals of maintaining and servicing of electronically-controlled domestic appliances 2.4. Fundamentals of coaching and mentoring 2.5. Theories of adult learning 2.6. Methods of teaching
3. Underpinning skills	3.1. Communicate effectively with trainees 3.2. Applying effective techniques of coaching and mentoring 3.3. Demonstrate skills in maintaining and servicing consumer electronic products and system 3.4. Demonstrate positive work values and attitudes 3.5. Effectively deliver training in accordance to training plan 3.6. Develop training plan/lesson plan 3.7. Perform trainee evaluation
4. Resource implications	Includes but not limited to: 4.1. Writing table/bench 4.2. Personal computer
5. Method of assessment	The assessor must select at least two of the following assessment methods to objectively assess the candidate: 5.1. Direct observation of application to tasks and questions related to underpinning knowledge 5.2. Case study/written report 5.3. Portfolio 5.4. Third Party Report
6. Context of assessment	6.1. Competency maybe assessed in the workplace or in a simulated workplace setting

SECTION 3 TRAINING STANDARDS

3.1 CURRICULUM DESIGN

Course Title: Consumer Electronics Servicing **NC Level:** NC III

Nominal Training Duration: 36 hrs – Basic Competencies
60 hrs – Common Competencies
80 hrs – Core Competencies

Course Description:

This course is designed to develop & enhance the knowledge, skills, & attitudes of a Consumer Electronics 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 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	2.1 Identify appropriate technology 2.2 Apply relevant technology 2.3 Maintain/enhance relevant technology	• Direct observation • Simulation/role playing • Case studies	• Written test • Practical/ performance test

COMMON COMPETENCIES

60 hrs

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

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Apply Quality Standards	1.1 Asses quality of received materials 1.2 Assess own work 1.3 Engage in quality improvement	▪ Field trip ▪ Symposium ▪ Film showing ▪ Simulation ▪ On the job training	▪ Demonstration & questioning ▪ Observation & questioning ▪ Third party report
2. Perform Computer Operation	2.1 Plan and prepare for task to be undertaken 2.2 Input data into computer 2.3 Access information using computer 2.4 Produce output/data using computer system 2.5 Use basic functions of a web browser to locate information 2.6 Maintain computer equipment and systems	• Modular • Film showing • Computer based training (e-learning) • Project method • On the job training	• Demonstration & questioning • Observation & questioning • Third party report • Assessment of output product • Portfolio • Computer-based assessment

3. Use Hand Tools	3.1 Identify, explain and apply the use of different types of hand tools 3.2 Perform basic maintenance and proper storage of hand tools according to the standard operating procedures 3.3 Document and record the sequence of events in safe keeping hand tools.	▪ Lecture / Demonstration ▪ Distance education ▪ Film Showing	▪ Written/Oral examination ▪ Practical demonstration
4. Perform Mensurations and Calculation	4.1 Select measuring instruments; 4.2 Carry-out measurements and calculations;	▪ Self- paced/ modular ▪ Demonstration ▪ Small group discussion ▪ Distance education	▪ Written/Oral examination ▪ Practical demonstration
5. Interpret Technical Drawings And Plans	5.1 Select and interpret technical drawing 5.2 Perform freehand sketching	▪ Lecture/ demonstration ▪ Dualized ▪ Distance learning	▪ Written /oral ▪ examinations ▪ Direct ▪ observation ▪ Project method ▪ interview
6. Terminate and Connect Electrical wiring and Electronic Circuit	6.1 Terminate or join non-soldered connections 6.2 Terminate or join soldered connections	▪ Film Viewing ▪ Individualized Learning ▪ Direct Student Laboratory Experience ▪ On the Job Training ▪ Project ▪ Method	▪ Demonstration and Questioning ▪ Assessment of Output Product

CORE COMPETENCIES
80 hrs

Note: This course design covers only NC level III core units.

Unit of Competency	Learning Outcomes	Methodology	Assessment Approach
1. Commission Consumer Electronic Products and Systems	1.1 Read & interpret work instructions according to job requirements. 1.2 Identify the tools, equipment, testing devices, & materials needed for loop checking. 1.3 Identify the PPE & OHS policies & procedures required for the loop checking job. 1.4 Commission of consumer electronic products and systems in accordance to industry standards 1.5 Evaluate commissioning activity	• Lecture • Discussion • Demonstration • Viewing multimedia	• Written exam • Practical exam Observation in workplace • Interviews/ questioning
2. Develop Servicing System for Consumer Electronic Products	2.1 Identify the tools, equipment, testing devices, & materials and facilities needed for maintenance repair. 2.2 Identify the PPE & OHS policies & procedures required for the maintenance & repair job. 2.3 Identify organized maintenance and servicing procedures 2.4 Evaluate work activity according to the procedures	• Lecture • Discussion • Demonstration • Viewing multimedia	• Written exam • Practical exam • Observation in workplace • Interviews/ questioning
3. Train Service Technician	3.1 Develop training plan in accordance to workplace requirement 3.2 Conduct training of service technicians 3.3 Evaluate progress of training in accordance to plan		

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 Consumer Electronics Servicing NCII program or equivalent
- Must have interest and potential in handling supervisory functions

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 Consumer Electronics Servicing NC III.

TOOLS		EQUIPMENT		MATERIALS	
Qty.	Description	Qty.	Description	Qty.	Description
		1 pc	LCD Projector	10 pcs	Whiteboard marker, red
		1 pc	Large projection screen	10 pcs	Whiteboard marker, black
		25 set	Writing table and chair	10 pcs	Whiteboard marker, blue
		1 pc	Laptop computer	5 pcs	Whiteboard eraser
		1 set	Audio video system	25 pcs	Flow chat template

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
Learning Resource Area	4 x 5	20	1	20
Wash ,Toilet & Locker Room	2 x 5	10	2	20
Total				80
Facilities / Equipment / Circulation**				30
Total Area				**110**

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

3.6 TRAINERS QUALIFICATIONS

Consumer Electronics Technician NC III
Trainer's Qualification TQ III

- Must be a holder of TESDA Consumer Electronics Servicing NCIV or equivalent
- Must have completed Training Methodology III (TM III) course or equivalent
- * Must have at least 2-years relevant industry experience.
- Must be physically & mentally fit.

* Optional: Only when required by the hiring institution.

3.7 INSTITUTIONAL ASSESSMENT

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

SECTION 4. NATIONAL ASSESSMENT AND CERTIFICATION ARRANGEMENTS

4.1 To attain the National Qualification of **Consumer Electronics Servicing 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 **Consumer Electronics Servicing 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. **Equipment -** A component part of an installation used for a particular purpose. Equipment includes, but is not limited to, that contained in the following divisions. It will necessarily include new and emerging technologies:

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

    - **Appliances** including portable electric tools, motor driven pumps, vacuum cleaners, food preparation equipment, hair dryers, refrigerators, washing machines, dish washers, paper shredders, water coolers, clothes dryers, pest exterminators, electric motor driven industrial tools and equipment, sanitary disposal units, radial and tangential fans and blowers.

2. **Appliances -** A fixed (for support only), hand-held (held in hand during normal use), portable (moved whilst in operation or easily moved from one place to another while connected to the supply) or stationary (can be moved, but not easily) consuming device, other than a lamp.

3. **Competent person -** A person who has the relevant competencies described in this competency

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

5. **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.

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

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

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

9. **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.

10. **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.

11. **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.

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

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

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

15. **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.

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

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

ANNEX A - COMPETENCY MAP – CONSUMER ELECTRONICS SERVICING 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 Instrumentation and Control Devices	Calibrate Instrumentation and Control Devices	Configure Instrumentation and Control Devices	Loop Check Instrumentation and Control Devices	Maintain and Repair Instrumentation & Control Devices
Start-up Instrumentation and Control Systems	Diagnose and Troubleshoot Instrumentation and Control Systems	Install Mechatronic Devices	Configure and Adjust Mechatronic Devices	Develop Mechatronic Control Circuits and Software Application Programs
Maintain and Repair Mechatronic Systems	Commission Mechatronic Systems	Diagnose and Troubleshoot Mechatronic Systems	Service and Repair Audio Systems and Products	Service and Repair Video Systems and Products
Service and Repair Business Machines	Assemble and Disassemble Consumer Electronic Products	Maintain and Repair Electronically Controlled Domestic Appliances	Maintain and Repair Audio-Video Products and Systems	Maintain and Repair Cellular Phones
Commission Consumer Electronic Products and Systems	Develop Servicing Systems for Consumer Electronic Products	Train service technician	Manage Servicing Systems for Consumer Electronics Products and Systems	Train service technician supervisors

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