

K to 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL-LIVELIHOOD TRACK
INDUSTRIAL ARTS – ELECTRONIC PRODUCTS ASSEMBLY AND SERVICING NC II
(640 hours)

These are the specializations and their pre-requisites. These lists should be used as reference for curriculum maps.

AGRI-FISHERY ARTS

	Specialization	Number of Hours	Pre-requisite
1.	Agricultural Crops Production (NC I)	320 hours	
2.	Agricultural Crops Production (NC II) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	640 hours	
3.	Agricultural Crops Production (NC III)	640 hours	Agricultural Crops Production (NC II)
4.	Animal Health Care Management (NC III)	320 hours	Animal Production (Poultry-Chicken) (NC II) or Animal Production (Ruminants) (NC II) or Animal Production (Swine) (NC II)
5.	Animal Production (Poultry-Chicken) (NC II) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	320 hours	
6.	Animal Production (Large Ruminants) (NC II) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	320 hours	
7.	Animal Production (Swine) (NC II) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	320 hours	
8.	Aquaculture (NC II)	640 hours	
9.	Artificial Insemination (Large Ruminants) (NC II)	160 hours	Animal Production (Large Ruminants) (NC II)
10.	Artificial Insemination (Swine) (NC II)	160 hours	Animal Production (Swine) (NC II)
11.	Fish Capture (NC II)	640 hours	
12.	Fishing Gear Repair and Maintenance (NC III)	320 hours	
13.	Fish-Products Packaging (NC II)	320 hours	
14.	Fish Wharf Operation (NC I)	160 hours	
15.	Food Processing (NC II)	640 hours	
16.	Horticulture (NC III)	640 hours	Agricultural Crops Production (NC II)
17.	Landscape Installation and Maintenance (NC II)	320 hours	
18.	Organic Agriculture (NC II)	320 hours	
19.	Pest Management (NC II)	320 hours	
20.	Rice Machinery Operations (NC II)	320 hours	
21.	Rubber Processing (NC II)	320 hours	
22.	Rubber Production (NC II)	320 hours	
23.	Slaughtering Operations (Hog/Swine/Pig) (NC II)	160 hours	

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HOME ECONOMICS

	Specialization	Number of Hours	Pre-requisite
1.	Attractions and Theme Parks Operations with Ecotourism (NC II)	160 hours	
2.	Barbering (NC II)	320 hours	
3.	Bartending (NC II)	320 hours	
4.	Beauty/Nail Care (NC II)	160 hours	
5.	Bread and Pastry Production (NC II)	160 hours	
6.	Caregiving (NC II)	640 hours	
7.	Commercial Cooking (NC III)	320 hours	Cookery (NC II)
8.	Cookery (NC II)	320 hours	
9.	Dressmaking (NC II)	320 hours	
10.	Events Management Services (NC III)	320 hours	
11.	Fashion Design (Apparel) (NC III)	640 hours	Dressmaking (NC II) or Tailoring (NC II)
12.	Food and Beverage Services (NC II) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	160 hours	
13.	Front Office Services (NC II)	160 hours	
14.	Hairdressing (NC II)	320 hours	
15.	Hairdressing (NC III)	640 hours	Hairdressing (NC II)
16.	Handicraft (Basketry, Macrame) (Non-NC)	160 hours	
17.	Handicraft (Fashion Accessories, Paper Craft) (Non-NC)	160 hours	
18.	Handicraft (Needlecraft) (Non-NC)	160 hours	
19.	Handicraft (Woodcraft, Leathercraft) (Non-NC)	160 hours	
20.	Housekeeping (NC II) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	160 hours	
21.	Local Guiding Services (NC II)	160 hours	
22.	Tailoring (NC II)	320 hours	
23.	Tourism Promotion Services (NC II)	160 hours	
24.	Travel Services (NC II)	160 hours	
25.	Wellness Massage (NC II)	160 hours	

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INDUSTRIAL ARTS

	Specialization	Number of Hours	Pre-requisite
1.	Automotive Servicing (NC I) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	640 hours	
2.	Automotive Servicing (NC II)	640 hours	Automotive Servicing (NC I)
3.	Carpentry (NC II)	640 hours	
4.	Carpentry (NC III)	320 hours	Carpentry (NC II)
5.	Construction Painting (NC II)	160 hours	
6.	Domestic Refrigeration and Air-conditioning (DOMRAC) Servicing (NC II)	640 hours	
7.	Driving (NC II)	160 hours	
8.	Electrical Installation and Maintenance (NC II)	640 hours	
9.	Electric Power Distribution Line Construction (NC II)	320 hours	Electrical Installation and Maintenance (NC II)
10.	Electronic Products Assembly and Servicing (NC II) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	640 hours	
11.	Furniture Making (Finishing) (NC II)	640 hours	
12.	Instrumentation and Control Servicing (NC II)	320 hours	Electronic Products Assembly and Servicing (EPAS) (NC II)
13.	Gas Metal Arc Welding (GMAW) (NC II)	320 hours	Shielded Metal Arc Welding (SMAW) (NC II)
14.	Gas Tungsten Arc Welding (GTAW) (NC II)	320 hours	Shielded Metal Arc Welding (GMAW) (NC II)
15.	Machining (NC I)	640 hours	
16.	Machining (NC II)	640 hours	Machining (NC I)
17.	Masonry (NC II)	320 hours	
18.	Mechatronics Servicing (NC II)	320 hours	Electronic Products Assembly and Servicing (EPAS) (NC II)
19.	Motorcycle/Small Engine Servicing (NC II)	320 hours	
20.	Plumbing (NC I)	320 hours	
21.	Plumbing (NC II)	320 hours	Plumbing (NC I)
22.	Refrigeration and Air-Conditioning (Packaged Air-Conditioning Unit [PACU]/Commercial Refrigeration Equipment [CRE]) Servicing (NC III)	640 hours	Domestic Refrigeration and Air-conditioning (DOMRAC) Servicing (NC II)
23.	Shielded Metal Arc Welding (NC I)	320 hours	
24.	Shielded Metal Arc Welding (NC II)	320 hours	Shielded Metal Arc Welding (NC I)
25.	Tile Setting (NC II)	320 hours	
26.	Transmission Line Installation and Maintenance (NC II)	640 hours	Electrical Installation and Maintenance (NC II)

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INFORMATION, COMMUNICATIONS AND TECHNOLOGY (ICT)

	Specialization	Number of Hours	Pre-requisite
1.	Animation (NC II)	320 hours	
2.	Broadband Installation (Fixed Wireless Systems) (NC II)	160 hours	Computer Systems Servicing (NC II)
3.	Computer Programming (.Net Technology) (NC III) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	320 hours	
4.	Computer Programming (Java) (NC III) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	320 hours	
5.	Computer Programming (Oracle Database) (NC III) <i>updated based on TESDA Training Regulations published December 28, 2013</i>	320 hours	
6.	Computer Systems Servicing (NC II) <i>updated based on TESDA Training Regulations published December 28, 2007</i>	640 hours	
7.	Contact Center Services (NC II)	320 hours	
8.	Illustration (NC II)	320 hours	
9.	Medical Transcription (NC II)	320 hours	
10.	Technical Drafting (NC II)	320 hours	
11.	Telecom OSP and Subscriber Line Installation (Copper Cable/POTS and DSL) (NC II)	320 hours	Computer Systems Servicing (NC II)
12.	Telecom OSP Installation (Fiber Optic Cable) (NC II)	160 hours	Computer Systems Servicing (NC II)

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Course Description:

This course is designed to develop knowledge, skills, and desirable attitudes of an individual in the field of **Electronic Products Assembly and Servicing** National Certificate Level II (NCII). The student is expected to demonstrate **common competencies** in applying quality standards, perform computer operations, perform mensuration and calculation, prepare and interpret technical drawings, use and maintain hand tools, terminate and connect electrical wiring and electronic circuits, and test electronic components. It also includes the development of **core competencies** such as assembling electronic products, service consumer electronic products and systems (audio products and audio-video products), and service industrial electronic modules, products, and systems.

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<p>Introduction</p> <ol style="list-style-type: none"> 1. Basic concepts in assembling electronic products 2. Relevance of the course 3. Career opportunities 	<p>The learners demonstrate an understanding of the basic concepts and underlying theories in assembling electronic products</p>	<p>The learners shall be able to independently demonstrate the common competencies in electronic products assembly and servicing as prescribed by TESDA Training Regulations</p>	<p>The learners...</p> <ol style="list-style-type: none"> 1. Explain basic concepts in assembling electronic products 2. Discuss the relevance of the course 3. Explore career opportunities in assembling electronic products 	
PERSONAL ENTREPRENEURIAL COMPETENCIES (PECs)				
<ol style="list-style-type: none"> 1. Assessment of Personal Competencies and Skills (PECs) vis-à-vis PECs of a practicing entrepreneur/employee <ol style="list-style-type: none"> 1.1 Characteristics 1.2 Attributes 1.3 Lifestyle 1.4 Skills 1.5 Traits 2. Analysis of PECs compared to those of a practitioner 3. Align one's PECs based on the results of the assessment 	<p>The learners demonstrate an understanding of one's PECs in electronic products assembly and servicing</p>	<p>The learners shall be able to prepare an activity plan that aligns with the PECs of a practitioner/entrepreneur in electronic products assembly and servicing</p>	<p>LO 1. Recognize Personal Entrepreneurial Competencies and Skills (PECs) needed in electronic products assembly and servicing</p> <ol style="list-style-type: none"> 1.1 Compare one's PECs with those of a practitioner/entrepreneur 1.2 Align one's PECs with those of a practitioner/entrepreneur 1.3 Assess one's PECs 1.4 Assess practitioner's PECs 	<p>TLE_PECs7-12-00-1</p>

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1. Strengthening and developing further one's PECs	The learners demonstrate an understanding of one's PECs in electronic products assembly and servicing	The learners shall be able to create a plan of action that strengthens/develops one's PECs in electronic products assembly and servicing	LO 2. Develop and strengthen personal competencies and skills (PECs) needed in electronic products assembly and servicing 2.1 Identify areas for improvement, development and growth 2.2 Align one's PECs according to his/her business/career choice 2.3 Create a plan of action that ensures success of his/her business/career choice	TLE_PECs7-12-00-2
ENVIRONMENT AND MARKET (EM)				
Market (Town) 1. Key concepts of market 2. Players in the market (competitors) 1. Products & services available in the market	The learners demonstrate an understanding of the concepts of environment and market and how they relate to the field of electronic products assembly and servicing, particularly in one's town/ municipality	The learners shall be able to create a business vicinity map reflective of the potential electronic products assembly and servicing market in the locality/town	LO 1. Recognize and understand the market in electronic products assembly and servicing 1.1 Identify the players/ competitors within the town 1.2 Identify the different products/services available in the market	TLE_EM7-12-00-1
Market (customer) 1. Key concepts in identifying and understanding the consumer 2. Consumer analysis through: 2.1 Observation 2.2 Interviews 2.3 Focus group discussion (FGD) 2.4 Survey			LO 2. Recognize the potential customer/ market in electronic products assembly and servicing 2.1 Profile potential customers 2.2 Identify the customer's needs and wants through consumer analysis 2.3 Conduct consumer/market analysis	TLE_EM7-12-00-2

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1. Generating business ideas 1.1 Key concepts in generating business ideas 1.2 Knowledge, skills, passions, and interests 1.3 New applications 1.4 Irritants 1.5 Striking ideas (new concepts) 1.6 Serendipity Walk			LO 3. Create new business ideas in electronic products assembly and servicing by using various techniques 3.1 Explore ways of generating business ideas from ones' own characteristics/attributes 3.2 Generate business ideas using product innovation from irritants, trends, and emerging needs 3.3 Generate business ideas using Serendipity 3.1 Walk	TLE_EM7-12-00-3
1. Product development 2. Key concepts in developing a product 3. Finding Value 4. Innovation 1. Unique Selling Proposition (USP)	The learners demonstrate an understanding of concepts of environment and market and how they relate to electronic products assembly and servicing, particularly in one's town/municipality	The learners shall be able to create a business vicinity map reflective of the potential electronic products assembly and servicing market within the locality/town	LO 4. Develop a product/service in electronic products assembly and servicing 4.1 Identify what is of "value" to the customer 4.2 Identify the customer 4.3 Explain what makes a product unique and competitive 4.4 Apply creativity and innovative techniques to develop marketable product 4.5 Employ a USP to the product/service	TLE_EM7-12-00-4
1. Selecting business idea 2. Key concepts in selecting a business idea 2.1 Criteria 2.1 Techniques			LO 5. Select a business idea based on the criteria and techniques set 5.1 Enumerate various criteria and steps in selecting a business idea 5.2 Apply the criteria/steps in selecting a viable business idea 5.3 Determine a business idea based on the criteria/techniques set	TLE_EM7-12-00-5
1. Branding			LO 6. Develop a brand for the product 6.1 Identify the benefits of having a good brand 6.2 Enumerate recognizable brands in the town/province 6.3 Enumerate criteria for developing a brand 6.4 Generate a clear appeal	TLE_EM7-12-00-6

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COMMON COMPETENCIES				
LESSON 1: APPLYING QUALITY STANDARDS (AQS)				
<ul style="list-style-type: none"> • Standard operating procedures in <ul style="list-style-type: none"> - Work instructions - Work implementation/ completion • Work instructions <ul style="list-style-type: none"> - Work orders - Job orders • Specification of materials and components <ul style="list-style-type: none"> - Wires - Cables - Electrical tape • Components <ul style="list-style-type: none"> - Resistors - Capacitors - Integrated circuits - Diodes - Transistor • Faults <ul style="list-style-type: none"> - Factory defects - Nonconformity to specifications - Nonconformity to government standards and PEC, environmental code - Safety defects • Recording and reporting procedures <ul style="list-style-type: none"> - Parts identification - Component identification - Unit model and make 	<p>The learners demonstrate an understanding of the underlying principles in applying quality standards based on prescribed procedures and standards</p>	<p>The learners shall be able to apply quality standards based on prescribed procedures and standards</p>	<p>LO 1. Assess quality of received materials or components</p> <ul style="list-style-type: none"> 1.1 Obtain work instructions in accordance with standard operating procedures 1.2 Carry out work in accordance with standard operating procedures 1.3 Check received materials or component parts against workplace standards and specifications 1.4 Isolate faults and faulty materials 1.5 Record and/or report faults and faulty materials to the supervisor concerned in accordance with workplace procedures 1.6 Replace faulty materials and components in accordance with workplace procedures 	<p>TLE_IAEPAS9-12AQS-Ia-1</p>

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<ul style="list-style-type: none"> • Related documents <ul style="list-style-type: none"> - Service manuals - Operations Manual - Certifications - Type approval certificates • Quality standards on: <ul style="list-style-type: none"> - Materials - Component parts - Final product - Product production • Checking process <ul style="list-style-type: none"> - Quality controlling <ul style="list-style-type: none"> ➢ Visual inspection ➢ Comparison - Quality assurance • Records and documents <ul style="list-style-type: none"> - Organization work procedures - Manufacturers instruction manual - Forms 			<p>LO 2. Assess own work</p> <p>2.1 Use documentation relative to quality within the company</p> <p>2.2 Check completed work against workplace standards relevant to the task undertaken</p> <p>2.3 Isolate faulty pieces</p> <p>2.4 Record information on the quality and other indicators of production performance according to workplace procedures</p> <p>2.5 Report deviations causes from specified quality standards</p>	TLE_IAEPAS9-12AQS-Ib-2
<ul style="list-style-type: none"> • Performance monitoring system <ul style="list-style-type: none"> - Customer satisfaction - Customer feedback form - Co-workers' feedback - Supervisors rating sheet - Suppliers feedback 			<p>LO 3. Engage in quality improvement</p> <p>3.1 Participate in process improvement procedures in relation to workplace assignment</p> <p>3.2 Carry out work according to process improvement procedures</p> <p>3.3 Monitor performance of operation or quality of product or service to ensure customer satisfaction</p>	TLE_IAEPAS9-12AQS-Ic-3
LESSON 2: PERFORMING COMPUTER OPERATIONS (PCO)				
<ul style="list-style-type: none"> • Task identification <ul style="list-style-type: none"> - Planning - Preparing 	The learners demonstrate an understanding of the underlying principles of operation and maintenance of a computer based on the	The learners shall be able to perform computer operations based on the task assigned and required outcome	<p>LO 1. Plan and prepare for task to be undertaken</p> <p>1.1 Determine requirements of task in accordance with job specifications</p>	TLE_IAEPAS9-12PCO-Ic-d-4

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<ul style="list-style-type: none"> • Operational Health and Safety (OHS) guidelines and procedures • Computer hardware <ul style="list-style-type: none"> - Keyboard - Mouse - Hard drives - Monitor • Computer application software 	task assigned and required outcome		1.2 Select appropriate hardware and software in accordance with task assigned and required outcome 1.3 Plan task to ensure that the OHS guidelines and procedures are followed	
<ul style="list-style-type: none"> • Application software • Data processing • Editing and saving • Storage devices <ul style="list-style-type: none"> - CD's, CDR, CDRW, DVD - Hard disk drives local or remote/external - Flash drives • Work ergonomic 			LO 2. Input data into the computer 2.1 Enter data into the computer using appropriate program/application 2.2 Check information in accordance with standard operating procedures 2.3 Store inputted data in storage media according to requirements 2.4 Perform work within ergonomic guidelines	TLE_IAEPAS9-12PCO-Id-e-5
<ul style="list-style-type: none"> • Desktop icons <ul style="list-style-type: none"> - Directories - Files and folders - Recycle bin • Keyboard techniques <ul style="list-style-type: none"> - Proper handling - Shortcut keys • Keyboard care and maintenance 			LO 3. Access information using the computer 3.1 Select correct program/application based on job requirements 3.2 Access program/application containing the information required 3.3 Open/close desktop icons correctly for navigation purposes 3.4 Carry out keyboard techniques in line with OHS requirements for safe use of keyboards	TLE_IAEPAS9-12PCO-Ie-f-6

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<ul style="list-style-type: none"> • Computer application software • Computer peripherals <ul style="list-style-type: none"> - Printer • Storage devices 			<p>LO 4. Produce/output data using computer system</p> <p>4.1 Process entered data using appropriate software commands</p> <p>4.2 Print out data as required using computer hardware/peripheral devices</p> <p>4.3 Transfer files/data between compatible systems using computer software and hardware/peripheral devices</p>	<p>TLE_IAEPAS9-12PCO-If-7</p>
<ul style="list-style-type: none"> • Computer maintenance <ul style="list-style-type: none"> - Disk cleanup - Checking disk errors - Replacement of consumables - Dusting the external and internal part of the computer • File maintenance <ul style="list-style-type: none"> - Backing up files - Deleting unwanted files - Updating anti-virus database/using more appropriate antivirus program 			<p>LO 5. Maintain computer equipment and systems</p> <p>5.1 Undergo systems cleaning, minor maintenance, and replacement of consumables</p> <p>5.2 Implement procedures for ensuring security of data, including regular backups and virus checks</p> <p>5.3 Perform basic file maintenance procedures</p>	<p>TLE_IAEPAS9-12PCO-Ig-8</p>
LESSON 3: PERFORMING MENSURATION AND CALCULATION (PMC)				
<ul style="list-style-type: none"> • Objects <ul style="list-style-type: none"> - Cylindrical objects - Rectangular objects - Cubes - Triangular objects • Components <ul style="list-style-type: none"> - Resistor 	<p>The learners demonstrate an understanding of the underlying principles in measurements and calculations in line with job requirements</p>	<p>The learners shall be able to perform mensuration and calculation in line with job requirements</p>	<p>LO 1. Select measuring instrument</p> <p>1.1 Identify object or component to be measured</p> <p>1.2 Obtain correct specifications from relevant source</p> <p>1.3 Select measuring tools in line with job requirements</p>	<p>TLE_IAEPAS9-12PMC-Ig-h-9</p>

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<ul style="list-style-type: none"> - Capacitors - Coil - Transistors - ICs • Specifications of objects and components • Measuring instruments <ul style="list-style-type: none"> - Vernier caliper - English/Metric rule - Torque gauge - Tri-square - Protractor - Combination gauge 				
<ul style="list-style-type: none"> • Mensuration /Calculations <ul style="list-style-type: none"> - Volume - Area - Displacement - Inside diameter - Circumference - Length - Thickness - Outside diameter - Taper • Ohms Law <ul style="list-style-type: none"> - Series circuit - Parallel circuit - Combination of series and parallel circuit 			<p>LO 2. Carry out measurement and calculation</p> <p>2.1 Select appropriate measuring instrument</p> <p>2.2 Obtain accurate measurements for job</p> <p>2.3 Perform calculation needed to complete work tasks are using the four basic process of addition (+), subtraction (-), multiplication (x), and division (÷)</p> <p>2.4 Use calculation involving fractions, percentages and mixed numbers to complete workplace tasks</p> <p>2.5 Check numerical computation for accuracy</p> <p>2.6 Read instruments to the limit of accuracy</p>	<p>TLE_IAEPAS9-12PMC-Ih-j-10</p>
<ul style="list-style-type: none"> • Maintenance of measuring instruments <ul style="list-style-type: none"> - 5S - Lubrication - Cleaning - Storage 			<p>LO 3. Maintain measuring instruments</p> <p>3.1 Handle measuring instruments without damage</p> <p>3.2 Clean measuring instruments before and after using</p> <p>3.3 Undertake proper storage of instruments</p>	<p>TLE_IAEPAS9-12PMC-Ij-11</p>

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LESSON 4: PREPARING AND INTERPRETING TECHNICAL DRAWINGS (PITD)				
<ul style="list-style-type: none"> • Technical drawings <ul style="list-style-type: none"> - Schematic diagrams - Charts - Block diagrams - Layout plans - Location plans - Process and instrumentation diagrams - Loop diagrams • Electronics components and symbols identification <ul style="list-style-type: none"> - Type of component 	<p>The learners demonstrate an understanding of the concepts in interpreting simple technical drawings and electronics diagram according to job requirements and company procedures</p>	<p>The learners shall be able to prepare and interpret technical drawings according to job requirements and company procedures</p>	<p>LO 1. Identify different kinds of technical drawings</p> <p>1.1 Select appropriate technical drawing according to job requirements</p> <p>1.2 Segregate technical drawings in accordance with the types and kinds of drawings</p>	<p>TLE_IAEPAS9-12PITD-IIa-12</p>
<ul style="list-style-type: none"> • Electronic components • Measurements and dimensions of a given object • Electronic components and symbol <ul style="list-style-type: none"> - NEC- National Electric Code - IEC -International Electrotechnical Commission - ASME - American Society of Mechanical Engineers - IEEE - Institute of Electrical and Electronics Engineers - ISA - Instrumentation System and Automation Society • Job requirements • Drawing instruments/ equipment <ul style="list-style-type: none"> - Components/dividers - Drawing boards - Rulers - T-square - Calculator 			<p>LO 2. Interpret technical drawing</p> <p>2.1 Recognize components, assemblies, or objects</p> <p>2.2 Correctly identify the dimensions of the key features of the objects depicted in the drawing</p> <p>2.3 Interpret the symbols used in the drawing</p> <p>2.4 Validate the drawing against job requirements or equipment</p>	<p>TLE_IAEPAS9-12PITD-IIb-c-13</p>

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Electrical/electronic diagrams <ul style="list-style-type: none"> - Schematic - Block - Location plan - Layout plans - System control diagrams - Process and instrumentation diagram • Equipment <ul style="list-style-type: none"> - Components/dividers - Drawing boards - Rulers - T-square - Calculator 			LO 3. Prepare/make changes to electrical/ electronic schematics and drawings 3.1 Identify electrical/electronic schematic symbols correctly 3.2 Use equipment according to job requirements in drawing electrical/ electronic schematic correctly	TLE_IAEPAS9-12PITD-IIc-d-14
<ul style="list-style-type: none"> • Care and maintenance <ul style="list-style-type: none"> - 5S • Inventory and recording procedures <ul style="list-style-type: none"> - Classifying - Tagging - Recording • Proper storage 			LO 4. Store technical drawings and equipment /instruments 4.1 Undertake care and maintenance of drawings in accordance with company procedures 4.2 Prepare inventory of technical drawings in accordance with company procedures 4.3 Undertake proper storage of instruments in accordance with company procedures	TLE_IAEPAS9-12PITD-IIe-15
LESSON 5: USING AND MAINTAINING HAND TOOLS (UMHT)				
<ul style="list-style-type: none"> • Planning for task • Selection of tools for task • Hand tools for <ul style="list-style-type: none"> - Adjusting - Dismantling - Assembling - Finishing - Cutting 	The learners demonstrate an understanding of the underlying principles in the use and maintenance of electronic hand tools based on standard company procedures	The learners shall be able to use and maintain hand tools based on standard company procedures	LO 1. Plan for tasks to be undertaken 1.1 Identify tasks to be undertaken properly 1.2 Choose appropriate hand tools according to task requirements	TLE_IAEPAS9-12UMHT-IIf-16
<ul style="list-style-type: none"> • Inspection of hand tools • Hand tools; set of: <ul style="list-style-type: none"> - Screwdrivers - Pliers - Wrenches - Files 			LO 2. Prepare hand tools 2.1 Check appropriate hand tools for proper operation and safety 2.2 Mark unsafe or faulty tools for repair in accordance with standard company procedure	TLE_IAEPAS9-12UMHT-IIg-17

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> - Hand drills - Hacksaw - Tin snips • Standard company procedure for unsafe and faulty tools <ul style="list-style-type: none"> - Identifying - Marking - Repairing 				
<ul style="list-style-type: none"> • Proper use of tools for a job/task • Safety in using tools • Personal Protective Equipment (PPE) for <ul style="list-style-type: none"> - Hands - Face - Body • Reporting unusual events 			<p>LO 3 Use appropriate hand tools and equipment</p> <ul style="list-style-type: none"> 3.1 Use tools according to the tasks to be undertaken 3.2 Observe safety procedures in using tools at all times and use appropriate PPE 3.3 Report malfunctions, unplanned or unusual events to the supervisor 	<p>TLE_IAEPAS9-12UMHT-IIh-i-18</p>
<ul style="list-style-type: none"> • Maintain hand tools <ul style="list-style-type: none"> - Cleaning - Lubricating - Tightening - Tools repairs - Adjusting using correct procedures - Sharpening • Proper storage of tools • Maintenance schedule 			<p>LO 4. Maintain hand tools</p> <ul style="list-style-type: none"> 4.1 Handle tools without damage according to procedures 4.2 Undergo routine maintenance of tools according to standard operational procedures, principles and techniques 4.3 Store tools safely in appropriate locations in accordance with manufacturer’s specifications 	<p>TLE_IAEPAS9-12UMHT-IIIj-19</p>
LESSON 6: TERMINATING AND CONNECTING ELECTRICAL WIRING AND ELECTRONIC CIRCUITS (TCEC)				
<ul style="list-style-type: none"> • Material specification <ul style="list-style-type: none"> - Assorted wires and cables • Task requirements <ul style="list-style-type: none"> - Splicing - Jointing - Soldering • Tools and equipment <ul style="list-style-type: none"> - Pliers 	<p>The learners demonstrate an understanding of the underlying principles in terminating and connecting electrical wiring and electronic circuits based on standards and work site procedures</p>	<p>The learners shall be able to terminate and connect electrical wiring and electronic circuit based on standards and work site procedures</p>	<p>LO 1. Plan and prepare for termination/connection of electrical wiring/electronics circuits</p> <ul style="list-style-type: none"> 1.1 Check materials in accordance with specifications and tasks 1.2 Select appropriate tools and equipment in accordance with tasks requirements 	<p>TLE_IAEPAS9-12TCEC-IIIa-20</p>

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> - Cutters - Screw driver - Soldering gun - Multitester • OHS guidelines and procedures • Electrical wiring diagram • Electronics kit 			1.3 Plan task to ensure that OHS guidelines and procedures are followed 1.4 Prepare electrical wiring/electronic circuits correctly prepared for connecting/ termination in accordance with instructions and work site procedures	
<ul style="list-style-type: none"> • Safety in handling tools • PPE • Workplace safety • Methods of terminating/connecting electrical wiring/electronic circuit as per specification and manufacturer’s requirements <ul style="list-style-type: none"> - Clamping - Pin connection - Soldered joints - Plugs • Sequencing of operation • Proper settings and adjustments of accessories • Reporting 			LO 2. Terminate/connect electrical wiring/electronic circuits 2.1 Observe safety procedures in using tools and use personal protective equipment 2.2 Undertake work safely in accordance with the workplace and standard procedures 2.3 Use appropriate range of methods in termination/connection in accordance with specifications, manufacturer’s requirements and safety 2.4 Follow sequence of operation correctly according to job specifications 2.5 Adjust accessories used, if necessary 2.6 Confirm termination/connection undertaken successfully in accordance with job specification	TLE_IAEPAS9-12TCEC-IIIb-c-21
<ul style="list-style-type: none"> • Testing procedure of electrical wiring/ electronic <ul style="list-style-type: none"> - Multitester • Safety precautions in terminating/connecting electrical wiring/ electronic circuit <ul style="list-style-type: none"> - PPE 			LO 3. Test termination/connections of electrical wiring/electronic circuits 3.1 Conduct testing of all completed termination/connections of electric wiring/electronic circuits in compliance with specifications and regulations using appropriate procedures and equipment 3.2 Check wiring and circuits using specified testing procedures 3.3 Respond to unplanned events or conditions in accordance with established procedures	TLE_IAEPAS9-12TCEC-IIId-e-22

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
LESSON 7: TESTING ELECTRONIC COMPONENTS (TEC)				
<ul style="list-style-type: none"> • Work instructions <ul style="list-style-type: none"> - Job order - Work order • Person in charge <ul style="list-style-type: none"> - Supervisor - Manager - Instructor • Criteria for testing components <ul style="list-style-type: none"> - controls - functionality, including flow - interoperability - performance - reliability 	<p>The learners demonstrate an understanding of the underlying principles in testing electronic components based on manufacturer’s specifications and testing criteria</p>	<p>The learners shall be able to test electronic components based on manufacturer’s specifications and testing criteria</p>	<p>LO 1. Determine criteria for testing electronics components</p> <ul style="list-style-type: none"> 1.1 Clarify work instructions based on job order or client requirements 1.2 Consult responsible person for effective and proper work coordination 1.3 Interpret datasheets/application notes based on manufacturer’s specifications 1.4 Define testing criteria to ensure that components meet technical and quality requirements 1.5 Discuss testing criteria to relevant personnel 	TLE_IAEPAS9-12TEC-IIIIf-23
<ul style="list-style-type: none"> • Methods of testing components <ul style="list-style-type: none"> - automated - inspection - platform testing - prototyping • Testing strategy <ul style="list-style-type: none"> - Passive testing - Dynamic testing - In-circuit testing 			<p>LO 2. Plan an approach for component testing</p> <ul style="list-style-type: none"> 2.1 Identify various testing methods based on the types of electronic components 2.2 Determine the characteristics and appropriateness of testing methods to be used during development and on completion 2.3 Consider testing methods in relation to appropriate testing strategy 2.4 Develop a plan for testing components at specified points during development and on completion 2.5 Check required test and measuring instruments and tools in accordance with established procedures 2.6 Establish a recording system to document testing results, including problems and faults 	TLE_IAEPAS9-12TEC-IIIIf-24

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Test and measuring instruments <ul style="list-style-type: none"> - Variable DC power supply - Digital VOM - analog VOM - dual trace triggered oscilloscope - function generator • Tools • Record system <ul style="list-style-type: none"> - description of fault - identification of code - user responses - written or verbal comments - retest result 			<p>LO 3. Test components</p> <p>3.1 Apply testing methods to ensure that the products meet creative, production, and technical requirements</p> <p>3.2 Record problems and faults detected by testing and document remedial steps taken in records system</p> <p>3.3 Resolve problems and faults detected during testing in accordance with agreed project or industry practice</p> <p>3.4 Evaluate final products against the previously determined criteria</p> <p>3.5 Document testing process and submit summarized evaluation report to relevant personnel</p>	<p>TLE_IAEPAS9-12TEC-IIIh-i-25</p>
<ul style="list-style-type: none"> • Evaluation of the testing process <ul style="list-style-type: none"> - Proper handling of components - Proper use of equipment and instruments - Proper handling of tools - OHS policies and guidelines - 5S • Documentation of testing result 			<p>LO 4. Evaluate the testing process</p> <p>4.1 Identify successful testing methods and those that led to difficulties based on industry standards</p> <p>4.2 Evaluate testing process and records system based on standard procedures</p> <p>4.3 Document test results/findings for subsequent components testing</p>	<p>TLE_IAEPAS9-12TEC-IIIj-26</p>

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
CORE COMPETENCIES				
LESSON 8: ASSEMBLING ELECTRONIC PRODUCTS (AEP)				
<ul style="list-style-type: none"> • OHS policies and procedure • Hazard and risk assessment mechanisms • Use of protective equipment and clothing • Philippine Electronics Code (PEC) • Materials, tools, and equipment uses and specifications 	The learners demonstrate an understanding of concepts and underlying principles in assembling electronic products based on task requirement and acceptable procedures and standards	The learners shall be able to assemble electronic products based task requirements and acceptable procedures and standards	LO 1. Prepare to assemble electronics product 1.1 Prepare assembly workplace in accordance with OHS policies and procedures 1.2 Follow established risk control measures for work preparation 1.3 Clarify work instructions based on job order or client requirements 1.4 Consult a responsible person for effective and proper work coordination	TLE_IAEPAS9-12AEP-IVa-27
<ul style="list-style-type: none"> • Identification of hand tools • Proper care and use of Hand tools • Preparing the assembly workplace 			1.5 Check required materials, tools, and equipment in accordance with established procedures 1.6 Obtain parts and components needed to complete the work in accordance with requirements	
<ul style="list-style-type: none"> • Electronics theory • PCB problems and solutions • PCB Manufacturing Information • PCB characteristics • Design compliance with EMI / EMC • PCB Layout and Artwork • Acceptable methods <ul style="list-style-type: none"> - Silk screen - Photo transfer • Fabrication • Blanking, cutting, punching, drilling • Laminating techniques • Plating, etching, surface finishing • Coatings 			LO 2. Prepare/make PCB modules 2.1 Verify PCB layout for conformity with the schematic diagram in accordance with the layout rules 2.2 Transfer PCB layout to copper-clad board following acceptable methods and standards 2.3 Perform visual inspection 2.4 Drill thru-hole 2.5 Clean PCB based on standards procedures 2.6 Test functionality of PCB and perform visual inspection	TLE_IAEPAS9-12AEP-IVb-c-28

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Soldering principles <ul style="list-style-type: none"> - The four key principles to producing a good joint • Soldering technology <ul style="list-style-type: none"> - Reflow soldering - Wave soldering - Hand soldering - RoHS and lead-free soldering - Nonsolder Connections (terminal block) - Cleaning - Repair and rework - Safety • Mounting of components <ul style="list-style-type: none"> - Surface mount components and devices - Thru-hole mount components and devices - Thermal and vibration theories • Soldering/desoldering procedures <ul style="list-style-type: none"> - Hot iron soldering procedures - Hot air soldering procedures 			<p>LO 3. Mount and solder electronic components</p> <p>3.1 Apply knowledge on lead and lead-free soldering characteristics and requirements in mounting and soldering process in accordance with OHS standards</p> <p>3.2 Mount and solder components in accordance with soldering principles</p> <p>3.3 Apply soldering/desoldering techniques and procedures in accordance with established standards and requirements</p> <p>3.4 Check soldered products in accordance with international standards and task specifications</p>	<p>TLE_IAEPAS9-12AEP-IVc-f-29</p>
<ul style="list-style-type: none"> • Familiarize with the product diagram • 3Rs waste management program • Rules and conventions • Philippine Electronics Code • RoHS/WEEE Directives <ul style="list-style-type: none"> - Restrictions on Hazardous Substance 			<p>LO 4. Perform Electronic Products Assembly</p> <p>4.1 Follow work instructions based on job order or client requirements</p> <p>4.2 Perform assembly procedures in accordance with OHS policies and work instructions</p> <p>4.3 Connect and/or integrate modules and accessories into the final product based on the client specifications</p> <p>4.4 Dispose excess components and materials based on WEEE directives and 3Rs waste management program</p>	<p>TLE_IAEPAS9-12AEP-IVf-i-30</p>

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> - Waste on electrical/electronic equipment • RA 9292 – ECE Law on product assembly • Assembling product 				
<ul style="list-style-type: none"> • Testing <ul style="list-style-type: none"> - Aging test - Substitution test - Mechanical testing • Environmental safety <ul style="list-style-type: none"> - Work safety requirements and economy of materials with durability - Knowledge in 5S application and observation of required time frame - Testing procedure 			<p>LO 5. Test and inspect assembled electronic products</p> <ul style="list-style-type: none"> 5.1 Subject finished products to final visual/sensory inspection and testing in accordance with quality standards, procedures, and requirements 5.2 Perform mechanical and electrical/electronic testing in accordance with quality standards, procedures, and requirements 5.3 Document work completion and inform responsible person in accordance with established procedures 5.4 Observe housekeeping procedures in accordance with 5S discipline and established procedures 	<p>TLE_IAEPAS9-12AEP-IVi-j-31</p>
LESSON 9: SERVICING CONSUMER ELECTRONIC PRODUCTS AND SYSTEMS-DOMESTIC ELECTRONIC APPLIANCES WITH ELECTRIC MOTOR (SCEP-DEAEM)				
<ul style="list-style-type: none"> • Service information <ul style="list-style-type: none"> - Job report sheets - Job order - Bill of materials - Customer index - Service flowchart - Stock and inventory record - Requisition slips (for acquisition of parts) - Supplier Index • Domestic Electronic Appliances <ul style="list-style-type: none"> - Electronic-controlled electric fan 	<p>The learners demonstrate an understanding of concepts and underlying principles in servicing consumer electronic products and systems based on clients requirements and as per standard procedure</p>	<p>The learners shall be able to service consumer electronic products and systems (products with electric motors) based on clients requirements and as per standard procedure</p>	<p>LO 1. Prepare unit, tools, and workplace for installation and service</p> <ul style="list-style-type: none"> • Conduct complete checkup of consumer electronic products and systems and verify defects against customer description • Acquire manuals and service information required for installation as per standard procedure • Verify repair/maintenance history in line with the company procedures • Set/prepare workplace for installation job in line with the client's requirements • Prepare necessary tools, test instruments, and PPE in line with job requirements 	<p>TLE_IAEPAS9-12SCEP-DEAEM-Ia-b-32</p>

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> - Electronic-controlled Washing machines - Home food Processing equipment • Service manuals of domestic electronic appliances (with electric motor) • Tools, materials, and test instruments for servicing tools <ul style="list-style-type: none"> - Variable power supply - Step-down transformer - Soldering iron/gun - Desoldering tools - Screwdriver (assorted) - Wrenches (assorted) - Allen wrench/key - Utility knife/stripper - Pliers (assorted) - High-grade magnifying glass with lamp - Flashlight - Cleaning brush - High voltage probe - Ball peen hammer • Instruments <ul style="list-style-type: none"> - Multitesters (analog/digital) - ESD-free work bench with mirror • Materials <ul style="list-style-type: none"> - Soldering lead - Hook-up wires - Assorted electronic components • Servicing Workplace • OHS and PPE • Service information 				

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Service Manuals • Pretesting Procedures • Installation Procedures • Service information <ul style="list-style-type: none"> - Job report sheets 			<p>LO 2. Install consumer electronic products and systems</p> <p>2.1 Obtain materials necessary to complete the work in accordance with job requirements</p> <p>2.2 Install consumer electronic products and systems in accordance with manufacturer’s instructions, requirements, and without damage to the surrounding place or environment</p> <p>2.3 Test devices in accordance with standard procedures</p> <p>2.4 Undertake final inspections to ensure that the installed device conforms to technical requirements</p> <p>2.5 Respond to unplanned events or conditions in accordance with established procedures</p> <p>2.6 Clean/clear work site of all debris and left safe in accordance with the company requirements</p> <p>2.7 Prepare report on installation and testing of equipment according to company’s procedures/policies</p>	<p>TLE_IAEPAS9-12SCEP-DEAEM-Ib-d-33</p>
<ul style="list-style-type: none"> • Pretesting procedure <ul style="list-style-type: none"> - Visual inspection - Interview of customer - Operate the unit • Systems defects/fault symptoms • Troubleshooting techniques <ul style="list-style-type: none"> - Sensory method <ul style="list-style-type: none"> ➤ Visual ➤ Listening to telltale sound ➤ Look out for unusual smell ➤ Touching or feeling - Component substitution - Signal injection and 			<p>LO 3. Diagnose faults and defects of consumer electronic products and systems</p> <p>3.1 Observe systematic pretesting procedure in accordance with manufacturer’s instructions</p> <p>3.2 Identify system defects/fault symptoms using appropriate tools and equipment and troubleshooting techniques in accordance with safety procedures</p> <p>3.3 Use test instruments required for the job in accordance with user manuals</p> <p>3.4 Isolate circuits using specified testing procedures</p> <p>3.5 Explain identified defects and faults to the responsible person in accordance with enterprise or company policy and procedures</p> <p>3.6 Check control settings/adjustments in</p>	<p>TLE_IAEPAS9-12SCEP-DEAEM-Ie-f-34</p>

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
tracing - Voltage and current measurements - Resistance check - Waveform analysis - Display analysis - Circuit analysis • Responsible persons - Manager - Supervisor • Service information - Customer index - Service flowchart/forms			conformity with service-manual specifications 3.7 Document results of diagnosis and testing accurately and completely within the specified time 3.8 Advise/inform customers regarding the status and serviceability of the unit according to procedures	
• PPE - Head protection - Hand protection - Body protection - Lower body protection • OHS • ESD protection procedure • Disassembling procedure • Troubleshooting Techniques - Sensory method - Component substitution - Voltage and current measurement - Resistance/ continuity measurement - Circuit analysis and isolation techniques • Soldering techniques • PPE/ OHS • 5S • Environmental Safety - WEEE - 3Rs - RoHS			LO 4. Maintain/repair consumer electronic products 4.1 Use personal protective equipment in accordance with OHS practices 4.2 Follow electro-static discharge (ESD) protection procedure in accordance with current industry standards 4.3 Replace defective parts/components with identical or recommended appropriate equivalent ratings 4.4 Solder/mount repaired or replaced parts/components in accordance with the current industry standards. 4.5 Perform control settings/adjustments in conformity with service-manual specifications 4.6 Undergo repair activity within the required timeframe 4.7 Observe care and extreme precaution in handling the unit/product as per procedures 4.8 Perform cleaning of unit in accordance with standard procedures 4.9 Dispose excess components and materials based on WEEE directives and 3Rs waste management program	TLE_IAEPAS9-12SCEP-DEAEM-If-i-35

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Reassembling procedure • Testing procedure • Service Information <ul style="list-style-type: none"> - Service flow chart - Job report sheets • Environmental requirements 			<p>LO 5. Reassemble and test repaired consumer electronic product</p> <p>5.1 Re-assemble repaired units according to procedures</p> <p>5.2 Subject reassembled units to final testing and cleaning in conformity with manufacturer's specifications</p> <p>5.3 Comply to service completion procedures and documentations based on manual</p> <p>5.4 Dispose waste materials in accordance with environmental requirements</p>	<p>TLE_IAEPAS9-12SCEP-DEAEM-Ij-36</p>
<p>LESSON 10: SERVICING CONSUMER ELECTRONIC PRODUCTS AND SYSTEMS - DOMESTIC ELECTRONIC APPLIANCES WITH HEATING COMPONENT (SCEP-DEAHC)</p>				
<ul style="list-style-type: none"> • Service information <ul style="list-style-type: none"> - Job report sheets - Job order - Bill of materials - Customer index - Service flowchart - Stock and inventory record - Requisition slips (for acquisition of parts) - Supplier index • Domestic Electronic Appliances <ul style="list-style-type: none"> - Electric oven - Rice cooker - Microwave oven • Service manuals of domestic electronic appliances (with heating elements) • Tools, materials, and test instruments for servicing tools <ul style="list-style-type: none"> - Soldering iron/gun - Desoldering tools 	<p>The learners demonstrate an understanding of concepts and underlying principles in servicing consumer electronic products and systems based on clients requirements and as per standard procedure</p>	<p>The learners shall be able to service consumer electronic products and systems (appliance with heating components) based on clients requirements and as per standard procedure</p>	<p>LO 1. Prepare unit, tools, and workplace for installation and service</p> <p>1.1 Conduct complete checkup of consumer electronic products and systems and verify defects against customer description</p> <p>1.2 Acquire manuals and service information required for installation as per standard procedure</p> <p>1.3 Verify repair/maintenance history in line with the company procedures</p> <p>1.4 Set/prepare workplace for installation job in line with the client's requirements</p> <p>1.5 Prepare necessary tools, test instruments and personal protective equipment in line with job requirements</p>	<p>TLE_IAEPAS9-12SCEP-DEAHC-IIa-b-37</p>

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> - Screwdriver (assorted) - Wrenches (assorted) - Allen wrench/key - Utility knife/stripper - Pliers (assorted) - High-grade magnifying glass with lamp - Flashlight - Cleaning brush - High voltage probe - Ball peen hammer • Instruments <ul style="list-style-type: none"> - Multitesters (analog/digital) - Test jig - ESD-free work bench with mirror • Materials <ul style="list-style-type: none"> - Soldering lead - Hook-up wires - Assorted electronic components • Proper use and care • Servicing Workplace • OHS and PPE • Service information 				
<ul style="list-style-type: none"> • Service manuals • Pretesting procedures • Installation procedures • Service information <ul style="list-style-type: none"> - Job report sheets 			<p>LO 2. Install consumer electronic products and systems</p> <p>2.1 Obtain materials necessary to complete the work are obtained in accordance with job requirements</p> <p>2.2 Install consumer electronic products and systems in accordance with manufacturer's instructions, requirements, and without damage to the surrounding place or environment</p> <p>2.3 Test devices in accordance with standard procedures</p> <p>2.4 Undertake final inspections to ensure that the</p>	<p>TLE_IAEPAS9-12SCEP-DEAHC-IIb-d-38</p>

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(640 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
			<p>installed device conforms to technical requirements</p> <p>2.5 Respond to unplanned events or conditions in accordance with established procedures</p> <p>2.6 Clean/clear work site of all debris and left safe in accordance with the company requirements</p> <p>2.7 Prepare report on installation and testing of equipment according to company's procedures/policies</p>	
<ul style="list-style-type: none"> • Pre-testing procedure <ul style="list-style-type: none"> - Visual inspection - Interview of customer - Operate the unit • Systems defects/fault symptoms • Troubleshooting techniques <ul style="list-style-type: none"> - Sensory method <ul style="list-style-type: none"> ➤ Visual ➤ Listening to telltale sound ➤ Look out for unusual smell ➤ Touching or feeling - Component substitution - Signal injection and tracing - Voltage and current measurements - Resistance check - Waveform analysis - Display analysis - Circuit analysis • Responsible persons <ul style="list-style-type: none"> - Manager - Supervisor • Service information <ul style="list-style-type: none"> - Customer index - Service flowchart/ forms 			<p>LO 3. Diagnose faults and defects of consumer electronic products and systems</p> <p>3.1 Observe systematic pretesting procedure in accordance with manufacturer's instructions</p> <p>3.2 Identify system defects/fault symptoms using appropriate tools and equipment and troubleshooting techniques in accordance with safety procedures</p> <p>3.3 Use test instruments required for the job in accordance with user manuals</p> <p>3.4 Isolate circuits using specified testing procedures</p> <p>3.5 Explain identified defects and faults to the responsible person in accordance with enterprise or company policy and procedures</p> <p>3.6 Check control settings/adjustments in conformity with service-manual specifications</p> <p>3.7 Document results of diagnosis and testing accurately and completely within the specified time</p> <p>3.8 Advise/inform customers regarding the status and serviceability of the unit according to procedures</p>	<p>TLE_IAEPAS9-12SCEP-DEAHC-IIe-j-39</p>

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Personal Protective Equipment <ul style="list-style-type: none"> - Head protection - Hand protection - Body protection - Lower body protection • OHS • ESD protection procedure • Disassembling procedure • Troubleshooting Techniques <ul style="list-style-type: none"> - Sensory method - Component substitution - Voltage and current measurement - Resistance/ continuity measurement - Circuit analysis and isolation techniques • Soldering techniques • PPE/ OHS • 5S • Environmental Safety <ul style="list-style-type: none"> - WEEE - 3Rs - RoHS 			<p>LO 4. Maintain/repair consumer electronic products</p> <p>4.1 Use personal protective equipment in accordance with Occupational Health and Safety practices.</p> <p>4.2 Follow electro-static discharge (ESD) protection procedure in accordance with current industry standards.</p> <p>4.3 Replace defective parts/components with identical or recommended appropriate equivalent ratings</p> <p>4.4 Solder/mount repaired or replaced parts/components in accordance with the current industry standards</p> <p>4.5 Perform control settings/adjustments in conformity with service-manual specifications</p> <p>4.6 Undergo repair activity within the required timeframe</p> <p>4.7 Observe care and extreme precaution in handling the unit/product as per procedures</p> <p>4.8 Perform cleaning of unit in accordance with standard procedures</p> <p>4.9 Dispose excess components and materials based on WEEE directives and 3Rs waste management program</p>	<p>TLE_IAEPAS9-12SCEP-DEAHC-IIIa-h-40</p>
<ul style="list-style-type: none"> • Reassembling procedure • Testing procedure • Service information <ul style="list-style-type: none"> - Service flow chart - Job report sheets • Environmental requirements 			<p>LO 5. Reassemble and test repaired consumer electronic product</p> <p>5.1 Reassemble repaired units according to procedures</p> <p>5.2 Subject reassembled units to final testing and cleaning in conformity with manufacturer’s specifications</p> <p>5.3 Comply to service completion procedures and documentations based on manual</p> <p>5.4 Dispose waste materials in accordance with environmental requirements</p>	<p>TLE_IAEPAS9-12SCEP-DEAHC-IIIh-j-41</p>

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
LESSON 11: SERVICING CONSUMER ELECTRONIC PRODUCTS AND SYSTEMS - DOMESTIC ELECTRONIC APPLIANCES – RECHARGEABLE AND ELECTRONIC-CONTROLLED LIGHTING UNITS (SCEP-DEARE)				
<ul style="list-style-type: none"> • Service information <ul style="list-style-type: none"> - Job report sheets - Job order - Bill of materials - Customer index - Service flowchart - Stock and inventory record - Requisition slips (for acquisition of parts) - Supplier index • Domestic electronic Appliances <ul style="list-style-type: none"> - Rechargeable lighting unit - Electronic-controlled lighting unit • Service Manuals of domestic electronic appliances (Rechargeable light, electronic-controlled lighting unit) • Tools, materials, and test instruments for servicing tools <ul style="list-style-type: none"> - Variable power supply - Step-down transformer - Soldering iron/gun - Desoldering tools - Screwdriver (assorted) - Wrenches (assorted) - Allen wrench/key - Utility knife/stripper - Pliers (assorted) - High-grade magnifying glass with lamp - Flashlight 	<p>The learners demonstrate an understanding of concepts and underlying principles in servicing consumer electronic products and systems based on clients requirements and as per standard procedure</p>	<p>The learners shall be able to service consumer electronic products and systems (rechargeable and electronic-controlled lighting units and charging system) based on clients requirements and as per standard procedure</p>	<p>LO 1. Prepare unit, tools, and workplace for installation and service</p> <ol style="list-style-type: none"> 1.1 Conduct complete checkup of consumer electronic products and systems and verify defects against customer description 1.2 Acquire manuals and service information required for installation as per standard procedure 1.3 Verify repair/maintenance history in line with the company procedures. 1.4 Set/prepare workplace for installation job in line with the client’s requirements 1.5 Prepare necessary tools, test instruments, and PPE in line with job requirements 	<p>TLE_IAEPAS9-12SCEP-DEARE-IVa-b-42</p>

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> - Cleaning brush - High voltage probe - Ball peen hammer • Instruments <ul style="list-style-type: none"> - Multitesters (analog/digital) - Test jig - ESD-free work bench with mirror • Materials <ul style="list-style-type: none"> - Soldering lead - Hook-up wires - Assorted electronic components • Proper use and care • Servicing Workplace • OHS and PPE • Service information 				
<ul style="list-style-type: none"> • Service Manuals • Waste from Electrical and Electronic Equipment (WEEE) requirements • Pretesting procedures • Installation procedures • Service information <ul style="list-style-type: none"> - Job report sheets 			<p>LO 2. Install consumer electronic products and systems</p> <ul style="list-style-type: none"> 2.1 Obtain materials necessary to complete the work are obtained in accordance with job requirements 2.2 Install consumer electronic products and systems in accordance with manufacturer’s instructions, requirements, and without damage to the surrounding place or environment 2.3 Test devices in accordance with standard procedures 2.4 Undertake final inspections to ensure that the installed device conforms to technical requirements 2.5 Respond to unplanned events or conditions in accordance with established procedures 2.6 Clean/clear work site of all debris and left safe in accordance with the company requirements 	<p>TLE_IAEPAS9-12SCEP-DEARE-IVb-f-43</p>

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(640 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Pretesting procedure <ul style="list-style-type: none"> - Visual inspection - Interview of customer - Operate the unit • Systems defects/Fault symptoms • Troubleshooting techniques <ul style="list-style-type: none"> - Sensory method <ul style="list-style-type: none"> ➤ Visual ➤ Listening to telltale sound ➤ Look out for unusual smell ➤ Touching or feeling - Component substitution - Signal injection and tracing - Voltage and current measurements - Resistance check - Waveform analysis - Display analysis - Circuit analysis • Responsible persons <ul style="list-style-type: none"> - Manager - Supervisor • Service information <ul style="list-style-type: none"> - Customer index - Service flowchart/forms 			<p>2.7 Prepare report on installation and testing of equipment according to company procedures/policies</p> <p>LO 3. Diagnose faults and defects of consumer electronic products and systems</p> <p>3.1 Observe systematic pretesting procedure in accordance with manufacturer’s instructions</p> <p>3.2 Identify system defects/fault symptoms using appropriate tools and equipment and troubleshooting techniques in accordance with safety procedures</p> <p>3.3 Use test instruments required for the job in accordance with user manuals</p> <p>3.4 Isolate circuits using specified testing procedures</p> <p>3.5 Explain identified defects and faults to the responsible person in accordance with enterprise or company policy and procedures</p> <p>3.6 Check control settings/adjustments in conformity with service-manual specifications</p> <p>3.7 Document results of diagnosis and testing accurately and completely within the specified time</p> <p>3.8 Advise/Inform customers regarding the status and serviceability of the unit according to procedures</p>	<p>TLE_IAEPAS9-12SCEP-DEARE-IVf-h-44</p>
<ul style="list-style-type: none"> • PPE <ul style="list-style-type: none"> - Head protection - Hand protection - Body protection - Lower body protection 			<p>LO 4. Maintain/repair consumer electronic products</p> <p>4.1 Use personal protective equipment in accordance with OHS practices.</p> <p>4.2 Follow electro-static discharge (ESD) protection procedure in accordance with</p>	<p>TLE_IAEPAS9-12SCEP-DEARE-IVi-j-Ia-c-45</p>

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(640 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • OHS • ESD protection procedure • Disassembling procedure • Troubleshooting Techniques <ul style="list-style-type: none"> - Sensory method - Component substitution - Voltage and current measurement - Resistance/ continuity measurement - Circuit analysis and isolation techniques • Soldering techniques • PPE/OHS • 5S • Environmental Safety <ul style="list-style-type: none"> - WEEE - 3Rs - OHS 			<p>current industry standards</p> <p>4.3 Replace defective parts/components with identical or recommended appropriate equivalent ratings</p> <p>4.4 Solder/mount repaired or replaced parts/components in accordance with the current industry standards</p> <p>4.5 Perform control settings/adjustments in conformity with service-manual specifications</p> <p>4.6 Undergo repair activity within the required timeframe</p> <p>4.7 Observe care and extreme precaution in handling the unit/product as per procedures</p> <p>4.8 Perform cleaning of unit in accordance with standard procedures</p> <p>4.9 Dispose excess components and materials based on WEEE directives and 3Rs waste management program</p>	
<ul style="list-style-type: none"> • Reassembling procedure • Testing procedure • Service information <ul style="list-style-type: none"> - Service flow chart - Job report sheets • Environmental Requirements 			<p>LO 5. Reassemble and test repaired consumer electronic product</p> <p>5.1 Reassemble repaired units according to procedures</p> <p>5.2 Subject reassembled units to final testing and cleaning in conformity with manufacturer’s specifications</p> <p>5.3 Comply to service completion procedures and documentations based on manual</p> <p>5.4 Dispose of waste materials in accordance with environmental requirements</p>	<p>TLE_IAEPAS9-12SCEP-DEARE-Id-e-46</p>
LESSON 12: SERVICING CONSUMER ELECTRONIC PRODUCTS AND SYSTEMS - DOMESTIC ELECTRONIC APPLIANCES - SECURITY AND SOLAR POWER MANAGEMENT SYSTEM (SCEP-DEASS)				
<ul style="list-style-type: none"> • Service information <ul style="list-style-type: none"> - Job report sheets - Job order - Bill of materials - Customer index 	<p>The learner demonstrates an understanding of concepts and underlying principles in servicing consumer electronic products and systems based</p>	<p>The learners shall be able to service home security equipment and solar powered management system based on client’s requirements and as per standard</p>	<p>LO 1. Prepare unit, tools, and workplace for installation and service</p> <p>1.1 Conduct complete check-up of consumer electronic products and systems and verify defects against customer description</p>	<p>TLE_IAEPAS9-12SCEP-DEASS-If-g-47</p>

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(640 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> - Service flowchart - Stock and inventory record - Requisition slips (for acquisition of parts) - Supplier Index • Domestic Electronic Appliances <ul style="list-style-type: none"> - Home security equipment <ul style="list-style-type: none"> ➢ CCTV ➢ Fire alarm system ➢ Intruder alarm - Solar powered management system • Service manuals of domestic electronic appliances (home security system, solar power system) • Tools, materials, and test instruments for servicing tools <ul style="list-style-type: none"> - Variable power supply - Step-down transformer - Soldering iron/gun - Desoldering tools - Screwdriver (assorted) - Wrenches (assorted) - Allen wrench/key - Utility knife/stripper - Pliers (assorted) - High-grade magnifying glass with lamp - Flashlight - Cleaning brush - High voltage probe - Ball peen hammer • Instruments <ul style="list-style-type: none"> - Signal generator - AF/RF 	<p>on client’s requirements and as per standard procedure</p>	<p>procedure</p>	<ul style="list-style-type: none"> 1.2 Acquire manuals and service information required for installation as per standard procedure 1.3 Verify repair/maintenance history in line with the company procedures 1.4 Set/prepare workplace for installation job in line with the client’s requirements 1.5 Prepare necessary tools, test instruments and PPE in line with job requirements 	

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(640 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> - Multitesters (analog/digital) - Test jig - ESD-free work bench with mirror - Oscilloscope • Materials <ul style="list-style-type: none"> - Soldering lead - Hook-up wires - Assorted electronic components • Proper use and care • Servicing Workplace • OHS and PPE • Service information 				
<ul style="list-style-type: none"> • Service manuals • Waste from Electrical and Electronic Equipment (WEEE) requirements • Pretesting procedures • Installation procedures • Service information <ul style="list-style-type: none"> - Job report sheets 			<p>LO 2. Install consumer electronic products and systems</p> <ul style="list-style-type: none"> 2.1 Obtain materials necessary to complete the work are obtained in accordance with job requirements 2.2 Install consumer electronic products and systems in accordance with manufacturer’s instructions, requirements, and without damage to the surrounding place or environment 2.3 Test devices in accordance with standard procedures. 2.4 Undertake final inspections to ensure that the installed device conforms to technical requirements 2.5 Respond to unplanned events or conditions in accordance with established procedures 2.6 Clean/clear work site of all debris and left safe in accordance with the company requirements 2.7 Prepare report on installation and testing of equipment according to company’s procedures/policies 	<p>TLE_IAEPAS9-12SCEP-DEASS-Ig-j-48</p>

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(640 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Pretesting procedure <ul style="list-style-type: none"> - Visual inspection - Interview of customer - Operate the unit • Systems defects/Fault symptoms • Troubleshooting techniques <ul style="list-style-type: none"> - Sensory method <ul style="list-style-type: none"> ➢ Visual ➢ Listening to telltale sound ➢ Look out for unusual smell ➢ Touching or feeling - Component substitution - Signal injection and tracing - Voltage and current measurements - Resistance check - Waveform analysis - Display analysis - Circuit analysis • Responsible persons <ul style="list-style-type: none"> - Manager - Supervisor • Service information <ul style="list-style-type: none"> - Customer index - Service flowchart/forms 			<p>LO 3. Diagnose faults and defects of consumer electronic products and systems</p> <p>3.1 Observe systematic pretesting procedure in accordance with manufacturer’s instructions</p> <p>3.2 Identify system defects/fault symptoms using appropriate tools and equipment and troubleshooting techniques in accordance with safety procedures</p> <p>3.3 Use test instruments required for the job in accordance with user manuals</p> <p>3.4 Isolate circuits using specified testing procedures</p> <p>3.5 Explain identified defects and faults to the responsible person in accordance with enterprise or company policy and procedures</p> <p>3.6 Check control settings/adjustments in conformity with service-manual specifications.</p> <p>3.7 Document results of diagnosis and testing accurately and completely within the specified time</p> <p>3.8 Advise/inform customers regarding the status and serviceability of the unit according to procedures</p>	<p>TLE_IAEPAS9-12SCEP-DEASS-IIa-c-49</p>
<ul style="list-style-type: none"> • PPE <ul style="list-style-type: none"> - Head protection - Hand protection - Body protection - Lower body protection • OHS • ESD protection procedure • Disassembling procedure • Troubleshooting Techniques 			<p>LO 4. Maintain/repair consumer electronic products</p> <p>4.1 Use personal protective equipment in accordance with OHS practices</p> <p>4.2 Follow electro-static discharge (ESD) protection procedure in accordance with current industry standards.</p> <p>4.3 Replace defective parts/components with identical or recommended appropriate</p>	<p>TLE_IAEPAS9-12SCEP-DEASS-IIId-h-50</p>

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> - Sensory method - Component substitution - Voltage and current measurement - Resistance/ continuity measurement - Circuit analysis and isolation techniques • Soldering techniques • PPE/ OHS • 5S • Environmental Safety <ul style="list-style-type: none"> - WEEE - 3Rs - RoHS 			<p>equivalent ratings</p> <p>4.4 Solder/mount repaired or replaced parts/components in accordance with the current industry standards</p> <p>4.5 Perform control settings/adjustments in conformity with service-manual specifications</p> <p>4.6 Undergo repair activity within the required timeframe</p> <p>4.7 Observe care and extreme precaution in handling the unit/product as per procedures</p> <p>4.8 Perform cleaning of unit in accordance with standard procedures</p> <p>4.9 Dispose excess components and materials based on WEEE directives and 3Rs waste management program</p>	
<ul style="list-style-type: none"> • Reassembling procedure • Testing procedure • Service Information <ul style="list-style-type: none"> - Service flow chart - Job report sheets • Environmental Requirements 			<p>LO 5. Reassemble and test repaired consumer electronic product</p> <p>5.1 Reassemble repaired units according to procedures</p> <p>5.2 Subject reassembled units to final testing and cleaning in conformity with manufacturer’s specifications</p> <p>5.3 Comply to service completion procedures and documentations based on manual</p> <p>5.4 Dispose of waste materials in accordance with environmental requirements</p>	TLE_IAEPAS9-12SCEP-DEASS-III-j-51
LESSON 13: SERVICING CONSUMER ELECTRONIC PRODUCTS AND SYSTEMS - AUDIO PRODUCTS AND SYSTEMS (SCEP-APS)				
<ul style="list-style-type: none"> • Service information <ul style="list-style-type: none"> - Job report sheets - Job Order - Bill of materials - Customer index - Service flowchart - Stock and inventory record - Requisition slips (for acquisition of parts) 	The learners demonstrate an understanding of concepts and underlying principles in servicing consumer electronic products and systems based on customer description and standard procedures	The learners shall be able to service consumer electronic products and systems (audio products and systems) based on customer description and standard procedures	<p>LO 1. Prepare unit, tools, and workplace for installation and service</p> <p>1.1 Conduct complete checkup of consumer electronic products and systems and verify defects against customer description</p> <p>1.2 Acquire manuals and service information required for installation as per standard procedure.</p> <p>1.3 Verify repair/maintenance history in line with the company procedures</p>	TLE_IAEPAS9-12SCEP-APS-IIIa-c-52

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> - Supplier index • Domestic Electronic Appliances <ul style="list-style-type: none"> - Radio receivers - Audio recorders - Electronic musical instruments/keyboard - Professional audio/public address system • Service Manuals of domestic electronic appliances (audio products) • Tools, Materials and Test Instruments for Servicing Tools <ul style="list-style-type: none"> - Variable power supply - Step-down transformer - Soldering iron/gun - Desoldering tools - Screwdriver (assorted) - Wrenches (assorted) - Allen wrench/key - Utility knife/stripper - Pliers (assorted) - High-grade magnifying glass with lamp - Flashlight - Cleaning brush - High voltage probe - Ball peen hammer • Instruments <ul style="list-style-type: none"> - Signal generator - AF/RF - Multi-testers (analog/digital) - Test jig - ESD-free work bench with mirror - Oscilloscope 			<p>1.4 Set/prepare workplace for installation job in line with the client's requirements</p> <p>1.5 Prepare necessary tools, test instruments and personal protective equipment in line with job requirements</p>	

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Materials <ul style="list-style-type: none"> - Soldering lead - Hook-up wires - Assorted electronic components • Proper use and care • Servicing Workplace • OH S and PPE • Service information 				
<ul style="list-style-type: none"> • Service Manuals • Waste from Electrical and Electronic Equipment (WEEE) requirements • Pretesting Procedures • Installation Procedures • Service information <ul style="list-style-type: none"> - Job report sheets 			<p>LO 2. Install consumer electronic products and systems</p> <p>2.1 Obtain materials necessary to complete the work are obtained in accordance with job requirements</p> <p>2.2 Install consumer electronic products and systems in accordance with manufacturer’s instructions, requirements, and without damage to the surrounding place or environment</p> <p>2.3 Test devices in accordance with standard procedures</p> <p>2.4 Undertake final inspections to ensure that the installed device conforms to technical requirements</p> <p>2.5 Respond to unplanned events or conditions in accordance with established procedures</p> <p>2.6 Clean/clear work site of all debris and left safe in accordance with the company requirements</p> <p>2.7 Prepare report on installation and testing of equipment according to company’s procedures/policies</p>	<p>TLE_IAEPAS9-12SCEP-APS-IIIc-e-53</p>
<ul style="list-style-type: none"> • Pretesting procedure <ul style="list-style-type: none"> - Visual inspection - Interview of customer - Operate the unit • Systems defects/Fault 			<p>LO 3. Diagnose faults and defects of consumer electronic products and systems</p> <p>3.1 Observe systematic pretesting procedure in accordance with manufacturer’s instructions</p> <p>3.2 Identify system defects/fault symptoms using appropriate tools and equipment and</p>	<p>TLE_IAEPAS9-12SCEP-APS-IIIf-h-54</p>

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(640 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> symptoms • Troubleshooting techniques <ul style="list-style-type: none"> - Sensory method <ul style="list-style-type: none"> ➤ Visual ➤ Listening to telltale sound ➤ Look out for unusual smell ➤ Touching or feeling - Component substitution - Signal injection and tracing - Voltage and current measurements - Resistance check - Waveform analysis - Display analysis - Circuit analysis • Responsible persons <ul style="list-style-type: none"> - Manager - Supervisor • Service information <ul style="list-style-type: none"> - Customer index - Service flowchart/ forms 			<ul style="list-style-type: none"> troubleshooting techniques in accordance with safety procedures 3.3 Use test instruments required for the job in accordance with user manuals 3.4 Isolate circuits using specified testing procedures 3.5 Explain identified defects and faults to the responsible person in accordance with enterprise or company policy and procedures 3.6 Check control settings/adjustments in conformity with service-manual specifications 3.7 Document results of diagnosis and testing accurately and completely within the specified time 3.8 Advise/inform customers regarding the status and serviceability of the unit according to procedures 	
<ul style="list-style-type: none"> • PPE <ul style="list-style-type: none"> - Head protection - Hand protection - Body protection - Lower-body protection • OHS • ESD protection procedure • Disassembling procedure • Troubleshooting Techniques <ul style="list-style-type: none"> - Sensory method - Component substitution - Voltage and current measurement - Resistance/ continuity 			<p>LO 4. Maintain/repair consumer electronic products</p> <ul style="list-style-type: none"> 4.1 Use personal protective equipment in accordance with OHS practices 4.2 Follow electro-static discharge (ESD) protection procedure in accordance with current industry standards 4.3 Replace defective parts/components with identical or recommended appropriate equivalent ratings 4.4 Solder/mount repaired or replaced parts/components in accordance with the current industry standards 4.5 Perform control settings/adjustments in 	<p>TLE_IAEPAS9-12SCEP-APS-IIIh-j-IVa-c-55</p>

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> measurement - Circuit analysis and isolation techniques • Soldering techniques • PPE/ OHS • 5S • Environmental Safety <ul style="list-style-type: none"> - WEEE - 3Rs - RoHS 			<ul style="list-style-type: none"> conformity with service-manual specifications 4.6 Undergo repair activity within the required timeframe 4.7 Observe care and extreme precaution in handling the unit/product as per procedures 4.8 Perform cleaning of unit in accordance with standard procedures 4.9 Dispose excess components and materials based on WEEE directives and 3Rs waste management program 	
<ul style="list-style-type: none"> • Reassembling procedure • Testing procedure • Service information <ul style="list-style-type: none"> - Service flow chart - Job report sheets • Environmental requirements 			<p>LO 5. Re-assemble and test repaired consumer electronic product</p> <ul style="list-style-type: none"> 5.1 Reassemble repaired units according to procedures 5.2 Subject reassembled units to final testing and cleaning in conformity with manufacturer's specifications 5.3 Comply to service completion procedures and documentations based on manual 5.4 Dispose waste materials in accordance with environmental requirements 	TLE_IAEPAS9-12SCEP-APS-IVc-e-56
LESSON14: SERVICING CONSUMER ELECTRONIC PRODUCTS AND SYSTEMS- AUDIO-VIDEO PRODUCTS AND SYSTEMS (SCEP-AVP)				
<ul style="list-style-type: none"> • Service information <ul style="list-style-type: none"> - Job Report Sheets - Job Order - Bill of materials - Customer index - Service flowchart - Stock and inventory record - Requisition slips (for acquisition of parts) - Supplier index • Domestic electronic appliances <ul style="list-style-type: none"> - Videoke system - DVD/VCD player 	The learners demonstrate an understanding of concepts and underlying principles in servicing consumer electronic products and systems based on customers description and standard procedures	The learners shall be able to service consumer electronic products and systems (audio-video products and systems) based on customers description and standard procedures	<p>LO 1. Prepare unit, tools, and workplace for installation and service</p> <ul style="list-style-type: none"> 1.1 Conduct complete checkup of consumer electronic products and systems and verify defects against customer description 1.2 Acquire manuals and service information required for installation as per standard procedure 1.3 Verify repair/maintenance history in line with the company procedures 1.4 Set/prepare workplace for installation job in line with the client's requirements 1.5 Prepare necessary tools, test instruments, and PPE in line with job requirements 	TLE_IAEPAS9-12SCEP-AVP-IVf-g-57

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> - Television - Home theater system - PC monitors • Service manuals of domestic electronic appliances (audio-video system) • Tools, materials, and test instruments for servicing tools <ul style="list-style-type: none"> - Variable power supply - Step-down transformer - Soldering iron/gun - Desoldering tools - Screwdriver (assorted) - Wrenches (assorted) - Allen wrench/key - Utility knife/stripper - Pliers (assorted) - High-grade magnifying glass with lamp - Flashlight - Cleaning brush - High voltage probe - Ball peen hammer • Instruments <ul style="list-style-type: none"> - Signal generator - AF/RF - Multi-testers (analog/digital) - Test jig - ESD-free work bench with mirror - Oscilloscope • Materials <ul style="list-style-type: none"> - Soldering lead - Hook-up wires - Assorted electronic components • Proper use and care 				

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Servicing Workplace • OHS and PPE • Service information 				
<ul style="list-style-type: none"> • Service manuals • Waste from Electrical and Electronic Equipment (WEEE) requirements • Pretesting procedures • Installation procedures • Service information <ul style="list-style-type: none"> - Job report sheets 			<p>LO 2. Install consumer electronic products and systems</p> <ul style="list-style-type: none"> 2.1 Obtain materials necessary to complete the work are obtained in accordance with job requirements 2.2 Install consumer electronic products and systems in accordance with manufacturer’s instructions, requirements, and without damage to the surrounding place or environment 2.3 Test devices in accordance with standard procedures 2.4 Undertake final inspections to ensure that the installed device conforms to technical requirements 2.5 Respond to unplanned events or conditions in accordance with established procedures 2.6 Clean/clear work site of all debris and left safe in accordance with the company requirements 2.7 Prepare report on installation and testing of equipment according to company’s procedures/policies 	<p>TLE_IAEPAS9-12SCEP-AVP-IVg-j-Ia-b-58</p>
<ul style="list-style-type: none"> • Pretesting procedure <ul style="list-style-type: none"> - Visual inspection - Interview of customer - Operate the unit • Systems defects/fault symptoms • Troubleshooting techniques <ul style="list-style-type: none"> - Sensory method <ul style="list-style-type: none"> ➢ Visual ➢ Listening to telltale sound ➢ Look out for unusual 			<p>LO 3. Diagnose faults and defects of consumer electronic products and systems</p> <ul style="list-style-type: none"> 3.1 Observe systematic pretesting procedure in accordance with manufacturer’s instructions 3.2 Identify system defects/fault symptoms using appropriate tools and equipment and troubleshooting techniques in accordance with safety procedures 3.3 Use test instruments required for the job in accordance with user manuals 3.4 Isolate circuits using specified testing procedures 	<p>TLE_IAEPAS9-12SCEP-AVP-Ib-d-59</p>

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> smell <ul style="list-style-type: none"> ➤ Touching or feeling - Component substitution - Signal injection and tracing - Voltage and current measurements - Resistance check - Waveform analysis - Display analysis - Circuit analysis • Responsible persons <ul style="list-style-type: none"> - Manager - Supervisor • Service information <ul style="list-style-type: none"> - Customer index - Service flowchart/ forms 			<ul style="list-style-type: none"> 3.5 Explain identified defects and faults to the responsible person in accordance with enterprise or company policy and procedures 3.6 Check control settings/adjustments in conformity with service-manual specifications 3.7 Document results of diagnosis and testing accurately and completely within the specified time 3.8 Advise/inform customers regarding the status and serviceability of the unit according to procedures 	
<ul style="list-style-type: none"> • PPE <ul style="list-style-type: none"> - Head protection - Hand protection - Body protection - Lower-body protection • OHS • ESD protection procedure • Disassembling procedure • Troubleshooting Techniques <ul style="list-style-type: none"> - Sensory method - Component substitution - Voltage and current measurement - Resistance/ continuity measurement - Circuit analysis and isolation techniques • Soldering techniques • PPE/ OHS • 5S • Environmental Safety 			<p>LO 4. Maintain/repair consumer electronic products</p> <ul style="list-style-type: none"> 4.1 Use personal protective equipment in accordance with OHS practices 4.2 Follow electro-static discharge (ESD) protection procedure in accordance with current industry standards 4.3 Replace defective parts/components with identical or recommended appropriate equivalent ratings 4.4 Solder/mount repaired or replaced parts/components in accordance with the current industry standards. 4.5 Perform control settings/adjustments in conformity with service-manual specifications 4.6 Undergo repair activity within the required timeframe 4.7 Observe care and extreme precaution in handling the unit/product as per procedures 4.8 Perform cleaning of unit in accordance with standard procedures 	<p>TLE_IAEPAS9-12SCEP-AVP-Ie-h-60</p>

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> - WEEE - 3Rs - RoHS 			4.9 Dispose excess components and materials based on WEEE directives and 3Rs waste management program	
<ul style="list-style-type: none"> • Reassembling procedure • Testing procedure • Service Information <ul style="list-style-type: none"> - Service flow chart - Job report sheets • Environmental Requirements 			LO 5. Reassemble and test repaired consumer electronic product 5.1 Reassemble repaired units according to procedures 5.2 Subject reassembled units to final testing and cleaning in conformity with manufacturer's specifications 5.3 Comply to service completion procedures and documentations based on manual 5.4 Dispose of waste materials in accordance with environmental requirements	TLE_IAEPAS9-12SCEP-AVP-Ih-j-61
LESSON 15: SERVICING INDUSTRIAL ELECTRONIC MODULES, PRODUCTS AND SYSTEMS - CONTROL BOARDS, MODULES, MOTOR CONTROLLERS AND DRIVES (SIEM-CMMD)				
<i>[NOTE: Only the electronics portion of the products and/or systems is covered in this lesson (3)]</i>				
<ul style="list-style-type: none"> • Industrial electronic products and systems • Industrial electronic components • Industrial electronic product <ul style="list-style-type: none"> - Control boards and modules - Motor controllers and drives • Service information • Service manuals • Materials, tools/ instruments and equipment in servicing Tools <ul style="list-style-type: none"> - Variable power supply - Step-down transformer - Soldering iron/gun - Desoldering tools - Screwdriver (assorted) - Wrenches (assorted) 	The learners demonstrate an understanding of concepts and underlying principles in servicing industrial electronics modules, products, and systems based on customers description and standard procedures	The learners shall be able to service industrial electronic modules, products, and systems (control boards, modules, motor controllers and drives) based on customers description and standard procedures	LO 1. Prepare unit, tools, and workplace for installation/ servicing 1.1 Conduct complete checkup of industrial electronic components, products and systems and verify defects against customer description 1.2 Verify repair/maintenance history in line with the company procedures 1.3 Acquire service manuals and service information required for repair/ maintenance as per standard procedure 1.4 Set/prepare workplace for repair job in line with the company requirements 1.5 Prepare necessary tools, test instruments and personal protective equipment in line with job requirements	TLE_IAEPAS9-12SIEM-CMMD-IIa-b-62

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(640 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> - Allen wrench/key - Utility knife/stripper - Pliers (assorted) - High-grade magnifying glass with lamp - Flashlight - Cleaning brush - High-voltage probe - Ball peen hammer • Instruments <ul style="list-style-type: none"> - Signal generator - AF/RF - Multitesters (analog/digital) - Test jig - ESD-free work bench with mirror - Oscilloscope • Materials <ul style="list-style-type: none"> - Soldering lead - Hook-up wires - Assorted industrial electronic components • Identification • Proper use and care • PPE • Workplace requirements 				
<ul style="list-style-type: none"> • Installation procedure of industrial electronic modules/ products/system • Testing procedure of devices for industrial electronic modules/ products/system • Quality inspection procedure for installed industrial electronic modules/ products/system • 5S • Service information 			<p>LO 2. Install industrial electronic modules/products/ systems</p> <p>2.1 Obtain materials necessary to complete the work are obtained in accordance with job requirements</p> <p>2.2 Install industrial electronic modules/products/systems in accordance with manufacturer’s instructions, requirements, and without damage to the surrounding place or environment</p> <p>2.3 Test devices in accordance with standard procedures</p>	<p>TLE_IAEPAS9-12SIEM-CMMD-IIb-e-63</p>

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> - Job report sheets - Job order - Service flow chart 			2.4 Undertake final inspections to ensure that the installed device conforms to technical requirements 2.5 Respond to unplanned events or conditions in accordance with established procedures 2.6 Clean/clear work site of all debris and left safe in accordance with the company requirements 2.7 Prepare report on installation and testing of equipment according to company's procedures/policies	
<ul style="list-style-type: none"> • Pretesting procedure <ul style="list-style-type: none"> - Visual inspection - Interview of customer - Operate the unit • Systems defects/Fault symptoms • Troubleshooting techniques <ul style="list-style-type: none"> - Sensory method - Component substitution - Voltage and current measurement - Resistance/ continuity measurement - Circuit analysis and isolation techniques • Proper handling of tools, materials, and test instruments • Service information <ul style="list-style-type: none"> - Customer index - Service flowchart/ forms 			LO 3. Diagnose faults and defects of industrial electronic modules/products/systems 3.1 Observe systematic pretesting procedure in accordance with manufacturer's instructions 3.2 Identify system defects/fault symptoms using appropriate tools and equipment and troubleshooting techniques in accordance with safety procedures 3.3 Use test instruments required for the job in accordance with user manuals. 3.4 Isolate circuits using specified testing procedures 3.5 Explain identified defects and faults to the responsible person in accordance with enterprise or company policy and procedures 3.6 Check control settings/adjustments in conformity with service-manual specifications 3.7 Document results of diagnosis and testing accurately and completely within the specified time 3.8 Advise/inform customers regarding the status and serviceability of the unit according to procedures	TLE_IAEPAS9-12SIEM-CMMD-IIe-h-64

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • ESD protection procedure • PPE/ OHS • Disassembling procedures of industrial electronic modules, products, and systems • Troubleshooting Techniques • Maintaining and repairing process of industrial electronic modules/ products/system • Soldering techniques • Proper handling of industrial electronic modules/ products/system • Accomplish service forms • 5S • Environmental safety 			<p>LO 4. Maintain/repair industrial electronic products</p> <p>4.1 Use personal protective equipment in accordance with Occupational Health and Safety practices</p> <p>4.2 Follow electro-static discharge (ESD) protection procedure in accordance with current industry standards</p> <p>4.3 Replace defective parts/components with identical or recommended appropriate equivalent ratings</p> <p>4.4 Solder/mount repaired or replaced parts/components in accordance with the current industry standards</p> <p>4.5 Perform control settings/adjustments in conformity with service-manual specifications</p> <p>4.6 Undergo repair activity within the required timeframe</p> <p>4.7 Observe care and extreme precaution in handling the unit/product as per procedures</p> <p>4.8 Clean unit in accordance with standard procedures</p> <p>4.9 Dispose excess components and materials based on WEEE directives and 3Rs waste management program</p>	<p>TLE_IAEPAS9-12SIEM-CMMD-IIh-j-IIIa-c-65</p>
<ul style="list-style-type: none"> • Reassembling procedure of industrial electronic product • Posttesting procedure of industrial electronic product • Service information <ul style="list-style-type: none"> - Service flow chart - Job report sheets • PPE • Environmental requirements 			<p>LO 5. Reassemble and test repaired industrial electronic products</p> <p>5.1 Reassemble repaired units according to procedures</p> <p>5.2 Subject reassembled units to final testing and cleaning in conformity with manufacturer’s specifications</p> <p>5.3 Comply to service completion procedures and documentations based on manual</p> <p>5.4 Dispose waste materials in accordance with environmental requirements</p>	<p>TLE_IAEPAS9-12SIEM-CMMD-IIIC-e-66</p>

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
LESSON 16: SERVICING INDUSTRIAL ELECTRONIC MODULES, PRODUCTS AND SYSTEMS - SENSORS, INPUT DEVICES, ACTUATORS, OUTPUT DEVICES, OPTO-ELECTRONICS EQUIPMENT AND DEVICES (SIEM-IOOE)				
[NOTE: Only the electronics portion of the products and/or systems is covered in this lesson (4)]				
<ul style="list-style-type: none"> • Service information <ul style="list-style-type: none"> - Job report sheets - Job order - Customer index • Industrial electronic product <ul style="list-style-type: none"> - Sensors and input devices - Actuators and output devices - Opto-electronics equipment and devices • Service manuals • Materials, tools/ instruments and equipment in servicing • Tools, materials, and test instruments for servicing • Tools <ul style="list-style-type: none"> - Variable power supply - Step-down transformer - Soldering iron/gun - Desoldering tools - Screwdriver (assorted) - Wrenches (assorted) - Allen wrench/key - Utility knife/stripper - Pliers (assorted) - High-grade magnifying glass with lamp - Flashlight - Cleaning brush - High-voltage probe - Ball peen hammer • Instruments <ul style="list-style-type: none"> - Signal generator - AF/RF 	<p>The learners demonstrate an understanding of concepts and underlying principles in servicing industrial electronics modules, products, and systems based on customer's description and standard procedures</p>	<p>The learners shall be able to must be able to service industrial electronic modules, products and systems (sensors, input devices, actuators, output devices, opto-electronics equipment and devices) based on customer's description and standard procedures</p>	<p>LO 1. Prepare unit, tools and workplace for installation/ servicing</p> <ol style="list-style-type: none"> 1.1 Conduct complete checkup of industrial electronic components, products, and systems and verify defects against customer description 1.2 Verify repair/maintenance history in line with the company procedures 1.3 Acquire service manuals and service information required for repair/ maintenance as per standard procedure 1.4 Set/prepare workplace for repair job in line with the company requirements 1.5 Prepare necessary tools, test instruments, and PPE in line with job requirements 	<p>TLE_IAEPAS9-12SIEM-IOOE-IIIIf-g-67</p>

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> - Multi-testers (analog/digital) - Test jig - ESD-free work bench with mirror - Oscilloscope • Materials <ul style="list-style-type: none"> - Soldering lead - Hook-up wires - Assorted electronic components • Proper use and care • PPE • Workplace requirements 				
<ul style="list-style-type: none"> • Installation procedure of industrial electronic modules/ products/system • Testing procedure of devices for industrial electronic modules/ products/system • Quality inspection procedure for installed industrial electronic modules/ products/system • 5S • Service information <ul style="list-style-type: none"> - Job report sheets - Job order - Service flow chart 			<p>LO 2. Install industrial electronic modules/products/ systems</p> <ul style="list-style-type: none"> 2.1 Obtain materials necessary to complete the work are obtained in accordance with job requirements 2.2 Install industrial electronic modules/products/systems in accordance with manufacturer’s instructions, requirements, and without damage to the surrounding place or environment 2.3 Test devices in accordance with standard procedures 2.4 Undertake final inspections to ensure that the installed device conforms to technical requirements 2.5 Respond to unplanned events or conditions in accordance with established procedures 2.6 Clean/clear work site of all debris and left safe in accordance with the company requirements 2.7 Prepare report on installation and testing of equipment according to company’s procedures/policies 	<p>TLE_IAEPAS9-12SIEM-IOOE-IIIh-j-IVa-68</p>

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Pretesting procedure <ul style="list-style-type: none"> - Visual inspection - Interview of customer - Operate the unit • Systems defects/fault symptoms • Troubleshooting Techniques <ul style="list-style-type: none"> - Sensory methods <ul style="list-style-type: none"> ➢ Visual checks ➢ Listening for telltale sounds ➢ Look out for unusual smells ➢ Touching or feeling - Component substitution - Signal injection and tracing - Voltage and current measurement - Continuity/resistance testing - Waveform analysis - Display analysis (for video displays) - Circuit analysis • Proper handling of tools, materials, and test instruments • Service information <ul style="list-style-type: none"> - Job report sheets - Job order - Bill of materials - Customer index - Service flowchart - Stock and inventory record - Requisition slips (for acquisition of parts) - Supplier index 			<p>LO 3. Diagnose faults and defects of industrial electronic modules/products/systems</p> <ul style="list-style-type: none"> 3.1 Observe systematic pre-testing procedure in accordance with manufacturer’s instructions. 3.2 Identify system defects/fault symptoms using appropriate tools and equipment and troubleshooting techniques in accordance with safety procedures 3.3 Use test instruments required for the job in accordance with user manuals 3.4 Isolate circuits using specified testing procedures 3.5 Explain identified defects and faults to the responsible person in accordance with enterprise or company policy and procedures 3.6 Check control settings/adjustments in conformity with service-manual specifications 3.7 Document results of diagnosis and testing accurately and completely within the specified time 3.8 Advise/inform customers regarding the status and serviceability of the unit according to procedures 	<p>TLE_IAEPAS9-12SIEM-IOOE-IVb-e-69</p>

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • ESD protection procedure • PPE/ OHS • Disassembling procedures of industrial electronic modules, products, and systems • Maintaining and repairing process of industrial electronic modules/products/system • Soldering techniques • Proper handling of industrial electronic modules/products/system • Accomplish service forms • 5S • Environmental Safety <ul style="list-style-type: none"> - WEEE directives - 3Rs - RoHS 			<p>LO 4. Maintain/repair industrial electronic products</p> <ul style="list-style-type: none"> 4.1 Use PPE in accordance with OHS practices 4.2 Follow electro-static discharge (ESD) protection procedure in accordance with current industry standards 4.3 Replace defective parts/components with identical or recommended appropriate equivalent ratings 4.4 Solder/mount repaired or replaced parts/components in accordance with the current industry standards 4.5 Perform control settings/adjustments in conformity with service-manual specifications 4.6 Undergo repair activity within the required timeframe 4.7 Observe care and extreme precaution in handling the unit/product as per procedures 4.8 Clean unit in accordance with standard procedures 4.9 Dispose of excess components and materials based on WEEE directives and 3Rs waste management program 	<p>TLE_IAEPAS9-12SIEM-IOOE-IVf-h-70</p>
<ul style="list-style-type: none"> • Reassembling procedure of industrial electronic product • Posttesting procedure of industrial electronic product • Service information <ul style="list-style-type: none"> - Service flow chart - Job report sheets • PPE • Environmental requirements 			<p>LO 5. Reassemble and test repaired industrial electronic products</p> <ul style="list-style-type: none"> 5.1 Reassemble repaired units according to procedures 5.2 Subject reassembled units to final testing and cleaning in conformity with manufacturer’s specifications 5.3 Comply to service completion procedures and documentations based on manual 5.4 Dispose of waste materials in accordance with environmental requirements 	<p>TLE_IAEPAS9-12SIEM-IOOE-IVi-j-71</p>

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RESOURCES			METHODOLOGY	ASSESSMENT METHOD
TOOLS	EQUIPMENT	MATERIALS		
<ul style="list-style-type: none"> • Pliers (assorted) • Screwdriver (assorted) • Desoldering tools • Wrenches (assorted) • Utility knife/stripper • Test jig • Wire stripper • Digital micrometer • Antistatic strap • Bread boards 	<ul style="list-style-type: none"> • Multimeters (analog/digital) • Workshop table • High grade magnifying glass with lamp • Variable power supply • Variable transformer • Hot-air soldering station • Oscilloscope, digital/ analog • Signal generator • Function generator • Electronically controlled soldering station • PPE <p><i>Recommended equipment (optional)</i></p> <ul style="list-style-type: none"> • Table top reflow oven • Lead-free soldering system • ESD free work bench with mirror (back-to-back/one-sided) 	<ul style="list-style-type: none"> • Soldering wire • SMD soldering paste • SMD soldering flux • Cleaning brush • Lacquer thinner/ alcohol • Thermal paste • Ferric Chloride • Pale or water bucket • Stranded/ solid/ hook-up wires • Wire stranded #22 assorted color (five colors) • Solid wire #22 assorted color (five colors) • Assorted electronic components (active & passive) • Terminal lugs • Cotton gloves • Electrical tape • Cable ties • Manuals/books • Learning elements and activity sheets • Schematic diagrams 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Viewing multimedia • Hands on practice • Simulation • Work immersion • Project making/ laboratory exercises • Dual training • Supervised-industry training • eLearning/ blended learning program 	<ul style="list-style-type: none"> • Written exam • Practical exam • Observation in workplace • Demonstration • Portfolio

K to 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL-LIVELIHOOD TRACK
INDUSTRIAL ARTS – ELECTRONIC PRODUCTS ASSEMBLY AND SERVICING NC II
(640 hours)

GLOSSARY

1. Appliances
 - A fixed (for support only), hand-held (held in hand during normal use), portable (moved while 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. It includes 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. 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, tape recorders, sound and video duplication equipment, digital versatile discs, digital audio tapes, professional and domestic speaker systems, and mixer desks
3. Component
 - That portion of a unit of equipment, which has been designed as a discrete unit and that can be identified as such
4. Electronic components
 - These are generally intended to be connected together, usually by being soldered to a printed circuit board (PCB), to create an electronic circuit with a particular function (for example an amplifier, radio receiver, or oscillator); components may be packaged singly, or in more complex groups as integrated circuits. Some common electronic components are capacitors, inductors, resistors, diodes, transistors, etc. Components are often categorized as active (e.g., transistors and thyristors) or passive (e.g., resistors and capacitors).
5. Electronic products
 - These are generally referred as electronic consumer products such as large and small household appliances, televisions, audio/video machines including its accessories, digital receivers, phones, lightings, health care and, soon, cameras and video surveillance equipment
6. Environment
 - The area surrounding the worksite that can be directly or indirectly affected by occurrences therein; 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 chlorofluorocarbons (CFCs) and the like.
7. Equipment
 - A component part of an installation used for a particular purpose
8. Established procedures
 - Formal arrangements of an organization, enterprise, or statutory authority of how work is to be done
9. Industrial electronics
 - The industry of making electronic products for industrial purposes
10. Modifications
 - To make changes to the physical parameters or operational function of a device, component, or piece of equipment or apparatus
11. OHS 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
12. Printed circuit boards (PCBs)
 - Used to mechanically support and electrically connect electronic components using conductive pathways, tracks, or signal traces etched from copper sheets laminated onto a nonconductive substrate. It is also referred to as **printed wiring board (PWB)** or **etched wiring board**. Printed circuit boards are used in virtually all but the simplest commercially produced electronic devices.
13. 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
- Servicing
 - Undertaking routine inspection, repair and maintenance of circuits, systems or apparatus; maintaining, fault finding and repair of equipment, plant, and machinery

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- 14. Standards
 - Technical documents that set out specifications and other criteria for equipment, materials, and methods to ensure that they consistently perform as intended
- 15. System
 - A group or combination of interrelated, interdependent, or interlocking elements forming a collective entity; includes circuits, apparatus, equipment and the like
- 16. Termination
 - The act by 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, and insulation piercing/compression.
- 17. Testing devices
 - Devices and instruments used to ensure that safety requirements and operational functions are met, and to diagnose faults in apparatus, circuits, or systems
- 18. Wiring systems
 - Permitted cables, enclosures, supports, and accessories for power, measurement, control or communications purposes

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CODE BOOK LEGEND

Sample: **TLE_EPAS8AQS-Ia-b-1**

LEGEND		SAMPLE	
First Entry	Learning Area and Strand	Technology and Livelihood Education_Industrial Arts	TLE_ IA
	Subject or Specialization	Electronic Products Assembly and Servicing	EPAS
	Grade Level	9/10/11/12	9-12
Uppercase Letter/s	Domain/ Content/ Component/ Topic	Applying Quality Standards	AQS
			-
Roman Numeral *Zero if no specific Quarter	Quarter	First Quarter	I
Lower case letter/s *put an en dash (–) between letters to indicate more than a specific week	Week	Week one	a
			-
Arabic Number	Learning Competency	Assess quality of received materials or components	1

Technology-Livelihood Education and Technical-Vocational Track specializations may be taken between Grades 9 to 12.

Schools may offer specializations from the four strands as long as the minimum number of hours for each specialization is met.

Please refer to the sample Curriculum Map on the next page for the number of semesters per Industrial Arts specialization and those that have pre-requisites. Curriculum Maps may be modified according to specializations offered by a school.

DOMAIN / COMPONENT	CODE
Common Competencies	
Applying Quality Standards	AQS
Performing Computer Operations	PCO
Performing Mensuration and Calculation	PMC
Preparing and Interpreting Technical Drawings	PITD
Using and Maintaining Hand Tools	UMHT
Terminating and Connecting Electrical Wiring and Electronic Circuits	TCEC
Testing Electronic Components	TEC
Core Competencies	
Assembling Electronic Products	AEP
Servicing Consumer Electronic Products and Systems – Domestic Electronic Appliances with Electric Motor	SCEP-DEAEM
Servicing Consumer Electronic Products and Systems – Domestic Electronic Appliances with Heating Component	SCEP-DEAHC
Servicing Consumer Electronic Products and Systems – Domestic Electronic Appliances - Rechargeable and Electronic-Controlled Lighting Units	SCEP-DEARE
Servicing Consumer Electronic Products and Systems – Domestic Electronic Appliances – Security and Solar Power Management System	SCEP-DEASS
Servicing Consumer Electronic Products and Systems – Audio Products and Systems	SCEP-APS
Servicing Consumer Electronic Products and Systems – Audio-Video Products and Systems	SCEP-AVP
Servicing Industrial Electronic Modules, Products and Systems – Control Boards, Modules, Motor Controllers and Drives	SIEM-CMMD
Servicing Industrial Electronic Modules, Products and Systems – Sensors, Input Devices, Actuators, Output Devices, Opto-Electronics Equipment and Devices	SIEM-IOOE

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SAMPLE INDUSTRIAL ARTS CURRICULUM MAP** (as of May 2016)

GRADE 7/8 (EXPLORATORY)			GRADES 9-12		
				Automotive Servicing (NC I)* <small>updated based on TESDA Training Regulations published December</small>	8 sems
				*Automotive Servicing (NC II)	8 sems
			Motorcycle/Small Engine Servicing (NC II) 4 sems	Driving (NC II) 2 sems	
				Electronic Products Assembly and Servicing (NC II)* <small>updated based on TESDA Training Regulations published December 28, 2013</small>	8 sems
				*Mechatronics Servicing (NC II)	4 sems
				*Instrumentation Control and Servicing (NC II)	4 sems
				Electrical Installation and Maintenance (NC II)	8 sems
				*Electrical Power Line Distribution Line Construction (NC II)	4 sems
				*Transmission Line Installation and Maintenance (NC II)	8 sems
				Machining (NC I)	8 sems
				*Machining (NC II)	8 sems
			Plumbing (NC I) 4 sems	*Plumbing (NC II)	4 sems
				Domestic Refrigeration and Air-conditioning Servicing (NC II)	8 sems
				*Refrigeration and Air-conditioning Servicing (PACU/CRE) (NC III)	8 sems
			Shielded Metal Arc Welding (NC I) 4 sems	*Shielded Metal Arc Welding (NC II)	4 sems
				*Gas Metal Arc Welding (GMAW) (NC II)	4 sems
				*Gas Tungsten Arc Welding (GTAW) (NC II)	4 sems
				Carpentry (NC II)	8 sems
			*Carpentry (NC III) 4 sems	Construction Painting (NC II) 2 sems	
				Furniture Making (Finishing) (NC II)	8 sems
			Masonry (NC II) 4 sems	Tile Setting (NC II)	4 sems

EXPLORATORY

4
sems

* Please note that these subjects have pre-requisites mentioned in the CG.

+ CG updated based on new Training Regulations of TESDA.

Other specializations with no prerequisites may be taken up during these semesters.

Pre-requisites of the subjects to the right should be taken up during these semesters.

****This is just a sample. Schools make their own curriculum maps considering the specializations to be offered. Subjects may be taken up at any point during Grades 9-12.**

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Reference:

Technical Education and Skills Development Authority-Qualification Standards Office. *Training Regulations for Electronic Products Assembly and Servicing NC II*. Taguig City, Philippines: TESDA, 2013.