

Kto12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)

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)		
2.	Agricultural Crops Production (NC II) ⁺⁺	480 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 (NC II)
5.	Animal Production (NC II) ⁺ <i>When updated, this CG will become the following:</i> 1. Animal Production (Poultry-Chicken) (NC II); 2. Animal Production (Ruminants) (NC II); and 3. Animal Production (Swine) (NC II)	480 hours	
6.	Aquaculture (NC II)	640 hours	
7.	Artificial Insemination (Ruminants) (NC II)	160 hours	Animal Production (NC II)
8.	Artificial Insemination (Swine) (NC II)	160 hours	Animal Production (NC II)
9.	Agricultural Crops Production (NC I)	320 hours	
10.	Fish Capture (NC II) ⁺⁺	640 hours	
11.	Fishing Gear Repair and Maintenance (NC III)	320 hours	
12.	Fish-Products Packaging (NC II)	320 hours	
13.	Fish Wharf Operation (NC I)	160 hours	
14.	Food (Fish) Processing (NC II)	640 hours	
15.	Horticulture (NC II) ⁺	640 hours	
16.	Horticulture (NC III)	640 hours	Horticulture (NC II)
17.	Landscape Installation and Maintenance (NC II)	320 hours	Agricultural Crops Production (NC I)
18.	Organic Agriculture (NC II)	320 hours	Agricultural Crops Production (NC I)
19.	Pest Management (NC II)	320 hours	Agricultural Crops Production (NC I)
20.	Rice Machinery Operation (NC II)	320 hours	Agricultural Crops Production (NC I)
21.	Rubber Processing (NC II)	320 hours	
22.	Rubber Production (NC II)	320 hours	
23.	Slaughtering Operation (NC II)	160 hours	Animal Production (NC II)

⁺CG to be updated by December 2015

⁺⁺CG to be uploaded by December 2015

Kto12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)

HOME ECONOMICS

	Specialization	Number of Hours	Pre-requisite
1.	Attractions and Theme Parks (NC II)	160 hours	
2.	Barbering (NC II)	320 hours	
3.	Bartending (NC II)	320 hours	
4.	Beauty/Nail Care (NC II)	160 hours	40 hours of the subject during exploratory Grade 7/8
5.	Bread and Pastry Production (NC II)	160 hours	
6.	Caregiving (NC II)	640 hours	40 hours of the subject during exploratory Grade 7/8
7.	Commercial Cooking (NC III)	320 hours	Cookery (NC II)
8.	Cookery (NC II)	320 hours	40 hours of the subject during exploratory Grade 7/8
9.	Dressmaking (NC II)	320 hours	40 hours of the subject during exploratory Grade 7/8
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) ⁺	160 hours	
13.	Front Office Services (NC II)	160 hours	40 hours of the subject during exploratory Grade 7/8
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) ⁺	160 hours	
21.	Local Guiding Services (NC II)	160 hours	
22.	Tailoring (NC II)	320 hours	40 hours of the subject during exploratory Grade 7/8
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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Kto12 BASIC EDUCATION CURRICULUM

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INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)**

INDUSTRIAL ARTS

	Specialization	Number of Hours	Pre-requisite
1.	Automotive Servicing (NC 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.	Consumer Electronics Servicing (NC II) ⁺	640 hours	
7.	Domestic Refrigeration and Airconditioning (DOMRAC) Servicing (NC II)	640 hours	
8.	Driving (NC II)	160 hours	
9.	Electrical Installation and Maintenance (NC II)	640 hours	
10.	Electric Power Distribution Line Construction (NC II)	320 hours	Electrical Installation and Maintenance (NC II)
11.	Electronic Products Assembly and Servicing (NC II) ⁺⁺ <i>(CG under construction based on Consumer Electronics Servicing (NC II) CG)</i>	640 hours	
12.	Furniture Making (Finishing) (NC II) ⁺	480 hours	
13.	Instrumentation and Control Servicing (NC II)	320 hours	Electronic Products Assembly and Servicing (EPAS) (NC II)
14.	Gas Metal Arc Welding (GMAW) (NC II)	320 hours	Shielded Metal Arc Welding (SMAW) (NC II)
15.	Gas Tungsten Arc Welding (GTAW) (NC II)	320 hours	Shielded Metal Arc Welding (GMAW) (NC II)
16.	Machining (NC I) ⁺⁺	640 hours	
17.	Machining (NC II)	640 hours	Machining (NC I)
18.	Masonry (NC II)	320 hours	
19.	Mechatronics Servicing (NC II)	320 hours	Consumer Electronics Servicing (NC II)
20.	Motorcycle/Small Engine Servicing (NC II)	320 hours	
21.	Plumbing (NC I)	320 hours	
22.	Plumbing (NC II)	320 hours	Plumbing (NC I)
23.	Refrigeration and Air-Conditioning (Packaged Air-Conditioning Unit [PACU]/Commercial Refrigeration Equipment [CRE]) Servicing (NC III)	640 hours	Domestic Refrigeration and Airconditioning (DOMRAC) Servicing (NC II)
24.	Shielded Metal Arc Welding (NC I)	320 hours	
25.	Shielded Metal Arc Welding (NC II)	320 hours	Shielded Metal Arc Welding (NC I)
26.	Tile Setting (NC II)	320 hours	
27.	Transmission Line Installation and Maintenance (NC II)	640 hours	Electrical Installation and Maintenance (NC II)

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Kto12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)

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	1. Telecom OSP and Subscriber Line Installation (Copper Cable/POTS and DSL) (NC II) 2. Telecom OSP Installation (Fiber Optic Cable) (NC II)
3.	Computer Hardware Servicing (NC II) ⁺	320 hours	
4.	Computer Programming (NC IV) ⁺ <i>When updated, this CG will become the following:</i> 1. Programming (.net Technology) (NC II) ⁺⁺ 2. Programming (Java) (NC II) ⁺⁺ 3. Programming (Oracle Database) (NC II) ⁺⁺	320 hours	
5.	Computer System Servicing (NC II) ⁺⁺ <i>(CG under construction based on Computer Hardware Servicing (NC II) CG)</i>	320 hours	
6.	Contact Center Services (NC II)	320 hours	
7.	Illustration (NC II)	320 hours	
8.	Medical Transcription (NC II)	320 hours	
9.	Technical Drafting (NC II)	320 hours	
10.	Telecom OSP and Subscriber Line Installation (Copper Cable/POTS and DSL) (NC II)	320 hours	Computer Hardware Servicing (NC II)
11.	Telecom OSP Installation (Fiber Optic Cable) (NC II)	160 hours	Telecom OSP and Subscriber Line Installation (Copper Cable/POTS and DSL) (NC II)

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Kto12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)
Grade 7/Grade 8 (Exploratory)

Course Description:

This is an exploratory and introductory course which leads to an **Electrical Installation and Maintenance** National Certificate Level II (NCII). It covers **five** common competencies that the **Grade 7/Grade 8** Technology and Livelihood Education (TLE) student ought to possess: (1) using tools, equipment and paraphernalia, 2) performing mensuration and calculation, 3) practicing Occupational Health and Safety (OHS) procedures, 4) maintaining tools, equipment and paraphernalia, and 5) interpreting technical drawing and plans.

The preliminaries of this exploratory course include the following: (1) discussion on the relevance of the course, 2) explanation of key concepts relative to the course, and 3) exploration of career opportunities.

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
Introduction 1. Basic concepts in Electrical Installation and Maintenance 2. Relevance of the course 3. Career opportunities	The learner demonstrates an understanding of the basic concepts and underlying theories in electrical installation and maintenance.	The learner independently demonstrates common competencies in electrical installation and maintenance as prescribed by TESDA Training Regulations.	1. Explain basic concepts in electrical installation and maintenance 2. Discuss the relevance of the course 3. Explore career opportunities in electrical installation and maintenance	
PERSONAL ENTREPRENEURIAL COMPETENCIES (PeCS)				
1. Assessment of Personal Entrepreneurial Competencies and Skills (PeCS) vis-à-vis those of a practicing entrepreneur/employee 1.1 Characteristics 1.2 Attributes 1.3 Lifestyle 1.4 Skills 1.5 Traits 2. Analysis of one's PeCS	The learner demonstrates an understanding of one's Personal Entrepreneurial Competencies and Skills (PeCS).	The learner recognizes his/her PeCS and prepares a list of PeCS of a practitioner/entrepreneur in electrical installation and maintenance.	LO 1. Recognize Personal Entrepreneurial Competencies and Skills (PeCS) needed in electrical installation and maintenance 1.1 Assess one's PeCS: characteristics, attributes, lifestyle, skills, traits 1.2 Assess practitioner's PeCS: characteristics, attributes, lifestyle, skills, traits 1.3 Compare one's PeCS with those of a practitioner /entrepreneur	TLE_PECS7/8-00-1

Kto12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
ENVIRONMENT AND MARKET (EM)				
<ol style="list-style-type: none"> 1. Key concepts of Environment and Market 2. Products & services available in the market 3. Differentiation of products and services 4. Customers and their buying habits 5. Competition in the market 6. SWOT Analysis 	<p>The learner demonstrates an understanding of the concepts of environment and market and how they relate with a career choice in electrical installation and maintenance.</p>	<p>The learner independently generates a business idea based on the analysis of environment and market in electrical installation and maintenance</p>	<p>LO 1. Generate a business idea that relates with a career choice in electrical installation and maintenance</p> <ol style="list-style-type: none"> 1.1 Conduct SWOT analysis 1.2 Identify the different products/services available in the market 1.3 Compare different products/services in the electrical installation and maintenance business 1.4 Determine the profile of potential customers 1.5 Determine the profile of potential competitors 1.6 Generate potential business ideas based on the SWOT analysis 	TLE_EM7/8-00-1
LESSON 1: PREPARE ELECTRICAL MATERIALS AND TOOLS (UT)				
<ol style="list-style-type: none"> 1. Electrical materials and tools 2. Different types of forms 	<p>The learner demonstrates an understanding of the concepts in the preparing electrical materials and tools using the different forms in electrical installation and maintenance.</p>	<p>The learner independently prepares appropriate electrical materials and tools using the different forms in electrical installation and maintenance based on industry standards.</p>	<p>LO 1. Prepare electrical materials and tools for the task</p> <ol style="list-style-type: none"> 1.1 Prepare a list of electrical tools and materials for a specific job 	TLE_IAEI7/8UT-0a-1
			<p>LO 2. Request appropriate electrical supplies materials and tools applicable to a specific job</p> <ol style="list-style-type: none"> 2.1 Use the appropriate form in requesting for electrical tools, supplies and materials for a 	TLE_IAEI7/8UT-0a-2

**Kto12 BASIC EDUCATION CURRICULUM
 JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
 INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)**

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
			specific job	
			LO 3. Receive and inspect electrical supplies, materials and tools 3.1 Check and control received items on the list	TLE_IAEI7/8MT-0b-3
LESSON 2: PERFORM MENSURATION AND CALCULATIONS (MC)				
1. Measurement 2. Ohm’s Law 3. Multitester	The learner demonstrates an understanding of the concepts and underlying principles in performing measurements and calculations.	The learner independently performs accurate measurements and calculation based on given tasks.	LO 1. Select electrical measuring tools and instruments 1.1 Identify object or component to be measured 1.2 Choose test instruments to be used for specific tasks 1.3 Identify alternative measuring tools without sacrificing cost and quality of work	TLE_IAEI7/8MC-0c-1
			LO 2. Carry out measurements and calculations 2.1 Use appropriate measuring devices for specific tasks 2.2 Compute for required data 2.3 Convert data to its equivalent unit of measurement	TLE_IAEI7/8MC-0d-2
LESSON 3: INTERPRET TECHNICAL DRAWINGS AND PLANS (ID)				
1. Basic technical drawing 2. Technical Plans and Schematic Diagram 3. Signs, Symbols and Abbreviations	The learner demonstrates an understanding of the concepts and underlying principles in interpreting simple technical drawings and plans in electrical	The learner independently reads and interprets specifications of simple technical drawings and plans.	LO 1. Analyze signs, electrical symbols and data 1.1 Read and interpret electrical signs, symbols and data 1.2 Analyze electrical components	TLE_IAEI7/8ID-0e-1

**Kto12 BASIC EDUCATION CURRICULUM
 JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
 INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)**

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
	installation and maintenance.		and materials based on electrical signs, symbols and data LO 2. Interpret technical drawings and plans 2.1 Read blueprints of electrical plans, diagrams and circuits 2.2 Identify necessary tools, materials and equipment according to blueprints of electrical plans, diagrams and circuits	TLE_IAEI7/8ID-0e-2
LESSON 4: MAINTAIN TOOLS AND EQUIPMENT (MT)				
1. Electrical tools and equipment 2. Maintenance of tools and equipment	The learner demonstrates an understanding of the underlying principles in the maintenance of electrical tools and equipment.	The learner independently performs proper maintenance of electrical tools and equipment based on industry standards.	LO 1. Check condition of tools and equipment 1.1 Label functional and non-functional tools and equipment LO 2. Perform basic maintenance 2.1 Clean and lubricate tools 2.2 Observe periodic preventive and maintenance of electrical tools and equipment 2.2.1 Sharpening 2.2.2 Oiling 2.2.3 Insulating LO 3. Store tools and equipment 3.1 Prepare inventory of tools and equipment 3.2 Store tools and equipment in their proper places	TLE_IAEI7/8MT-0f-1 TLE_IAEI7/8MT-0f-2 TLE_IAEI7/8MT-0g-3

**Kto12 BASIC EDUCATION CURRICULUM
 JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
 INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)**

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
LESSON 5: PRACTICE OCCUPATIONAL HEALTH AND SAFETY PROCEDURE (OS)				
1. Occupational health and safety procedures	The learner demonstrates an understanding of the concepts and underlying principles of occupational health and safety procedures.	The learner independently simulates occupational health and safety procedures.	LO1. Identify hazards and risks 1.1 List down hazards and risks in the workplace	TLE_IAEI7/8OS-0h-1
			LO2. Control hazards and risks 2.1 Determine effects of hazards and risks 2.2 Evaluate hazards and risks 2.3 Follow procedure for controlling hazards and risks in the workplace	TLE_IAEI7/8OS-0i-2
			LO3. Practice OHSP	TLE_IAEI7/8OS-0j-3

Kto12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)
(160 hours)

Course Description:

This is specialization course which leads to an **Electrical Installation and Maintenance** National Certificate Level II (NCII). It covers three core competencies that a high school student ought to possess: (1) preparing electric and hydraulic tools, (2) performing roughing-in and wiring activities for bus and under floor ducts, and (3) installing wiring devices for floor and ground fault current interrupting outlets.

The preliminaries of this exploratory course include the following: (1) discussion on the relevance of the course, (2) explanation of key concepts relative to the course, and 3) exploration of career opportunities.

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
Introduction 1. Basic concepts in electrical installation and maintenance 2. Relevance of the course 3. Career opportunities	The learner demonstrates an understanding of the basic concepts and underlying theories of electrical installation and maintenance.	The learner independently demonstrates common competencies in electrical installation and maintenance as prescribed by TESDA Training Regulations.	1. Explain basic concepts in electrical installation and maintenance 2. Discuss the relevance of the course 3. Explore career opportunities in electrical installation and maintenance	
PERSONAL ENTREPRENEURIAL COMPETENCIES (PeCS)				
1. Assessment of Personal Competencies and Skills (PeCS) vis-à-vis PeCS of a practicing entrepreneur/employee in locality/town. 1.1 Characteristics 1.2 Attributes 1.3 Lifestyle 1.4 Skills 1.5 Traits 2. Analysis of PeCS compared to PeCS of a practitioner 3. Align, strengthen and develop one's PeCS based on the results	The learner demonstrates an understanding of one's Personal Competencies and Skills (PeCS) in electrical installation and maintenance.	The learner recognizes his/her PeCS and prepares an activity plan that aligns with the PeCS of a practitioner/entrepreneur in electrical installation and maintenance.	LO 1. Recognize Personal Entrepreneurial Competencies and Skills (PeCS) needed in electrical installation and maintenance 1.1 Assess one's PeCS: characteristics, attributes, lifestyle, skills, traits 1.4 Assess practitioner's PeCS: characteristics, attributes, lifestyle, skills, traits 1.5 Compare one's PeCS with those of a practitioner /entrepreneur 1.6 Align one's PeCS with those of a practitioner/entrepreneur	TLE_PECS9-12-I0-1

Kto12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
ENVIRONMENT AND MARKET (EM)				
Market (Town) 1. Key concepts of Environment and Market 2. Players in the Market (Competitors) 3. Products & services available in the market	The learner demonstrates an understanding of the concepts of environment and market and how they relate to the field of electrical installation and maintenance, particularly in one's town/municipality.	The learner independently creates a business vicinity map reflective of the potential electrical installation and maintenance market within the locality/town.	LO 1. Recognize and understand the market in electrical installation and maintenance 1.1 Identify the players/ competitors within the town 1.2 Identify the different products/services available in the market	TLE_EM9-12-IO-1
Market (Customer) 4. Key concepts in Identifying and Understanding the Consumer 5. Consumer Analysis through: 5.1 Observation 5.2 Interviews 5.3 Focus group discussion 5.4 Survey			LO 2. Recognize the potential customer/market in electrical installation and maintenance 2.1 Identify the profile of potential customers 2.2 Identify the customer's needs and wants through consumer analysis 2.3 Conduct consumer/market analysis	TLE_EM9-12-II0-2
6. Generating Business Ideas 6.1 Key concepts in Generating Business Ideas 6.2 Knowledge & Skills, Passions, Interests 6.3 New application 6.4 Irritants 6.5 Striking ideas (new concept) 6.6 Serendipity Walk			LO 3. Create new business ideas for the electrical installation and maintenance business 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 Walk	TLE_EM9-12-III0-IV0-3

Kto12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
LESSON 1: PREPARE ELECTRIC AND HYDRAULIC TOOLS (ET)				
<ol style="list-style-type: none"> 1. Standard application of electric and hydraulic tools 2. Types of electrical tools, instruments, materials and their specifications 3. Hand tools 4. Proper maintenance of electric and hydraulic tools 5. Specification of electric and hydraulic tools 6. Electric and hydraulic tools safety practices 7. Electrical symbols used in electrical plan 	<p>The learner demonstrates an understanding of the principles in the preparation of electric and hydraulic tools.</p>	<p>The learner independently prepares electric and hydraulic tools for the task.</p>	<p>LO 1. Select electric and hydraulic tools</p> <ol style="list-style-type: none"> 1.1 Request tools, equipment and materials 1.2 Identify electric and hydraulic tools for the task 1.3 Inspect tools and equipment for damage prior to its use 1.4 Report damaged tools 	TLE_IAEI9-12ET-Ia-e-1
			<p>LO 2. Maintain electric and hydraulic tools</p> <ol style="list-style-type: none"> 2.1 Check the conditions of electric and hydraulic tools 2.2 Lubricate electric tools in line with manufacturer’s specification 2.3 Replace auxiliary part of electric and hydraulic tools according to manufacturer’s specifications 2.4 Store electric and hydraulic tools 	TLE_IAEI9-12ET-If-j-2
LESSON 2: PERFORM ROUGHING-IN ACTIVITIES FOR COMMUNICATION AND DISTRIBUTION SYSTEM (RC)				
<ol style="list-style-type: none"> 1. PEC provisions on electrical metallic conduits 2. Bending electrical metallic conduit 3. Procedure in installing electrical metallic conduit 4. Safety procedure in installing electrical metallic conduits 	<p>The learner demonstrates an understanding of the principles in performing roughing-in activities.</p>	<p>The learner independently performs roughing-in activities based on the Philippine Electrical Code (PEC) and National Electrical Code (NEC).</p>	<p>LO 1. Install electrical metallic tubing</p> <ol style="list-style-type: none"> 1.1 Prepare tools/equipment and materials needed for the installation of electrical metallic tubing in line with job requirements 1.2 Install electrical metallic tubing according to the job requirements following PEC and NEC 1.3 Observe safety procedure in installing electrical metallic tubing 1.4 According to OHS guidelines and 	TLE_IAEI9-12RC-IIa-j-1

Kto12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
			procedures	
5. PEC/NEC provisions on wire ways and cable trays 6. Procedure in installing wire ways and cable trays 7. Safety procedure in installing wire ways and cable trays			LO 2. Install wireways and cable trays 2.1 Prepare tools/equipment and materials needed for the installation of wire ways and cable trays in line with job requirements 2.2 Install wire ways and cable trays according to the job requirements following PEC and NEC 2.3 Observe safety procedure in installing wire ways and cable trays according to OHS guidelines and procedures	TLE_IAEI9-12RC-IIIa-j-2
8. PEC/NEC provisions on telephone terminal cabinet 9. Procedure in installing telephone terminal cabinet trays 10. Safety procedure in installing telephone terminal cabinet			LO 3. Install telephone terminal cabinet 3.1 Prepare tools/equipment and materials needed for the installation of telephone terminal cabinet in line with job requirement. 3.2 Install telephone terminal cabinet according to the job requirements following PEC and NEC 3.3 Observe safety procedure in installing telephone terminal cabinet according to OHS guidelines and procedures.	TLE_IAEI9-12RC-IVa-e-3
11. PEC provisions on cable bridge 12. Procedure in installing cable bridge 13. Safety procedure in installing cable bridge			LO 4. Install cable bridge 4.1 Prepare tools/equipment and materials needed for the installation of cable bridge in line with job requirements 4.2 Install cable bridge according to the job requirements following PEC and NEC	TLE_IAEI9-12RC-IVf-j-4

**Kto12 BASIC EDUCATION CURRICULUM
 JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
 INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)**

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
			4.3 Observe safety procedure in installing cable bridge according to OHS guidelines and procedures	

Kto12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)
(160 hours)

Course Description:

This is specialization course which leads to an **Electrical Installation and Maintenance** National Certificate Level II (NCII). It covers the core competency that a high school student ought to possess—namely, installing wiring devices for floor and ground fault current interrupting outlets.

The preliminaries of this exploratory course include the following: (1) discussion on the relevance of the course, (2) explanation of key concepts relative to the course, and (3) exploration of career opportunities.

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
Introduction 1. Basic concepts in electrical installation and maintenance 2. Relevance of the course 3. Career opportunities	The learner demonstrates an understanding of the basic concepts and underlying theories in electrical installation and maintenance.	The learner independently demonstrates an common competencies in electrical installation and maintenance as prescribed by TESDA Training Regulations.	1. Explain basic concepts in electrical installation and maintenance 2. Discuss the relevance of the course 3. Explore career opportunities in electrical installation and maintenance	
PERSONAL ENTREPRENEURIAL COMPETENCIES (PeCS)				
1. Assessment of learner’s Personal Competencies and Skills (PeCS) vis-à-vis those of a practicing entrepreneur/employee in a province. 1.1 Characteristics 1.2 Attributes 1.3 Lifestyle 1.4 Skills 1.5 Traits 2. Analysis of learner’s PeCS compared to those of a practitioner 3. Strengthening and further development of one’s PeCS	The learner demonstrates an understanding of one’s Personal Competencies and Skills (PeCS) in electrical installation and maintenance.	The learner independently creates a plan of action that strengthens/ further develops one’s PeCS in electrical installation and maintenance.	LO 1. Develop and strengthen personal competencies and skills (PeCS) needed in Electrical Installation and Maintenance 1.1 Identify areas for improvement, development and growth 1.2 Align one’s PeCS according to his/her business/career choice 1.3 Create a plan of action that ensures success of his/her business/career choice	TLE_PECS9-12-I0-1

Kto12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
ENVIRONMENT AND MARKET (EM)				
1. Product Development 2. Key concepts in developing a product 3. Finding Value 4. Innovation 4.1 Unique Selling Proposition (USP)	The learner demonstrates an understanding of the concepts environment and market in the electrical installation and maintenance field, particularly in one’s town/municipality.	The learner independently creates a business vicinity map reflective of the potential electrical installation and maintenance within the locality/town.	LO 1. Develop a product/ service in electrical installation and maintenance 1.1 Identify what is of “Value” to the customer 1.2 Identify the customer 1.3 Explain what makes a product unique and competitive 1.4 Apply creative and innovative techniques to develop marketable product 1.5 Employ a Unique Selling Proposition (USP) to the product/service	TLE_EM9-12-I0-II0-1
5. Selecting a Business Idea 6. Key concepts in Selecting a Business Idea 6.1 Criteria 6.2 Techniques			LO 2. Select a business idea based on the criteria and techniques set 2.1 Enumerate various criteria and steps in selecting a business idea 2.2 Apply the criteria/steps in selecting a viable business idea 2.3 Determine a business idea based on the criteria/techniques set	TLE_EM9-12-III0-2
7. Branding			LO 3. Develop a brand for the product 7.1 Identify the benefits of having a good brand 7.2 Enumerate recognizable brands in the town/province 7.3 Enumerate the criteria for developing a brand 7.4 Generate a clear appealing product brand	TLE_EM9-12-IV0-3

**Kto12 BASIC EDUCATION CURRICULUM
 JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
 INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)**

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
INSTALLING WIRING DEVICES FOR FLOOR AND GROUND FAULT CURRENT INTERRUPTING OUTLETS (WD)				
1. Standard application of tools, materials and equipment in accordance with PEC (Philippine Electrical Code) /NEMA 2. (National Electrical Manufacturers Association) 3. Safety procedure for handling electrical materials and devices 4. Specifications of electrical supplies and materials	The learner demonstrates an understanding of the underlying principles in installing wiring devices.	The learner independently installs wiring devices for floor and ground fault current interrupter.	LO 1. Select the wiring devices used for floor and ground fault current interrupter 1.1 Interpret plan/drawings for the selection of wiring devices based on the job requirement 1.2 Identify the correct quantity of wiring materials and devices to be used based on job requirement 1.3 Select tools and equipment to be used based on job requirement 1.4 Select appropriate Personal Protection Equipment (PPE)	TLE_IAEI9-12WD-Ia-IIj-1
5. Standard application of tools, materials and equipment in accordance with PEC/NEMA 6. Basic methods and requirements for the installation 7. Specifications of electrical supplies and materials			LO 2. Install the wiring devices for floor and ground fault current interrupter based on PEC standards 2.1 Interpret plan/drawings based on the job requirement 2.2 Install the wiring devices for floor and ground fault current interrupter in accordance with PEC 2.3 Observe safety procedure in installing the wiring devices for floor and ground fault current interrupter in accordance with OHS procedures	TLE_IAEI9-12WD-IIIa-IVj-2

Kto12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)
(160 hours)

Course Description:

This is a specialization course which leads to **Electrical Installation and Maintenance**, National Certificate Level II (NCII). It covers two (2) core competencies that a high school student ought to possess: (1) installation of standard electrical protection systems for lighting and grounding, and (2) installation of electrical lighting systems, auxiliary outlets and lighting fixtures.

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<p>Introduction</p> <ol style="list-style-type: none"> 1. Basic concepts in electrical installation and maintenance 2. Relevance of the course 3. Career opportunities 	<p>The learner demonstrates an understanding of the basic concepts and underlying theories in electrical installation and maintenance.</p>	<p>The learner independently demonstrates common competencies in electrical installation and maintenance as prescribed by TESDA Training Regulations.</p>	<ol style="list-style-type: none"> 1. Explain basic concepts in electrical installation and maintenance 2. Discuss the relevance of the course 3. Explore career opportunities in electrical installation and maintenance 	
INSTALL STANDARD ELECTRICAL PROTECTION SYSTEM FOR LIGHTING AND GROUNDING (EP)				
<ol style="list-style-type: none"> 1. Operation, reading and proper care and maintenance of different electrical measuring/testing instruments: <ol style="list-style-type: none"> 1.1 Ohmmeter 1.2 Ammeter Voltmeter 1.3 Volt-Ohmmeter (VOM) or multi tester 1.4 Clamp ammeter 1.5 Kilowatt-hour meter 2. Blueprint reading and interpretation 3. Electrical materials and tools for specific job order 	<p>The learner demonstrates an understanding of the underlying principles in the installation of standard electrical protection system for lighting and grounding.</p>	<p>The learner independently installs electrical protection system for lighting and grounding based on the Philippine Electrical Code (PEC) standards and Local Code/Utility Company Regulations.</p>	<p>LO 1. PLAN AND PREPARE WORK</p> <ol style="list-style-type: none"> 3.1 Read measurements in terms of : <ol style="list-style-type: none"> 1.1.1 Resistance 1.1.2 Current 1.1.3 Voltage 3.2 Use measuring / testing instruments <ol style="list-style-type: none"> 3.2.1 Ohmmeter 3.2.2 Ammeter 3.2.3 Voltmeter 3.2.4 Volt-Ohmmeter (VOM) or multi tester 3.2.5 Clamp ammeter 3.2.6 Kilowatt-hour meter 3.3 Interpret blueprint of electrical plan 3.4 Plan and prepare electrical materials and tools for the installation of: <ol style="list-style-type: none"> 3.4.1 Electrical meter connection and grounding 	<p>TLE_IAEI9-12EP-Ia-j-1</p>

**Kto12 BASIC EDUCATION CURRICULUM
 JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
 INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)**

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
			3.4.2 Service entrance and circuit breaker/safety switch installation of a bungalow residential building	
4. Electrical meter connection and grounding 5. Service entrance and circuit breaker/safety switch installation			LO 2. INSTALL STANDARD ELECTRICAL PROTECTION SYSTEM FOR LIGHTING AND GROUNDING 2.1 Perform the installation of: 2.1.1 Electrical meter connection and grounding 2.1.2 Service entrance and circuit breaker/safety switch of a residential structure 2.2 Follow schedule of work to ensure completion at agreed time and quality standards 2.3 Check quality of work following instructions and requirements 2.4 Follow safety procedure	TLE_IAEI9-12EP-IIa-j-2
INSTALL ELECTRICAL LIGHTING SYSTEMS, AUXILIARY OUTLETS AND LIGHTING FIXTURES (EL)				
1. Lighting fixtures and accessories 1.1 Lamp holders 1.2 Reflectors 1.3 Shades and shields 2. Incandescent lamp 2.1 Parts and functions 2.2 Types 2.3 Base sizes 3. Fluorescent lamp (20 and 40	The learner demonstrates an understanding of the underlying principles in the installation of electrical lighting systems, auxiliary outlets and lighting fixtures.	The learner independently installs electrical lighting systems, auxiliary outlets and lighting fixtures based on the Philippine Electrical Code (PEC) standards and Local Code/Utility Company Regulations.	LO 1. PLAN AND PREPARE WORK FOR A SPECIFIC JOB ORDER 1.1. Choose appropriate lighting fixtures for specific tasks 1.2. Differentiate type of fluorescent lamp 1.3. Identify the parts and discuss the functions of other lamps 1.4. Discuss parts of incandescent lamp and its function 1.5. Troubleshoot defective fluorescent lamp assembly	TLE_IAEI9-12EL-IIIa-IVj-1

**Kto12 BASIC EDUCATION CURRICULUM
 JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
 INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)**

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
watts tubular type) 3.1 Parts and functions 3.2 Assembly 3.3 Troubleshooting and repair of fluorescent lamp assembly 4. Types of fluorescent lamp 4.1 Linear 4.2 Circular 4.3 Compact fluorescent lamp (CFL) 5. Light emitting diode (LED) lamp 6. Other lamps: 6.1 Mercury lamp 6.2 Sodium vapor lamp 6.3 Halogen lamp 7. Electrical wiring plan			1.6. Prepare an electrical wiring plan of a bungalow residential building based on the Philippine Electrical Code requirements 1.7. Estimate the materials needed for the job	

Kto12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)
(160 hours)

Course Description:

This is a specialization course which leads to an **Electrical Installation and Maintenance** National Certificate Level II (NCII). It covers two (2) core competencies that a high school student ought to possess: (1) installation of electrical lighting systems, auxiliary outlets and lighting fixtures; and 2) maintenance and troubleshooting work.

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
Introduction <ol style="list-style-type: none"> 1. Basic concepts in Electrical Installation and Maintenance 2. Relevance of the course 3. Career opportunities 	The learner demonstrates an understanding of the basic concepts and underlying theories in electrical installation and maintenance.	The learner independently demonstrates the common competencies in electrical installation and maintenance as prescribed by TESDA Training Regulations.	<ol style="list-style-type: none"> 1. Explain basic concepts in electrical installation and maintenance 2. Discuss the relevance of the course 3. Explore career opportunities in electrical installation and maintenance 	
INSTALL ELECTRICAL LIGHTING SYSTEMS, AUXILIARY OUTLETS AND LIGHTING FIXTURES (EL)				
<ol style="list-style-type: none"> 1. Electrical tools, equipment and materials for specific job order 2. Different types of wiring methods approved in the Philippine condition. <ol style="list-style-type: none"> 2.1 Open wiring on insulator 2.2 Concealed wiring installation Non-metallic sheathed cable 2.3 Flexible conduit (metal & non-metal) 2.4 Surface raceway (metal and non-metal) 3. Basic electrical wiring installations <ol style="list-style-type: none"> 3.1 Circuit with one bulb controlled by surface 			LO 1. INSTALL ELECTRICAL SYSTEMS, AUXILIARY OUTLETS AND LIGHTING FIXTURES <ol style="list-style-type: none"> 2.1 Select appropriate electrical tools, equipment and materials for specific tasks 2.2 Apply suitable wiring method for the job 2.3 Install electrical wiring systems using different types of wiring methods: <ol style="list-style-type: none"> 2.3.1 Circuit with one bulb controlled by surface or flush type single pole switch 2.3.2 Circuit using 3-way switches in 2 locations 2.3.3 Circuit using 3- way and 4-way switches in 3 locations 2.3.4 Combination of lighting and convenience outlets 	TLE_IAEI9-12EL-Ia-IIj-1

Kto12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
or flush type single pole switch 3.2 Circuit using two 3-way switches 3.3 Circuit using two 3-way and one 4-way switches 3.4 Combination of lighting and convenience outlets 4. Republic Act 7832: the Anti-electricity and Electric Transmission Lines/Materials Pilferage Act of 1994 4.1 Acts punishable under RA 7832 4.2 <i>Section 2:</i> Illegal use of electricity 4.3 <i>Sec. 3:</i> Theft of electric power transmission lines/materials 4.4 <i>Sec. 4:</i> Prima facie evidence of illegal use of electricity 4.5 <i>Sec. 7:</i> Penalties				
PERFORM MAINTENANCE AND TROUBLESHOOTING WORK (TW)				
1. Testing wiring installation for possible circuit defects: 1.1. Open/loose wiring connections 1.2. Short circuit 1.3. Grounded circuit	The learner demonstrates an understanding of the concepts and underlying principles in the maintenance of electrical tools and equipment and troubleshooting work.	The learner independently performs proper maintenance of electrical tools and equipment and troubleshooting based on industry standards.	LO 1. PREPARE MAINTENANCE WORK 1.1 Test wiring installations for defects such as: 1.1. Open/loose circuit 1.2. Short circuit 1.3. Grounded circuit 1.2 Develop maintenance plan	TLE_IAEI9-12TW-IIIa-IVj-1

**Kto12 BASIC EDUCATION CURRICULUM
 JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
 INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)**

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
2. Maintenance and safety Measures: 2.1. Electrical wiring installation 2.2. Working area			LO 2. MAINTAIN ELECTRICAL SYSTEM 2.1. Check wiring installations periodically 2.2. Perform housekeeping in the working area	TLE_IAEI9-12TW-IIIa-IVj-2
3. Troubleshoot defects			LO 3. TROUBLESHOOT DEFECTS OF AN ELECTRICAL SYSTEM 3.1. Identify defects of an electrical system 3.2. Repair defects of an electrical system	TLE_IAEI9-12TW-IIIa-IVj-3

Kto12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)

Code Book Legend

Sample: TLE_IAEI9-12RC-IVf-j-4

LEGEND		SAMPLE	
First Entry	Learning Area and Strand/ Subject or Specialization	Technology and Livelihood Education_Industrial Arts Electrical Installation and Maintenance	TLE_IA EI 9-12
	Grade Level	Grade 9/10/11/12	
Uppercase Letter/s	Domain/Content/ Component/ Topic	Perform Roughing-in Activities for Communication and Distribution	RC
			-
Roman Numeral <i>*Zero if no specific quarter</i>	Quarter	Fourth Quarter	IV
Lowercase Letter/s <i>*Put a hyphen (-) in between letters to indicate more than a specific week</i>	Week	Week Six to Ten	f-j
			-
Arabic Number	Competency	Install cable bridge	4

DOMAIN/ COMPONENT	CODE
Personal Entrepreneurial Competencies	PECS
Environment and Marketing	EM
Prepare Electrical Materials and Tools	UT
Perform Mensuration and Calculations	MC
Interpret Technical Drawings and Plans	ID
Maintain Tools and Equipment	MT
Practice Occupational Health and Safety Procedure	OS
Prepare Electric and Hydraulic Tools	ET
Perform Roughing-in Activities for Communication and Distribution	RC
Installing Wiring Devices for Floor and Ground Fault Current Interrupting Outlets	WD

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.

Kto12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD EDUCATION AND SENIOR HIGH SCHOOL TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE (NC II)

SAMPLE INDUSTRIAL ARTS CURRICULUM MAP** (as of November 2015)

GRADE 7/8 (EXPLORATORY)				GRADES 9-12				
				Automotive Servicing (NC I)+			8 sems	
				*Automotive Servicing (NC II)			8 sems	
				Motorcycle/Small Engine Servicing (NC II)	4 sems	Driving (NC II)	2 sems	
				Consumer Electronics Servicing (NC II)+			8 sems	
				*Mechatronics Servicing (NC II)			4 sems	
				Electronic Products Assembly and Servicing (NC II)+ +			8 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)			4 sems	
				Machining (NC I)+ +			8 sems	
				*Machining (NC II)			8 sems	
				Plumbing (NC I)	4 sems	*Plumbing (NC II)	4 sems	
				Domestic Refrigeration and Airconditioning Servicing (NC II)			8 sems	
				*Domestic Refrigeration and Airconditioning Servicing (PACU/CRE) (NC III)			8 sems	
				*Shielded Metal Arc Welding (NC II)			4 sems	
				Shielded Metal Arc Welding (NC I)	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) +			6 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.
 Other specializations with no pre-requisites may be taken up during these semesters.
 Pre-requisites of the subjects to the right should be taken up during these semesters.

+ CG to be updated by December 2015 ++ CG to be updated by December 2015

****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.**