

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 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 enhance the knowledge, skills and attitudes of an individual in the field of Motorcycle/Small Engine Servicing in accordance with industry standards. It covers core competencies such as, 1) performing periodic maintenance, and 2) performing repair services or trouble shooting on small engine systems which include carburetor and fuel system, lubricating system, ignition system, suspension system, brake system, wheels and tires, clutch system, electrical system, final drive, and cooling system.

This course is also designed to equip the individual with the basic and common knowledge, skills and attitudes of the motorcycle/small engine mechanic in accordance with industry standards. The basic competency will be integrated in delivering the common and core competency. This course will lead to National Certificate II (Motorcycle/Small Engine Servicing NC II).

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
Introduction 1. Basic concepts in motorcycle/small engine servicing 2. Relevance of the course 3. Career opportunities	The learner demonstrates an understanding of the basic concepts and underlying theories and principles in motorcycle/small engine servicing.	The learner independently demonstrates common competencies in motorcycle/small engine servicing by TESDA Training Regulations.	1. Explain basic concepts in motorcycle/small engine servicing. 2. Discuss the relevance of the course 3. Explore career opportunities in motorcycle/small engine servicing.	
PERSONAL ENTREPRENEURIAL COMPETENCIES (PECS)				
1. Assessment of Personal Entrepreneurial Competencies and Skills (PECS) vis-à-vis a practicing entrepreneur/employee a. Characteristics b. Attributes c. Lifestyle d. Skills e. 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 Personal Entrepreneurial Competencies and Skills (PECS) and prepares a list of PECS of a practitioner/entrepreneur in Motorcycle/Small Engine Servicing.	LO 1. Recognize Personal Entrepreneurial Competencies and Skills (PECS) needed in Motorcycle/Small Engine Servicing 1.1 Assess one's PECS: characteristics, attributes, lifestyle, skills, traits 1.2 Assess practitioner's: characteristics, attributes, lifestyle, skills, traits 1.3 Compare one's PECS with that of a practitioner /entrepreneur	TLE_PECS9-12-00-1

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INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
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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 and 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 	The learner demonstrates an understanding of the concepts environment and market and how they relate to a career choice in Motorcycle/Small Engine Servicing.	The learner independently generates a business idea based on the analysis of environment and market in Motorcycle/Small Engine Servicing.	LO 1. Generate a business idea that relates with a career choice in Motorcycle/Small Engine Servicing <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 carpentry business. 1.4 Determine profile of potential customers. 1.5 Determine profile of potential competitors. 1.6 Generate potential business ideas based on the SWOT analysis. 	TLE_EM9-12-00-1
COMMON COMPETENCIES				
LESSON 1: APPLYING APPROPRIATE SEALANT/ADHESIVE (AAS)				
<ul style="list-style-type: none"> • Use of sealant and adhesive • Types and classification of sealant and adhesives • Procedure in checking sealant/adhesive 	The learner demonstrates an understanding of concepts and underlying principles in applying appropriate sealant/adhesive.	The learner independently performs application of appropriate sealant/adhesive based on service manual.	LO 1. Identify appropriate sealant/adhesive. <ol style="list-style-type: none"> 1.1 Identify appropriate sealant and adhesives. 1.2 Select sealant/adhesive in line with job requirements and manufacturers specification. 1.3 Perform sealant/adhesive checking to ensure the product is fit for use. 1.4 Apply work safety procedures. 	TLE_IAMSES9-12AAS-Ia-1
<ul style="list-style-type: none"> • Types of surface material and appropriate sealant/adhesive to be used. • Techniques and procedures in preparing surfaces for sealant/adhesive. • Safety in preparing different surfaces. 			LO 2. Prepare surface for sealant/adhesive application. <ol style="list-style-type: none"> 2.1 Identify the types of sealant and adhesives according to surface. 2.2 Identify surface materials as per construction. 2.3 Clean surface and free of moisture, dust and other foreign matters to ensure maximum adhesion or seal. 2.4 Observe safety while performing job. 	TLE_IAMSES9-12AAS-Ia-2

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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Use of sealant and adhesive • Types and classification of sealant and adhesives • Tools and materials to be used in applying sealant/adhesive • Techniques in applying sealant/adhesive • Safety requirements in applying sealant/adhesive • Hazards and risk associated with use of sealant/adhesive. 			<p>LO 3. Apply sealant/adhesive evenly.</p> <p>3.1 Apply sealant/adhesive evenly on the surface in line with manufacturer’s specification.</p> <p>3.2 Removed excess sealant/adhesive by sanding or by scrapping.</p> <p>3.3 Apply sealant/adhesive using tools and equipment appropriate to job requirements.</p> <p>3.4 Observe safety and wear PPE in accordance with industry SOP.</p> <p>3.5 Identify hazards associated with the use of sealant and adhesives.</p>	<p>TLE_IAMSES9-12AAS-Ia-3</p>
<ul style="list-style-type: none"> • Sealant/adhesive storing procedures. • Waste disposal standard procedures • Hazards associated with environment due to improper waste disposal 			<p>LO 4. Store unused and dispose used sealant/adhesive.</p> <p>4.1 Store sealant/adhesive as per prescribed procedure.</p> <p>4.2 Dispose waste as per workshop SOP.</p> <p>4.3 Observe safe handling of sealant/adhesive.</p>	<p>TLE_IAMSES9-12AAS-Ia-4</p>
LESSON 2: MOVING AND POSITIONING VEHICLE (MPV)				
<ul style="list-style-type: none"> • Safety in driving sign and symbols • Engine system check up procedures • Tire inflation pressure specification • Belt tension checking procedures • Driver’s code and conduct • BLOBAGS 	<p>The learner demonstrates an understanding of concepts and underlying principles in moving and positioning vehicle.</p>	<p>The learner independently performs moving and positioning vehicle based on the specific guidelines from manufactures manual.</p>	<p>LO 1. Prepare the vehicle for driving.</p> <p>1.1 Perform correct check-up procedures of engine system.</p> <p>1.2 Check tire inflation pressures according to manufacturer’s specification.</p> <p>1.3 Check braking system and fluid level.</p> <p>1.4 Check engine belt tension and other necessary units in accordance with manual.</p> <p>1.5 Check lighting system according to established procedures.</p>	<p>TLE_IAMSES9-12MPV-Ib-5</p>

K TO 12 BASIC EDUCATION CURRICULUM
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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Types of vehicle • Driving procedure and techniques <ul style="list-style-type: none"> - Manual Transmission - Automatic Transmission • Starting an engine • Shifting gears • Steering vehicle • Brake application • Driving skills • Parking safety and technique 			<p>LO 2. Move and Position Vehicle.</p> <p>2.1 Identify or select vehicle to be move or reposition as per job requirements.</p> <p>2.2 Drive vehicle safely to the designated location according to job specification.</p> <p>2.3 Park vehicle properly following safety procedures and techniques.</p>	<p>TLE_IAMSES9-12MPV-Ic-d-6</p>
<ul style="list-style-type: none"> • Vehicle safe position • Oil level • Brake fluid level • Battery electrolytes • Tire pressure • Clutch fluid • Position of driving gear • Lighting and warning devices • Types of vehicle external damages 			<p>LO 3. Check the vehicle.</p> <p>3.1 Check vehicle position as per requirement.</p> <p>3.2 Perform check up procedures upon parking.</p> <p>3.3 Check vehicle for external damage.</p>	<p>TLE_IAMSES9-12MPV-Ie-7</p>
LESSON 3: PERFORMING MENSURATION AND CALCULATION (PMC)				
<ul style="list-style-type: none"> • Types of measuring instruments and applications • Reading skills of measuring instrument • Techniques in measuring parts/components 	<p>The learner demonstrates an understanding of concepts and underlying principles in performing measurements and calculations.</p>	<p>The learner independently performs mensuration and calculation based on 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 appropriate measuring instrument as per job requirement.</p>	<p>TLE_IAMSES9-12PMC-If-8</p>

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Conversion of units of measurement from English-metric and vice versa • Techniques in determining tolerance/allowance of parts/components • Calibration and using testing instruments • Solving problems using formulas • Finding areas of different geometrical figures 			<p>LO 2. Carry out measurement and calculation.</p> <p>2.1 Select measuring tools in line with job requirements.</p> <p>2.2 Obtain accurate measurements.</p> <p>2.3 Perform calculations needed to complete work/task using fundamental operation of mathematics.</p> <p>2.4 Check correct and accurate numerical computation.</p>	<p>TLE_IAMSES9-12PMC-If-g-9</p>
<ul style="list-style-type: none"> • Safe handling and caring of measuring instruments • Calibrating measuring instrument • Safe handling and procedures in using measuring instruments • Storing of measuring instruments 			<p>LO 3. Maintain measuring instrument.</p> <p>3.1 Clean measuring instruments before and after using.</p> <p>3.2 Keep measuring instruments in safe dry place.</p> <p>3.3 Observe proper techniques in using precise instrument in accordance with the manufacturer’s standards.</p> <p>3.4 Observe proper handling of measuring instruments in accordance with industry standards.</p>	<p>TLE_IAMSES9-12PMC-Ig-10</p>
LESSON 4: READING, INTERPRETING AND APPLYING SPECIFICATION AND MANUAL (RIA)				
<ul style="list-style-type: none"> • Types of manuals used in automotive industry • Identifying appropriate manuals • Knowledge and techniques in accessing data and specification as per job requirements 	<p>The learner demonstrates an understanding of concepts and underlying theories and principles in interpreting manuals of specifications in automotive.</p>	<p>The learner independently reads, interprets and applies specification and manual as per job requirements.</p>	<p>LO 1. Identify and access manual/ specifications.</p> <p>1.1 Identify and access appropriate manuals as per job requirement.</p> <p>1.2 Check version and date of manual to ensure correct specification and identify procedures.</p>	<p>TLE_IAMSES9-12RIA-Ih-11</p>

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
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<ul style="list-style-type: none"> • Procedure/techniques in interpreting data and specifications • Identification of symbols used in the manuals • Identification of units of measurements 			LO 2. Interpret manuals. 2.1 Locate relevant sections, chapters of manuals/ specifications in relations to the work to be conducted. 2.2 Interpret information and procedure in the manual in accordance to industry practices.	TLE_IAMSES9-12RIA-Ih-12
<ul style="list-style-type: none"> • Interpreting appropriate data and specifications • Applying data and specification accessed from the manuals as required in the given task 			LO 3. Apply information accessed in the manual. 2.1 Interpret data and specification according to job requirement. 2.2 Identify work steps correctly in accordance with manufacturer’s specification. 2.3 Apply manual data according to the given task. 2.4 Interpret all correct sequence and adjustment in accordance with information contained on the manual or specification.	TLE_IAMSES9-12-RIA-Ih-13
<ul style="list-style-type: none"> • Techniques in storing manuals • Procedures in maintaining manuals 			LO 4. Store manual. 3.1 Store manuals appropriately to insure prevention of damage. 3.2 Store manuals properly for easy access and ready for updating of information required in the given task.	TLE_IAMSES9-12RIA-Ih-14
LESSON 5: USING AND APPLYING LUBRICANT/COOLANT (UAL)				
<ul style="list-style-type: none"> • Lubrication schedules • Uses of coolants • Properties of lubricant and coolant • Types of lubricant and application • Hazards associated with lubricants 	The learner demonstrates an understanding of basic concept in using and applying lubricant/coolant.	The learner independently performs the application of lubricant/coolant based on service manuals.	LO 1. Identify types of lubricants/ coolant. 1.1 Access and interpret correct information on lubrication schedule from appropriate manufacturer’s specifications manual. 1.2 Identify type and quantity of lubricants/ coolant as per job requirements.	TLE_IAMSES9-12UAL-Ii-15

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INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Lubrication schedule • Tools and application for coolant and lubricant application • Hazards associated with lubricant • Lubrication procedure • Techniques in handling lubricants • Personal safety procedures • Use and care of tools and equipment • Techniques in applying coolant/lubricant • Hazards of coolant/lubricant in the environment • Proper disposal of coolant and lubricants 			<p>LO 2. Use and apply lubricants/coolant</p> <p>2.1 Identify correct procedure for change of lubricant following manufacturer’s specification or manual.</p> <p>2.2 Select and use correct tools and equipment in line with job requirements.</p> <p>2.3 Remove and replaced existing lubricants with specified types and quantity of new materials in line with manufacturer’s specification.</p> <p>2.4 Observe safe procedure and use of PPE when removing or replacing lubricant.</p> <p>2.5 Dispose used lubricants in accordance with environmental guidelines.</p> <p>2.6 Check work in line with company SOP.</p>	<p>TLE_IAMSES9-12UAL-Ii-16</p>
<ul style="list-style-type: none"> • Workshop policy and procedure • Maintenance and storage of shop cleaning equipment • Use and storage of cleaning chemicals • Shop safety practices • Housekeeping practices • 5S 			<p>LO 3. Perform housekeeping activities</p> <p>3.1 Store tools, equipment and materials properly as per company SOP.</p> <p>3.2 Free workplace from waste materials.</p>	<p>TLE_IAMSES9-12UAL-Ii-17</p>
LESSON 6: PERFORMING SHOP MAINTENANCE (PSM)				
<ul style="list-style-type: none"> • Workshop policies • Types and usage of cleaning chemicals/agents • Safe handling of equipment and tools • Service procedures • Equipment maintenance standards • Procedures and techniques in cleaning work area 	<p>The learner demonstrates an understanding of concepts and underlying principles in performing shop maintenance.</p>	<p>The learner independently performs shop maintenance in accordance with OHS (occupational health and safety) procedures.</p>	<p>LO 1. Inspect and clean tools, equipment and work area.</p> <p>1.1 Inspect and clean tools, equipment and the work area, free from dust, grease and other substances.</p> <p>1.2 Observe cleaning solvent used as per workshop cleaning requirements.</p> <p>1.3 Check and clean work area.</p> <p>1.4 Keep dry wet surface or spot in the work area.</p>	<p>TLE_IAMSES9-12PSM-Ij-18</p>

K TO 12 BASIC EDUCATION CURRICULUM
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<ul style="list-style-type: none"> • Safe storing of tools and equipment • Storage and disposal of hazardous/flammable tools/materials • Personal safety procedures. • Relevant technical information on tools and equipment • Labeling procedures • Principles of total quality management (TQM) and 5S 			<p>LO 2. Store/arrange tools and shop equipment.</p> <p>2.1 Arrange and store tools and equipment in their respective shelves/location.</p> <p>2.2 Post visible corresponding labels.</p> <p>2.3 Secure and log tools in the record book.</p>	<p>TLE_IAMSES9-12PSM-Ij-19</p>
<ul style="list-style-type: none"> • Use PPE in handling automotive waste materials • Effects of automotive wastes to men and its environment. • Waste management and disposal • Recording of automotive waste materials • Cleaning chemicals for grease and lubricants • Labeling procedures and technique 			<p>LO 3. Dispose waste and used lubricants.</p> <p>3.1 Dispose waste and used lubricants in accordance with the standard operational procedures and environmental regulations.</p> <p>3.2 Label containers for waste and used lubricants properly.</p> <p>3.3 Observe personal safety in disposing waste and used lubricants.</p>	<p>TLE_IAMSES9-12PSM-Ij-20</p>
<ul style="list-style-type: none"> • Conducting inventory and preparing records. • Maintenance and safe handling of tools and equipment • Maintenance and updating of records and reports. 			<p>LO 4. Report damaged tools/equipment.</p> <p>4.1 Maintain complete inventory of tools and equipment.</p> <p>4.2 Identify damaged tools/equipment with repair recommendation.</p> <p>4.3 Prepare reports on damaged tools/equipment.</p>	<p>TLE_IAMSES9-12PSM-Ij-21</p>

K TO 12 BASIC EDUCATION CURRICULUM
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INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
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CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
CORE COMPETENCIES				
LESSON 7: PERFORMING PERIODIC MAINTENANCE (PPM)				
<ul style="list-style-type: none"> • Principles of motorcycle engine (2-stroke and 4-stroke) • Parts and function of motorcycle engine • Periodic Preventive Maintenance (PPM) and its purpose • Valve clearance adjustment • Timing chain adjustment • Types of spark plug • Adjusting spark plug gap/ clearances • Oil types and specifications • Techniques and procedures of cleaning motorcycle engine parts • Procedure for engine tune up • Use and care of tools and equipment • Removing upper part of an engine • Assembling of engine parts • Use of manufacturer’s specification manual • Safety precautions in assembling and disassembling of engine • Procedure in testing tuned-up engine 	The learner demonstrates an understanding of performing periodic maintenance.	The learner independently performs periodic maintenance based on industry standards.	LO 1. Perform engine tune-up. 1.1 For 4-stroke engine 1.1.1 Set/Adjust valve clearance in accordance with manufacturer’s specification. 1.1.2 Check timing chain for damage. 1.1.3 Check Timing chain tensioner/ adjuster in accordance with the manufacturer’s specification. 1.2 For 2-stroke engine 1.2.1 Decarbonize exhaust port, intake and exhaust valve, cylinder head and piston crown in accordance with prescribed procedure. 1.2.2 Replace cylinder head gasket in accordance with prescribed procedure. 1.2.3 Re-tighten cylinder head nuts and bolts to specified torque and time. 1.2.4 Ensure no damage to tools and equipment and observe safety practices during the engine tune-up. 1.3 Restore engine to its normal working condition.	TLE_IAMSES9-12PPM-IIa-b-22
<ul style="list-style-type: none"> • Function of motorcycle component systems • Parts of motorcycle component systems • Types of ignition system and checking procedure 			LO 2. Check motorcycle/small engine component system and make minor adjustments and replacements. 2.1 Ignition system 2.1.1 Perform task as per standard operating procedures.	TLE_IAMSES9-12PPM-IIb-d-23

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> ● Procedure in performing minor adjustments ● Use and care of tools and equipment ● Techniques and procedures to perform minor adjustments and replacement of motorcycle component systems ● Safety precautions in repairing/replacement of component systems ● Use of manufacturer’s specification manual for minor adjustments 			2.1.2 Identify ignition system defects such as high-tension cable cracks. 2.1.3 Check contact point as per manufacturer’s specification. 2.1.4 Adjust contact point as per manufacturer’s specification. 2.1.5 Adjust ignition timing to specification which is equal to or less than 1 degree. 2.1.6 Remove spark plug without damage on threads or no broken spark plug insulator. 2.1.7 Install spark plug without damage on threads or no broken spark plug insulator. 2.1.8 Restore spark plug clearance to normal condition. 2.1.9 Replace spark plug according to specifications. 2.1.10 Clean contact point from corrosion. 2.1.11 Replace contact point according to specifications. 2.1.12 Restore CDI unit and connection to corresponding terminal ignition timing.	
<ul style="list-style-type: none"> ● Fuel system component ● Motorcycle fuel system checking procedure ● Condition of fuel system component 			2.2 Fuel system 2.2.1 Switch off engine before inspection of fuel system. 2.2.2 Add fuel as per manufacturer’s specification and without spill. 2.2.3 Free fuel transfer pump from sediment, carb bowl from dirt, water and other foreign matters. 2.2.4 Tighten all mounting bolts to specified torque according to manufacturer’s specification. 2.2.5 Adjust engine idle speed between 700 to 750 rpm.	

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
			2.1.6 Ensure absence of cracks in fuel hoses in the system. 2.1.7 Ensure absence of sediments and impurities in the system. 2.1.8 Restore/Adjust carburetor idling speed to normal.	
<ul style="list-style-type: none"> • Air filter checking procedure 			2.3 Air filter system 2.3.1 Remove dust and oil from the system. 2.3.2 Ensure absence of air hose cuts and cracks in the system. 2.3.3 Clean air filter and air body from particles of dust and oil. 2.3.4 Replace filter according to manufacturer’s specification.	
<ul style="list-style-type: none"> • Lubricating system checking procedure 			2.4 Lubrication system 2.4.1 Fill engine with factory recommended oil type and rating to “Full” mark on the dipstick. 2.4.2 Connect oil lines to fitting with no indication of leakage. 2.4.3 Remove carbon and oil sludge deposits on the engine breather. 2.4.4 Check oil spill. 2.4.5 Change engine oil with recommended type and rating (4-stroke). 2.4.6 Check engine oil to correct level as specified in the manual. 2.4.7 Identify engine contaminants. 2.4.8 Check oil level using the engine dipstick. 2.4.9 Change engine oil filter and o-ring (2-stroke). 2.4.10 Replenish 2T oil tank. 2.4.11 Check oil line for air. 2.4.12 Check 2T oil pump. 2.4.13 Adjust 2T oil pump.	

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Cooling system components • Checking procedure 			<p>2.5 Cooling system</p> <p>2.5.1 Liquid cooled engine</p> <p style="padding-left: 20px;">2.5.1.1 Check absence of leak in coolant.</p> <p style="padding-left: 20px;">2.5.1.2 Check absence of hose cracks.</p> <p style="padding-left: 20px;">2.5.1.3 Remove dirt, sediments and impurities.</p> <p style="padding-left: 20px;">2.5.1.4 Tighten cooling fan bolts properly.</p> <p style="padding-left: 20px;">2.5.1.5 Fill radiator with coolant.</p> <p style="padding-left: 20px;">2.5.1.6 Adjust the deflection of radiator fan belt (should have ¼"when pressed down/deflation.</p> <p>2.5.2 Air cooled engine</p> <p style="padding-left: 20px;">2.5.2.1 Check absence of cracks, dirt and obstruction of air flow.</p> <p style="padding-left: 20px;">2.5.2.2 Install air cooling fins as required.</p> <p style="padding-left: 20px;">2.5.2.3 Tighten blower fan bolt properly.</p> <p style="padding-left: 20px;">2.5.2.4 Check cooling fans for bent or broken blades.</p>	
<ul style="list-style-type: none"> • Exhaust system component • Checking procedure 			<p>2.6 Exhaust system</p> <p>2.6.1 Tighten exhaust pipe bolts / nuts properly.</p> <p>2.6.2 Check exhaust for dents, cracks or leaks.</p> <p>2.6.3 Check carbon deposits in the exhaust pipe and muffler after decarbonizing (2-stroke).</p> <p>2.6.4 Checks exhaust muffler bolts/nuts.</p> <p>2.6.5 Tighten exhaust muffler bolts/nuts.</p> <p>2.6.6 Clean baffle pipe.</p> <p>2.6.7 Clean spark arrester.</p> <p>2.6.8 Clean muffler connector.</p>	

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> Suspension system components Checking procedures 			2.6.9 Check exhaust clamp for leaks. 2.6.10 Replace exhaust gasket. 2.7 Combustion chamber 2.7.1 Remove cylinder heads in a predetermined sequence set by the manufacturer. 2.7.2 Check cylinder head for cracks. 2.7.3 Install cylinder heads in a predetermined sequence set by the manufacturer. 2.7.4 Tighten cylinder head bolts to specified torque set by the manufacturer. 2.7.5 Remove carbon deposits in the combustion chamber. 2.8 Suspension system 2.8.1 Conduct visual inspection. 2.8.2 Check front fork compression and rebound damping. 2.8.3 Check front fork for oil seal leaks. 2.8.4 Check front fork oil level. 2.8.5 Check swing arm alignment. 2.8.6 Check pivot shaft and bushing. 2.8.7 Check air bleed front fork.	
<ul style="list-style-type: none"> Types of maintenance report Parts of maintenance report Accomplishing maintenance report 			LO 3. Prepare maintenance report. 3.1 Accomplish maintenance report/ checklist. 3.2 Complete maintenance report/checklist. 3.3 Submit maintenance report for signature and verification of supervisor.	TLE_IAMSES9-12PPM-IIe-24
LESSON 8: SERVICING FUEL SYSTEM (SFS)				
<ul style="list-style-type: none"> Throttle cable specification Proper grip play Tools and equipment used to adjust/replace throttle cable/choke cable 	The learner demonstrates an understanding of concept and underlying principles in servicing the fuel system.	The learner independently performs servicing of fuel system based on industry standards.	LO 1. Adjust/replace throttle cable/choke cable. 1.1 Ensure that the movement of handle bar does not raise or hang engine idle speed. 1.2 Check throttle/choke cable free play.	TLE_IAMSES9-12SFS-IIe-25

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Installation of cable • Procedure in adjusting throttle cable and choke cable free play. 			1.3 Adjust throttle/choke cable free play.	
<ul style="list-style-type: none"> • Function of fuel filter • Types of fuel filter • Installation of fuel filter • Safety precautions in installing fuel filter 			LO 2. Replace gasoline fuel filter. 2.1 Replace gasoline fuel filter with new gasket.	TLE_IAMSES9-12SFS-IIe-26
<ul style="list-style-type: none"> • Function of fuel tank • Procedure in draining fuel tank • Safety precautions in draining fuel tank • Safety features of fuel tank 			LO 3. Drain gasoline fuel tank. 3.1 Disconnect battery when the fuel tank is drained. 3.2 Check fuel tank for leakage and deposit of sludge and rust after draining. 3.3 Replace drain plug with new gasket. 3.4 Tighten drain plug with no sign of leaks.	TLE_IAMSES9-12SFS-IIe-27
<ul style="list-style-type: none"> • Function of fuel control valve • Replacing control valve • Safety precautions • Testing of control valve 			LO 4. Replace fuel control valve. 4.1 Replace fuel control valve with new gasket with no indication of leak.	TLE_IAMSES9-12SFS-IIe-28
<ul style="list-style-type: none"> • Operation of fuel tank • Procedure in cleaning fuel tank • Procedure in washing strainer screen • Installation of strainer • Sizes of O-ring 			LO 5. Clean fuel tank/filter. 5.1 Inspect fuel tank for leakage. 5.2 Replace fuel tank gaskets. 5.3 Check fuel tank cap ventilation and breather nose and valve. 5.4 Check fuel filter / strainer.	TLE_IAMSES9-12SFS-IIIf-29
<ul style="list-style-type: none"> • Fuel line hose • Checking fuel line • Procedure in disconnecting fuel line • Replacing fuel lines • Procedure in removing and installation of fuel cock 			LO 6. Inspect/ replace fuel lines. 6.1 Check fuel line hose damages. 6.2 Replace damaged fuel line hose. 6.3 Inspect fuel cock.	TLE_IAMSES9-12SFS-IIIf-30

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Types of fuel pump • Operation of fuel pump • Checking fuel pump operation • Procedure in replacing fuel pump • Measurement of gas discharge 			<p>LO 7. Inspect/ replace fuel pump. 7.1 Check fuel pump operation. 7.2 Measure fuel pump gas discharge rate.</p>	<p>TLE_IAMSES9-12SFS-IIIf-31</p>
<ul style="list-style-type: none"> • Types and function of air filter • Procedure in removing and installing air cleaner • Safety precautions in cleaning air cleaner • Cleaning of air filter • Replacing damaged as clogged air filter 			<p>LO 8. Inspect air cleaner assembly. 8.1 Determine/ check air filter element. 8.2 Lubricate foam type air filter. 8.3 Inspect air box for dirt and cracks. 8.4 Replace clogged or damage air filter. 8.5 Clean air box for dirt and cracks.</p>	<p>TLE_IAMSES9-12SFS-IIg-32</p>
<ul style="list-style-type: none"> • Principles of turbo charging • Types of bearing • Types of lubrication • Parts inspection of carburetor jets • Functions of diaphragm of C.V. constant velocity carburetor • Carburetor balancing and tuning procedures • Carburetor circuits 			<p>LO 9. Inspect turbo system. 9.1 Check turbo charger operation. 9.2 Check bearing for smoothness of operation. 9.3 Check exhaust turbine blade. 9.4 Check lubrication system.</p>	<p>TLE_IAMSES9-12SFS-IIg-33</p>
<ul style="list-style-type: none"> • Parts and operation of fuel injection system • Checking fuel pressure regulator • Fuel pump control system • Checking pump control system • Checking fuel injector assembly • Checking intake air control actuator 			<p>LO 10. Inspect fuel injection system. 10.1 Check fuel pressure regulator. 10.2 Check fuel pump control system. 10.3 Check fuel injector assembly. 10.4 Check fuel injection timing map. 10.5 Check intake air control valve and actuator. 10.6 Remove throttle body following correct procedure.</p>	<p>TLE_IAMSES9-12SFS-IIh-j-34</p>

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Operation and function of throttle body • Procedure on removal and installation of throttle body • Cleaning of throttle body • Disassembling and assembling of throttle body • Procedure in testing fuel injection system 			10.7 Clean throttle body. 10.8 Reassemble throttle body. 10.9 Checks throttle body lever gap adjustment. 10.10 Adjust throttle body lever gap adjustment. 10.11 Check vacuum damper for leaks.	
LESSON 9: SERVICING LUBRICATION SYSTEM (SLS)				
<ul style="list-style-type: none"> • Types of engine oil • Properties of engine oil • Contaminants of engine oil • Function of dipstick • Oil level 	The learner demonstrates an understanding of servicing the lubrication system.	The learner independently performs servicing the lubrication system based on industry standards.	LO 1. Inspect engine oil level. 1.1 Check engine oil to correct level as specified by the manufacturer. 1.2 Identify engine oil contaminants.	TLE_IAMSES9-12SLS-IIIa-35
<ul style="list-style-type: none"> • Operation of lubrication system of 2 stroke and 4 stroke motorcycle engine • Operation and functions of oil pressure gauge • Types , functions and operation of oil pumps • Parts of oil pump • Removal of oil pump • Disassembling and Assembling of oil pump • Measurement of clearances • Oil pump calibration • Installation of oil pump • Use of manufacturer’s standard specification manual 			LO 2. Check oil pump. 2.1 Check engine oil pump circulation and function. 2.2 Disassemble and assemble oil pump.	TLE_IAMSES9-12SLS-IIIa-36

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Location of oil lines • Replacement of oil lines • Types of oil contaminants • Removal of oil contaminants • Change oil procedure 			LO 3. Check oil lines and cables. 3.1 Check 2T oil lines for trapped air (2-stroke). 3.2 Check oil lines for clogging.	TLE_IAMSES9-12SLS-IIIa-37
<ul style="list-style-type: none"> • Location and function of 2T oil pump • Calibration of 2 stroke oil pump • Operations of lubrication system • Checking oil pump • Adjusting oil pump according to manufacturer’s specification manual 			LO 4. Check 2T oil pump. 4.1 Check 2T oil pump adjustment. 4.2 Adjust 2T oil pump to correct setting.	TLE_IAMSES9-12SLS-IIIa-38
<ul style="list-style-type: none"> • Classification of oil filters • Parts and function of oil filter assembly • Preventive maintenance of oil filter • Removal and disposal of used oil • Cleaning of oil filter parts 			LO 5. Check oil filter. 5.1 Check oil filter. 5.2 Clean oil filter.	TLE_IAMSES9-12SLS-IIIb-39
<ul style="list-style-type: none"> • Replacing of oil filter according to manufacturer’s specification and procedures. 			LO 6. Replace oil filter. 6.1 Replace oil filter following manufacturer’s procedures and specification. 6.2 Perform change oil procedure	TLE_IAMSES9-12SLS-IIIb-40
<ul style="list-style-type: none"> • Purpose of oil cooling system • Parts and function of oil cooler 			LO 7. Inspect oil cooler system. 7.1 Check oil cooler assembly for leaks/cracks. 7.2 Check oil cooler hose for leaks.	TLE_IAMSES9-12SLS-IIIb-c-41

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> assembly • Types of engine lubricants • Cleaning of oil cooler • Removal of oil cooler assembly • Disassembling and assembling of oil cooler • Checking oil cooler hose • Checking oil cooler gasket • Use of manufacturer’s specification manual 			7.3 Check oil cooler gaskets for leaks.	
<ul style="list-style-type: none"> • Function and location of oil pressure gauge • Operation of oil pressure gauge • Removal and installation of oil pressure gauge • Checking engine oil pressure • Checking oil pressure switch operation • Use of manufacturer’s specification manual 			LO 8. Check oil pressure. 8.1 Check engine oil pressure. 8.2 Check oil pressure switch operation.	TLE_IAMSES9-12SLS-IIId-e-42
LESSON 10: SERVICING IGNITION SYSTEM (SIS)				
<ul style="list-style-type: none"> • Function, types and specification of sparkplug • Cleaning of spark plug • Removing and replacing spark plug • Checking and adjusting spark plug according to manual specification 	The learner demonstrates an understanding of concepts and underlying principles in servicing the ignition system.	The learner independently performs servicing the ignition system based on industry standards.	LO 1. Check/adjust/replace spark plug. 1.1 Remove spark plug with no damage as per manufacturer’s instruction. 1.2 Check spark plug. 1.3 Clean spark plug. 1.4 Check spark plug gap/clearance according to manufacturer’s specification. 1.5 Adjust spark plug gap/clearance according to manufacturer’s specification. 1.6 Reinstall spark plug with no damage as per manufacturer’s instruction. 1.7 Replace sparkplug.	TLE_IAMSES9-12SIS-IIIf-43

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Troubleshooting of ignition system • Motorcycle ignition coil • Checking spark plug high tension cables • Replacing motorcycle ignition coil 			LO 2. Check/replace ignition coil. 2.1 Determine ignition coil condition and resistance. 2.2 Check high tension cord for cracks and resistance. 2.3 Troubleshoot ignition system.	TLE_IAMSES9-12SIS-IIIf-44
<ul style="list-style-type: none"> • Function and location of contact point/condenser • Types of condenser • Cleaning of contact point • Testing of condenser • Removal and installation of contact point/condenser • Checking/ Replacing contact point/ condenser 			LO 3. Inspect/adjust contact point/condenser. 3.1 Check contact point gap as per manufacturer’s specification. 3.2 Clean contact point faces for oil residue, dirt, burns, or pitting. 3.3 Replace worn out contact point assembly as per procedure. 3.4 Check condenser if defective as per procedure. 3.5 Replace condenser if defective as per procedure.	TLE_IAMSES9-12SIS-IIIf-45
<ul style="list-style-type: none"> • Checking and cleaning contact point • Removing and installing contact point • Removing and installing condenser 			LO 4. Adjust ignition timing. 4.1 Adjust contact point to specification. 4.2 Adjust contact point dwell angle using dwell tester instrument according to manufacturer’s specification.	TLE_IAMSES9-12SIS-IIIf-h-46
<ul style="list-style-type: none"> • Removal and installation of magnetic CDI digital or analog • Types of magnetic CDI digital or analog • Difference of magneto CDI and DC-CDI (Direct Current) • Interpretation of ignition system 			LO 5. Diagnose C.D.I. Magneto/C.D.I. battery. 5.1 Remove and install magneto type coil and CDI unit. 5.2 Check magneto type C.D.I. unit. 5.3 Check magneto type coil. 5.4 Check engine control module/unit. 5.5 Check ignition inter-lock system.	TLE_IAMSES9-12SIS-IIIf-j-47

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
wiring diagram <ul style="list-style-type: none"> • Operation of ignition system • Use and care of CDI tester • Repair maintenance of CDI 				
<ul style="list-style-type: none"> • Principles of centrifugal force use in the mechanical advancer • Function and location of mechanical advancer • Procedure in adjustment of mechanical advancer • Interpretation of mechanical advancer wiring diagram 			LO 6. Adjust mechanical advancer. 6.1 Adjust mechanical advance to correct timing. 6.2 Adjust stator plate to correct timing. 6.3 Check general and communication signal.	TLE_IAMSES9-12SIS-IIIj-48
LESSON 11: SERVICING EXHAUST SYSTEM (SES)				
<ul style="list-style-type: none"> • Principles of exhaust system • Types of exhaust system • Functions and location of muffler • Types of mufflers and alternatives • Removal and installation of muffler • Checking exhaust pipe/ mufflers mounting bolts • Checking muffler spacers 	The learner demonstrates an understanding of concepts and underlying principles in servicing the exhaust system.	The learner independently performs servicing the exhaust system based on industry standards.	LO 1. Inspect muffler. 1.1 Check exhaust pipe bolts/nuts. 1.2 Check muffler mounting bolts for looseness. 1.3 Check muffler spacers. 1.4 Inspect muffler for dents due to impact.	TLE_IAMSES9-12SES-IVa-49
<ul style="list-style-type: none"> • Procedure in repairing exhaust pipe • Safety precautions in repairing exhaust pipe • Aligning mufflers • Repairing muffler dents • Materials handling for repair of exhaust pipe system 			LO 2. Repair muffler dents. 2.1 Align mufflers as per procedure. 2.2 Repair muffler dents as per procedure.	TLE_IAMSES9-12SES-IVa-50

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Muffler assembly • Exhaust system maintenance procedure • Preventive maintenance for muffler 			<p>LO 3. Check muffler clamp gasket and connector.</p> <p>3.1 Check exhaust gasket for leaks.</p> <p>3.2 Check muffler connector for cracks and leaks.</p> <p>3.3 Check muffler clamp/nut for tightness.</p>	TLE_IAMSES9-12SES-IVa-51
<ul style="list-style-type: none"> • Procedure on muffler de-carbonizing • Types of pollutants in the exhaust system • Exhaust system maintenance procedure 			<p>LO 4. Clean exhaust canister.</p> <p>4.1 Clean exhaust canister.</p> <p>4.2 Replace exhaust canister fiber glass.</p> <p>4.3 Apply sealant to exhaust canister as per procedure.</p>	TLE_IAMSES9-12SES-IVb-52
<ul style="list-style-type: none"> • Safe handling of asbestos and fiber use in the exhaust pipe • Maintenance procedure of exhaust system • Replacing filter glass • Applying sealant to exhaust canister • Types of sealant 			<p>LO 5. Clean exhaust baffle pipe.</p> <p>5.1 Clean exhaust canister fiber glass as per procedure.</p> <p>5.2 Replace fiber glass as per procedure.</p> <p>5.3 Apply sealant to exhaust canister.</p>	TLE_IAMSES9-12SES-IVb-53
<ul style="list-style-type: none"> • Principle of power valve operation • Parts and function of power valve • Types of power valve system • Checking and cleaning of power valve • Removal and installation of power valve • Maintenance of power valve 			<p>LO 6. Check electronic / mechanical power valve.</p> <p>6.1 Check and clean mechanical power valve as per procedure.</p> <p>6.2 Clean power valve.</p> <p>6.3 Adjust mechanical power valve to specified play.</p> <p>6.4 Check electronic power valve module.</p> <p>6.5 Check electronic power valve actuator cable.</p> <p>6.6 Align actuator power valve.</p>	TLE_IAMSES9-12SES-IVb-d-54

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Emission analysis operation and function • Types of emissions • Provisions in Clean Air Act • Preventive maintenance for emission test 			<p>LO 7. Check smoke emission.</p> <p>7.1 Check smoke emission to required standard level.</p> <p>7.2 Check catalytic converter.</p> <p>7.3 Check evaporated canister.</p>	<p>TLE_IAMSES9-12SES-IVd-e-55</p>
LESSON 12: SERVICING SUSPENSION SYSTEM (SSS)				
<ul style="list-style-type: none"> • Operation of suspension system • Function and parts of suspension system • Principle operation of hydraulic and gas type suspension • Standard procedure of inspection of suspension components and friction • Proper care and handling during testing of suspension system • Use of manufacturer’s specifications manual 	<p>The learner demonstrates an understanding of concepts and underlying principles in servicing the suspension system.</p>	<p>The learner independently performs servicing the suspension system based on industry standards.</p>	<p>LO 1. Check suspension play.</p> <p>1.1 Check front fork standard travel and play.</p> <p>1.2 Check rear shocks standard travel and play.</p>	<p>TLE_IAMSES9-12SSS-IVf-56</p>
<ul style="list-style-type: none"> • Types of swing arm construction and design • Location and function of swing arm • Removal and installation of swing arm • Inspection procedure of swing arm alignment 			<p>LO 2. Check swing arm.</p> <p>2.1 Check rear swing arm pivot shaft.</p> <p>2.2 Check rear swing arm bearings/ bushings.</p> <p>2.3 Check swing arm alignment.</p>	<p>TLE_IAMSES9-12SSS-IVf-g-57</p>
<ul style="list-style-type: none"> • Location and function of front fork/outer tube • Common defects of front fork/outer tube 			<p>LO 3. Inspect front fork inner/outer tube.</p> <p>3.1 Inspect front fork outer/outer tube for defects.</p>	<p>TLE_IAMSES9-12SSS-IVg-58</p>

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Standard adjustment/ functions of spring and un-spring weight principle of the motorcycle • Suspension tuning/ adjustment procedure • Setting rebound, compression and damping before disassembling 			<p>LO 4. Adjust suspension.</p> <p>4.1 Adjust front suspension to load and road/track condition.</p> <p>4.2 Adjust rear suspension to load and road/track condition.</p>	<p>TLE_IAMSES9-12SSS-IVg-59</p>
<ul style="list-style-type: none"> • Standard procedure of inspection of suspension components and friction • Proper care and handling during testing of suspension system • Classification of hydraulic lubricants for suspension system • Overhauling of suspension linkages 			<p>LO 5. Inspect suspension linkage (lower and upper).</p> <p>5.1 Inspect suspension linkage smooth operation movement.</p> <p>5.2 Inspect suspension linkage bushings and spacers.</p> <p>5.3 Inspect suspension linkage lubrication and greasing.</p> <p>5.4 Inspect suspension linkage bolts and nuts fork tightness.</p> <p>5.5 Overhaul upper and lower suspension linkage.</p>	<p>TLE_IAMSES9-12SSS-IVh-i-60</p>
<ul style="list-style-type: none"> • Operation and types of telescopic front fork • Operation of suspension system • Parts and components of suspension system • Removal and installation of front fork • Overhauling procedure of front fork 			<p>LO 6. Overhaul front fork.</p> <p>6.1 Initiate front fork dismounting and bleeding.</p> <p>6.2 Disassemble front fork.</p> <p>6.3 Inspect fluid bushings and other sliding parts.</p> <p>6.4 Inspect damping rod.</p> <p>6.5 Measure fork spring free length.</p> <p>6.6 Replace oil seal and o-ring.</p> <p>6.7 Install fork oil to correct level.</p> <p>6.8 Move inner tube several strokes to let air bubbles out.</p> <p>6.9 Adjust fork damping compression and rebound setting.</p>	<p>TLE_IAMSES9-12SSS-IVi-j-61</p>

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
LESSON 13: SERVICING BRAKE SYSTEM (SBS)				
<ul style="list-style-type: none"> • Operation and principles of hydraulic brake system • Classification and types of motorcycle brake system • Types and classifications of brakes used on different types of motorcycle • Parts and function of brake system • Types of damages in motorcycle brake system • Checking of worn and damage brake system components • Types of brake fluids • Cost estimation • Use of manufacturer’s specification manual 	The learner demonstrates an understanding of concepts and underlying principles in servicing the brake system.	The learner independently performs servicing the brake system based on industry standards.	LO 1. Inspect motorcycle brake system components. <ol style="list-style-type: none"> 1.1 Inspect motorcycle brake system components as per manufacturer’s manual. 1.2 Compare conditions found with motorcycle braking system specifications and customer’s preference. 1.3 Identify worn-out or damaged components correctly. 1.4 Determine repair requirements as per customer’s needs and manufacturer’s specification. 1.5 Check repair requirements as per customer’s needs and manufacturer’s specification. 1.6 Document repair requirements 1.7 Discuss repair cost for customer’s approval is obtained. 	TLE_IAMSES9-12SBS-Ia-62
<ul style="list-style-type: none"> • Parts and components of a brake system • Maintenance procedure of a brake system • Disassembling and assembling of brake system • Repairing brake system • Adjustment of brake system • Use of manufacturer’s specification manual • Cleaning of brake system 			LO 2. Carry-out adjustment and repair. <ol style="list-style-type: none"> 2.1 Adjust brake cable to standard required play of brake lever (front). 2.2 Adjust brake rod to standard required play of brake pedal (rear) 2.3 Repair master cylinder as per procedure. 2.4 Drain brake fluid. 2.5 Remove brake lever and brake switch. 2.6 Separate reservoir cap and diaphragm including reservoir tank. 2.7 Remove connector and dust seal boot. 2.8 Remove piston, secondary cup, primary cup, spring and O-ring. 2.9 Replace cup and O-ring. 2.10 Inspect master cylinder bore for 	TLE_IAMSES9-12SBS-Ia-c-63

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
			scratches and other damages. 2.11 Reassemble master cylinder in reverse order of disassembling and removal. 2.12 Bleed brake as per procedures. 2.13 Connect transparent vinyl tube to bleeder valve of caliper. 2.14 Bleed air to remove bubbles in the system of the hydraulic brake. 2.15 Replace brake level/pedal as per procedure. 2.16 Replace broken or bent brake lever. 2.17 Replace bent or damaged brake pedal.	
<ul style="list-style-type: none"> • Principle of ABS • Parts and function of ABS • Check ABS components 			LO 3. Diagnose ABS system. 3.1 Check hydraulic unit operation. 3.2 Check solenoid valve operation. 3.3 Check valve relay. 3.4 Check brake motor pump. 3.5 Check one way valve. 3.6 Check speed sensor and check sensor rotor. 3.7 Check ABS warning light.	TLE_IAMSES9-12SBS-Ic-e-64
<ul style="list-style-type: none"> • Test procedure of motorcycle • Test procedure of ABS • Use of manufacturer’s specification manual 			LO 4. Perform final road test. 4.1 Initiate road testing procedure. 4.2 Check front brake operation and play. 4.3 Check rear brake operation and play. 4.4 Measure motorcycle braking distance. 4.5 Check ABS brake system operation/function.	TLE_IAMSES9-12SBS-Ie-65
LESSON 14: SERVICING WHEELS AND TIRES (SWT)				
<ul style="list-style-type: none"> • Classification of motorcycle tires • Construction and design of tires • Use and care of pressure gauge • Common tire damages • Inflating and deflating of tires 	The learner demonstrates an understanding of concepts and underlying principles in servicing the wheels and tires.	The learner independently performs servicing the wheels and tires based on industry standards.	LO 1. Inspect tire condition. 1.1 Check tire condition. 1.2 Inflate tire to the required pressure. 1.3 Check tire thread wear limit. 1.4 Check tire for cracks, and foreign objects imbedded on thread.	TLE_IAMSES9-12SWT-If-66

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Proper use of tires • Safe handling of tires • Use of manufacture’s specification manual 				
<ul style="list-style-type: none"> • Types of rim and rim lock • Adjustment procedure of rim lock • Checking rim lock • Remove and replace worn-out rim lock 			LO 2. Check rim lock. 2.1 Check wheel rim lock condition. 2.2 Re-tighten loose rim lock nut. 2.3 Replace worn-out rim locks.	TLE_IAMSES9-12SWT-If-67
<ul style="list-style-type: none"> • Checking of damaged bearing • Removal and installation of bearing • Application of bearing grease • Checking damages on hub damper 			LO 3. Check wheel bearings/ hub damper. 3.1 Check wheel bearing for smooth operating condition. 3.2 Grease wheel bearing. 3.3 Check wheel bearing distortion. 3.4 Replace wheel bearing. 3.5 Check wheel hub bearing seats. 3.6 Check rear hub damper condition for wear and cracks.	TLE_IAMSES9-12SWT-Ig-68
<ul style="list-style-type: none"> • Adjusting tension of spoke • Use and care of spoke nipple wrench 			LO 4. Check spoke tension. 4.1 Check spoke tension adjustment.	TLE_IAMSES9-12SWT-Ih-69
<ul style="list-style-type: none"> • Operation of wheel alignment tools and equipment • Procedure in wheel alignment • Use of manufacturer’s specification manual in performing wheel alignment 			LO 5. Perform wheel alignment. 5.1 Use wheel alignment tools. 5.2 Adjust wheels. 5.3 Align wheels.	TLE_IAMSES9-12SWT-Ih-i-70

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Operation of wheel balancing equipment • Procedure in wheel balancing • Installation of wheel balancer weights • Use of manufacturer’s specification manual in installing weight balancer 			LO 6. Perform wheel balancing. 6.1 Perform wheel balancing using the correct procedure. 6.2 Install correct wheel balancing weights.	TLE_IAMSES9-12SWT-Ii-j-71
LESSON 15: SERVICING CLUTCH SYSTEM (SCS)				
<ul style="list-style-type: none"> • Principles of motorcycle clutch system • Parts and function of clutch system • Maintenance of clutch system • Clutch system lubrication • Use of manufacturer’s specification manual 	The learner demonstrates an understanding of concept and underlying principles in servicing the clutch system.	The learner independently performs servicing the clutch system based on industry standards.	LO 1. Inspect/adjust clutch cable/push rod. 1.1 Inspect clutch cable and housing condition. 1.2 Adjust clutch cable. 1.3 Inspect clutch cable assembly. 1.4 Lubricate clutch cable assembly. 1.5 Lubricate clutch push rod. 1.6 Check clutch push rod for bends. 1.7 Check clutch arm.	TLE_IAMSES9-12SCS-IIa-72
<ul style="list-style-type: none"> • Specification of lever play • Causes of excessive lever play • Clutch lever adjustment procedure • Proper care of clutch cable 			LO 2. Adjust clutch lever free play. 2.1 Adjust clutch lever free play using the correct procedure.	TLE_IAMSES9-12SCS-IIa-73
<ul style="list-style-type: none"> • Principle of centrifugal clutch system • Pascal principle and operation • Operation of hydraulic clutch system • Overhauling of clutch system • Use of manufacturer’s maintenance procedure manual 			LO 3. Check centrifugal shoe/drum. 3.1 Check clutch centrifugal shoe lining thickness. 3.2 Check clutch drum inside diameter. 3.3 Check centrifugal clutch shoe/drum engagement.	TLE_IAMSES9-12SCS-IIa-74

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Function and parts of clutch master cylinder • Removal and installation of clutch master cylinder • Repair of clutch master cylinder • Types of clutch fluid • Cleaning of clutch fluid line • Changing clutch fluid • Use of manufacturer’s maintenance procedure manual 			<p>LO 4. Repair clutch master cylinder.</p> <p>4.1 Check clutch master cylinder for leaks. 4.2 Repair clutch master cylinder. 4.3 Inspect clutch fluid line. 4.4 Clean clutch fluid line 4.5 Change clutch fluid to correct level. 4.6 Refill clutch fluid to correct level.</p>	<p>TLE_IAMSES9-12SCS-IIb-75</p>
<ul style="list-style-type: none"> • Function and parts of clutch secondary cylinder • Removal and installation of clutch secondary cylinder • Repair of clutch secondary cylinder • Air bleeding of clutch secondary cylinder 			<p>LO 5. Repair clutch secondary cylinder.</p> <p>5.1 Inspect clutch secondary cylinder for leaks. 5.2 Bleed clutch secondary cylinder for trapped air.</p>	<p>TLE_IAMSES9-12SCS-IIb-76</p>
<ul style="list-style-type: none"> • Procedure in adjusting clutch release screw • Safety precautions in adjusting release screw • Types of lubricants • Lubricating clutch release screw 			<p>LO 6. Lubricate clutch release screw assembly.</p> <p>6.1 Inspect release screw. 6.2 Lubricate clutch release screw. 6.3 Adjust clutch release screw.</p>	<p>TLE_IAMSES9-12SCS-IIb-77</p>
<ul style="list-style-type: none"> • Parts and function of clutch system • Safety precautions • Overhauling of clutch system • Use of manufacturer’s maintenance procedure manual in checking clutch lining thickness, driving plates damper/ spring play and tension • Proper handling of tools 			<p>LO 7. Perform clutch overhauling.</p> <p>7.1 Overhaul clutch system. 7.2 Check clutch lining thickness. 7.3 Check clutch driving plates. 7.4 Check clutch damper/ spring play. 7.5 Check clutch rivet. 7.6 Check clutch spring for tension. 7.7 Replace clutch cover gasket.</p>	<p>TLE_IAMSES9-12SCS-IIc-d-78</p>

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Principles and operation of clutch system • Function of clutch gear • Maintenance of clutch gear 			<p>LO 8. Check gear backlash.</p> <p>8.1 Check clutch gear backlash. 8.2 Check clutch gear tooth contact. 8.3 Check clutch gear noise. 8.4 Inspect clutch back torque limiter.</p>	<p>TLE_IAMSES9-12SCS-IIe-79</p>
LESSON 16: SERVICING ELECTRICAL SYSTEM (SELS)				
<ul style="list-style-type: none"> • Types and classification of fuse • Functions and location of fuses • Testing and replacing of fuses • Cleaning of fuse, contacts and fuse box 	<p>The learner demonstrates an understanding of concepts and underlying principles in servicing the electrical system.</p>	<p>The learner independently performs servicing the electrical system based on industry standards.</p>	<p>LO 1. Check fuses.</p> <p>1.1 Check main fuse case if busted. 1.2 Replace main fuse case if busted. 1.3 Check fuse if securely fixed in fuse case. 1.4 Check fuses contact if free from dirt and rust.</p>	<p>TLE_IAMSES9-12SELS-IIif-80</p>
<ul style="list-style-type: none"> • Principle and operation of battery • Procedure of charging the battery • Maintenance of battery • Proper handling of the battery. • Electrical system for motorcycle • Types of electrolyte • Location and function of battery 			<p>LO 2. Check battery.</p> <p>2.1 Check battery terminal for contact and corrosion. 2.2 Check lead wire for looseness and breakage. 2.3 Check battery electrolyte level. 2.4 Check battery state of charge. 2.5 Check battery breather pipe.</p>	<p>TLE_IAMSES9-12SELS-IIif-81</p>
<ul style="list-style-type: none"> • Electrical wiring system components • Location and functions of components • Reading of wiring diagram • Checking lighting system and warning lights 			<p>LO 3. Check lighting system/warning devices.</p> <p>3.1 Check head light function and aiming. 3.2 Check rear tail lights function. 3.3 Check brake/stop lights function. 3.4 Check turn signal lights flashing operation. 3.5 Check neutral and other indicator lights. 3.6 Check speedometer and tachometer lights.</p>	<p>TLE_IAMSES9-12SELS-IIif-g-82</p>

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Electrical wiring system of motorcycle • Electrical wiring system parts, location and functions • Troubleshooting of electrical wiring system • Proper use of multi-tester • Wiring diagram and interpretation of harness • Use of manufacturer’s specification manual in checking wiring continuity/insulation 			<p>LO 4. Check wiring continuity/insulation.</p> <p>4.1 Check wiring harness lay-out and installation.</p> <p>4.2 Test wiring for continuity.</p> <p>4.3 Check wiring harness insulation.</p>	<p>TLE_IAMSES9-12SELS-IIg-83</p>
<ul style="list-style-type: none"> • Principle and operation of starting system • Parts and function of starting system • Disassembling and assembling of starter motor • Maintenance procedure of starter Motor 			<p>LO 5. Check starting system.</p> <p>5.1 Test starter motor operation.</p> <p>5.2 Inspect starter motor armature.</p> <p>5.3 Inspect starter motor commutator and brushes.</p> <p>5.4 Inspect starter motor bushings.</p> <p>5.5 Check starter relay.</p> <p>5.6 Check starter clutch switch.</p>	<p>TLE_IAMSES9-12SELS-IIg-h-84</p>
<ul style="list-style-type: none"> • Principle and operation of charging system • Wiring diagram of charging system • Parts and function of charging system • Maintenance procedure of charging system • Principles of rectification • Troubleshooting faults on charging system • Principles of alternator • Disassembling and assembling of alternator • Procedures on alternator repair 			<p>LO 6. Check charging system and replace components.</p> <p>6.1 Test battery current leak operation.</p> <p>6.2 Check battery charging output.</p> <p>6.3 Check regulator / rectifier.</p> <p>6.4 Test generator coil continuity.</p> <p>6.5 Check generator no load performance.</p> <p>6.6 Install rectifier to specified terminals on the stator.</p> <p>6.7 Expose minimum length of carbon brushes (± 1mm) as per manufacturer’s specification.</p> <p>6.8 Check bearing for smooth operation after replacement.</p> <p>6.9 Wire charging system.</p>	<p>TLE_IAMSES9-12SELS-IIh-i-85</p>

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Principle and operation of ignition system • Function and location of switches/coupler • Switch testing • Interpret electrical wiring diagram • Check switches and coupler 			<p>LO 7. Check switches/coupler.</p> <p>7.1 Check ignition switch operation. 7.2 Check headlight dimmer switch. 7.3 Check brake light switch. 7.4 Check horn button switch. 7.5 Check starter button switch. 7.6 Check turn signal light switch. 7.7 Check engine stop switch. 7.8 Check gear position indicator switch. 7.9 Check side stand switch. 7.10 Check combination switch coupler.</p>	<p>TLE_IAMSES9-12SELS-IIi-j-86</p>
<ul style="list-style-type: none"> • Principles and operations of warning devices • Location of warning devices • Electrical wiring diagram • Check warning devices 			<p>LO 8. Inspect warning devices.</p> <p>8.1 Check engine oil warning device. 8.2 Check 2T oil tank warning device. 8.3 Check center stand switch. 8.4 Check side stand switch. 8.5 Check fuel level indicator light switch.</p>	<p>TLE_IAMSES9-12SELS-IIj-87</p>
<ul style="list-style-type: none"> • Principles and operation of interlocking • Function and types of relays • Function and operation of accessories • Inspecting safety wiring • Inspecting relays 			<p>LO 9. Inspect safety wiring / relay / accessories.</p> <p>9.1 Check anti-theft ignition interlock switch. 9.2 Check side stand / ignition inter lock switch /relay. 9.3 Check cooling fan thermo-switch / relay. 9.4 Check engine coolant temperature meter and indicator switch. 9.5 Check fuel pump relay.</p>	<p>TLE_IAMSES9-12SELS-IIj-88</p>
<ul style="list-style-type: none"> • Principles and operation of electronic sensors • Function and location of different sensors • Analyze advance electronic wirings • Troubleshooting electronic faults 			<p>LO 10. Check speedometer / tachometer and engine sensors, fuel gauges unit.</p> <p>10.1 Check speedometer sensor. 10.2 Check tachometer sensor. 10.3 Check crankshaft position sensor. 10.4 Check camshaft position sensor. 10.5 Check engine coolant temperature sensor.</p>	<p>TLE_IAMSES9-12SELS-IIj-89</p>

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
LESSON 17: SERVICING FINAL DRIVE (SFD)				
<ul style="list-style-type: none"> • Operation and functions of final drive system • Parts and location of final drive • Design operation of motorcycle with drive shaft • Checking drive components • Cleaning of drive chain • Types of motorcycle shaft and joint coupling design • Classification of lubricants (gear oil use in the gear case) • Lubrication of drive chain • Adjustment of drive chain • Use and care of measuring instrument • Types of engine and rear sprocket sizes/gauge • Different types of pulley, functions and operations • Removal and installation of drive system • Use of manufacturer’s maintenance manual 	<p>The learner demonstrates an understanding of concepts and underlying principles in servicing the final drive.</p>	<p>The learner independently performs servicing the final drive based on industry standards.</p>	<p>LO 1. Inspect/check final drive component.</p> <p>1.1 Chain/ tensioner buffer</p> <p>1.1.1 Inspect drive chain.</p> <p>1.1.2 Adjust drive chain.</p> <p>1.1.3 Inspect engine sprocket wear.</p> <p>1.1.4 Inspect rear sprocket wear.</p> <p>1.1.5 Lubricate chain drive and sprockets with correct lubricants</p> <p>1.1.6 Check chain path alignment.</p> <p>1.1.7 Replace worn-out damaged drive chain.</p> <p>1.2 Check sprockets</p> <p>1.2.1 Check engine sprockets tooth/ spline condition.</p> <p>1.2.2 Check rear sprocket tooth condition.</p> <p>1.2.3 Check rear sprocket mounting drum bearing/oil seal.</p> <p>1.2.4 Check rear sprocket bolt/nuts and clocking washer.</p> <p>1.3 Drive belt</p> <p>1.3.1 Inspect drive belt for wear and tear.</p> <p>1.3.2 Adjust drive belt.</p> <p>1.3.3 Check drives belt alignment.</p> <p>1.3.4 Replace damaged drive belts.</p> <p>1.3.5 Check drive belts tension.</p> <p>1.4 Centrifugal pulley</p> <p>1.4.1 Check centrifugal pulley.</p> <p>1.4.2 Lubricate centrifugal pulley movable faces.</p> <p>1.4.3 Check centrifugal weights/rollers.</p> <p>1.4.4 Check centrifugal roller bearings.</p> <p>1.5 Gear oil</p> <p>1.5.1 Check gear oil.</p> <p>1.5.2 Change gear oil to correct level.</p> <p>1.5.3 Inspect gear oil to correct level.</p>	<p>TLE_IAMSES9-12SFD-IIIa-c-90</p>

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
			1.6 Cross joint 1.6.1 Inspect cross joint condition and play. 1.6.2 Inspect cross joint bearing. 1.6.3 Inspect cross joint oil seals. 1.6.4 Inspect cross joint boots and clamps. 1.7 Slip joint 1.7.1 Check slip joint universal coupling. 1.7.2 Check propeller shaft and bearing. 1.7.3 Check slip joint and final drive coupling. 1.7.4 Check pilot bearing and needle bearings. 1.7.5 Check oil seal, o-rings. 1.7.6 Check bearings retainer and bolts. 1.8 Gear backlash 1.8.1 Inspect gear oil in gear case correct fluid level. 1.8.2 Change gear oil in gear case correct fluid level. 1.8.3 Check oil seal and O-ring for leaks. 1.8.4 Replace oil seal and O-ring for leaks. 1.8.5 Check drive and driven bevel gears for wear or damage. 1.8.6 Service drive and driven bevel gears for wear or damage. 1.8.7 Check bearing noise/sound abnormality. 1.8.8 Check bearing for wear of damage. 1.8.9 Check bevel gear tooth contact/backlash. 1.8.10 Adjust final shim thickness. 1.8.11 Replace final shim thickness.	
<ul style="list-style-type: none"> • Procedure in diagnosing motorcycle final drive system • Use of manufacturer’s service manual in diagnosing motorcycle 			LO 2. Carry out diagnostic procedure. 2.1 Diagnose drive line faults as per procedure. 2.2 Prepare recommendation as per diagnostic	TLE_IAMSES9-12SFD-IIId-e-91

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
final drive system <ul style="list-style-type: none"> • Report making 			result. 2.3 Inform supervisor/clients of result. 2.4 Conduct diagnostic test without causing damage to other parts of the vehicle, equipment or workplace. 2.5 Prepare written report.	
LESSON 18: SERVICING COOLING SYSTEM (SCOS)				
<ul style="list-style-type: none"> • Operation, types and components of cooling system. • Common problem of cooling system and preventive maintenance. 	The learner demonstrates an understanding of concepts and underlying principles in servicing the cooling system.	The learner independently performs servicing the cooling system based on industry standards.	LO 1. Inspect, check and service cooling system components. 1.1 Cooling fins 1.1.1 Check cylinder head cooling fins for dirt and cracks. 1.1.2 Check blower fan blade for cracks and dents. 1.1.3 Check blower fan mounting bolts for tightness. 1.2 Radiator cap/hoses/clamp 1.2.1 Apply correct mixing ratio of coolant solution and water. 1.2.2 Check radiator cap valve release pressure. 1.2.3 Check radiator hose for cracks / leaks. 1.2.4 Check radiator clamp for looseness. 1.3 Radiator assembly 1.3.1 Check radiator coolant for air. 1.3.2 Check radiator assembly tightness by using radiator tester. 1.3.3 Check radiator clamp for cracks and check fins for damage. 1.4 Reservoir tank 1.4.1 Check reservoir tank for correct coolant level and leakage. 1.4.2 Check overflows hose of reservoir tank for cracks. 1.5 Temperature gauge 1.5.1 Check water temperature gauge	TLE_IAMSES9-12SCOS-IIIf-g-92

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
			<p style="text-align: center;">operation and function.</p> <p>1.6 Auxiliary fan 1.6.1 Check auxiliary fan motor operation. 1.6.2 Check auxiliary fan motor relay switch.</p> <p>1.7 Mechanical seal 1.7.1 Check mechanical seal for damage. 1.7.2 Check mechanical seal ring and o-ring.</p> <p>1.8 Water pump 1.8.1 Check bearing and seal condition. 1.8.2 Check water impeller for damage.</p> <p>1.9 Thermostat 1.9.1 Inspect thermostat pellet for cracks. 1.9.2 Check thermostat valve opening temperature.</p> <p>1.10 Sending unit 1.10.1 Conduct function check on sending unit. 1.10.2 Check radiator shroud unit. 1.10.3 Re-tighten radiator shroud unit.</p> <p>1.11 Radiator shroud 1.11.1 Check radiator shroud for crack and dirt. 1.11.2 Check radiator shroud mounting bolts. 1.11.3 Re-tighten radiator shroud mounting bolts.</p> <p>1.12 Coolant concentration 1.12.1 Check coolant concentration according to specified ratio.</p>	
<ul style="list-style-type: none"> • Diagnosing problems of the motorcycle cooling system • Use of manufacturers service manual, test equipment and procedure in diagnosing motorcycle cooling system. 			<p>LO 2. Diagnose faults from symptoms and decide preferred action.</p> <p>2.1 Identify faults and defective component as per symptoms.</p> <p>2.2 Diagnose faults with no damage to other components.</p>	<p>TLE_IAMSES9-12SCOS-IIIh-93</p>

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
			2.3 Set test equipment as per required specification in the manufacturer's manual. 2.4 Use test equipment as per required specification in the manufacturer's manual. 2.5 Forward findings and reports to supervisors. 2.6 Inform findings and reports to clients.	
<ul style="list-style-type: none"> • Servicing motorcycle cooling system components and safety procedure • Radiator removal and installation • Replacing coolant hose. 			LO 3. Repair cooling system components. 3.1 Repair cooling system without causing damage to any of the other components. 3.2 Carry out repairs according to manufacturer's current specification. 3.3 Use appropriate guards and cover.	TLE_IAMSES9-12SCOS-IIIi-j-94
LESSON 19: OVERHAULING MOTORCYCLE/SMALL ENGINE (OMS)				
<ul style="list-style-type: none"> • Principle and operation of motorcycle engine • Oil draining procedure • Parts and function of engine • Disassembly of engine components • Engine wiring diagram • Observing the safety measures. 	The learner demonstrates an understanding of concepts and underlying principles in overhauling motorcycle/small engine.	The learner independently performs overhauling motors/small engines based on industry standards.	LO 1. Disconnect/attach components of engine. 1.1 Disconnect attached components of engine in accordance with the repair manual. 1.2 Drain oil before disconnecting engine components. 1.3 Detach removable components from engine. 1.4 Disconnect cables from engine 1.5 Disconnect fluid lines from engine. 1.6 Disconnect wirings from the engine components.	TLE_IAMSES9-12OMS-IVa-95
<ul style="list-style-type: none"> • Removal procedure of engine • Use of service manual in pulling-out engine • Observe safety measures 			LO 2. Pull-out engine. 2.1 Remove engine bolts and nuts. 2.2 Remove/ loosen engine bracket bolts and nuts. 2.3 Remove engine from frame. 2.4 Practice safety working habit.	TLE_IAMSES9-12OMS-IVa-96

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Disassembling and overhauling of engine • Safety precautions • Use and care of special tools • Use of service manual in disassembling engine 			<p>LO 3. Disassemble engine.</p> <p>3.1 Disassemble and overhaul engine in accordance with the service manual.</p> <p>3.2 Use special tools as specified in the service manual.</p> <p>3.3 Practice safety working habit.</p>	<p>TLE_IAMSES9-12OMS-IVa-97</p>
<ul style="list-style-type: none"> • Procedure in assembly of engine • Types and classification of oil • Calibration of oil pump • Oil refilling of engine 			<p>LO 4. Install engine.</p> <p>4.1 Install engine parts in reverse order.</p> <p>4.2 Re-tighten engine bolts and nuts.</p> <p>4.3 Install detached components of engine.</p> <p>4.4 Refill engine with new oil.</p> <p>4.5 Reconnect 2T oil tank.</p> <p>4.6 Bleed 2T oil pump of air (2-stroke).</p> <p>4.7 Adjust oil pump to specified calibration.</p>	<p>TLE_IAMSES9-12OMS-IVb-98</p>
<ul style="list-style-type: none"> • Engine parts and its functions • Use of service manual in repairing/ replacing engine parts • Re-boring of cylinder block • Safety precautions in repairing engine 			<p>LO 5. Repair/replace engine parts.</p> <p>5.1 Re-bore cylinder block.</p> <p>5.2 Replace piston / ring sets.</p> <p>5.3 Replace bearing and oil seals.</p> <p>5.4 Conduct valve grinding procedure.</p> <p>5.5 Replace bushing.</p> <p>5.6 Replace o-ring and gasket.</p> <p>5.7 Conduct fitting and adjustment of parts.</p>	<p>TLE_IAMSES9-12OMS-IVc-f-99</p>
<ul style="list-style-type: none"> • Function and components of motorcycle transmission • Disassembling assembling and of transmission • Inspecting transmission component • Measurement of shift fork and shaft • Care of shafts, splines and drum 			<p>LO 6. Inspect transmission components.</p> <p>6.1 Inspect transmission gear, shaft for proper backlash and clearance.</p> <p>6.2 Inspect shifting cam groove for wear and damage.</p> <p>6.3 Inspect shifting fork for burned spots and wear.</p> <p>6.4 Inspect gear shifting mechanism shaft and shifting pawl.</p>	<p>TLE_IAMSES9-12-OMS-IVg-100</p>

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Removal and installation of shafts • Removal and installation of kick starter • Disassembling and assembling of kick starter 			6.5 Inspect kick starter for worn-out ratchet 6.6 Observe safety procedures.	
<ul style="list-style-type: none"> • Parts and function of transmission • Procedure used to replace transmission bearing and oil seals • Use of service manual in repairing/ replacing transmission components 			LO 7. Repair/replace transmission components. 7.1 Replace transmission bearing and oil seals. 7.2 Replace damaged gear and dogs. 7.3 Replace transmission bushings and cotter pin. 7.4 Replace worn-out kick starter ratchet.	TLE_IAMSES9-12OMS-IVh-101
<ul style="list-style-type: none"> • Disassembling and assembling of motorcycle engine • Safety precautions in assembling engine • Test transmission operation 			LO 8. Reassemble engine. 8.1 Assemble engine components in accordance with the service manual. 8.2 Insert bearings into crank case. 8.3 Install engine bushings. 8.4 Install engine oil seals. 8.5 Install transmission components on right or left half of crank case. 8.6 Apply small amount of engine oil to gears and bearings. 8.7 Install crankshaft assembly. 8.8 Apply sealant on left and right half of crank case before assembling. 8.9 Install gaskets. 8.10 Tighten screw of bearing retainers, cam guide and pawl lifter with thread lock cement. 8.11 Tighten crankcase bolts/screw. 8.12 Check crankshaft rotation for smoothness. 8.13 Check transmission for smooth shifting operation. 8.14 Tighten cylinder bolt and nuts according to specified torque. 8.15 Observe safety.	TLE_IAMSES9-12OMS-IVi-102

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CONTENT	CONTENT STANDARD	PERFORMANCE STANDARD	LEARNING COMPETENCIES	CODE
<ul style="list-style-type: none"> • Parts and function of external accessories of engine • Connecting engine wiring • Air bleeding procedure • Types of hydraulic fluids • Procedure in hydraulic fluid refilling 			<p>LO 9. Connect external accessories of engine.</p> <p>9.1 Reconnect electrical harness of engine. 9.2 Reconnect fuel lines and hoses to engine. 9.3 Reconnect cables/fluid lines to engine. 9.4 Bleed air from hydraulic fluid lines. 9.5 Refill hydraulic fluid to correct level.</p>	<p>TLE_IAMSES9-12OMS-IVj-103</p>
<ul style="list-style-type: none"> • Clean air act • Testing procedure of engine • Record work performance 			<p>LO 10. Test engine performance.</p> <p>10.1 Set engine performance to be in accordance with the repair manual and emission conforms to the standard set under Philippine clean air act and occupational health and safety procedures. 10.2 Start motorcycle/small engine. 10.3 Warm up motorcycle/small engine to normal operating temperature.</p>	<p>TLE_IAMSES9-12OMS-IVj-104</p>

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

RESOURCES			METHODOLOGY	ASSESSMENT METHOD
TOOLS	EQUIPMENT	MATERIALS		
<ul style="list-style-type: none"> • SST • Pliers (side cutting) • Pliers (long nose) • Wrench (socket) • Wrench (combination) • Screwdriver (flat) • Screwdriver (Phillips) • Hammer (ball peen) • Hammer (brass) • Vise grip • Hammer (plastic faced) • Feeler gauge • Pliers (mechanical) • Wrench (T-type) • Wrench (impact) • Wrench (spark plug) • Flux gauge • Steel brush • Hacksaw w/ blade • Center punch • Chisel • Hollow punch • Bearing puller • Wheel puller • Vernier caliper • Outside micrometer • Inside micrometer • Tire pressure gauge • Dial gauge • Spoke wrench • Wheel aligner • Torque wrench (click and dial type) 	<ul style="list-style-type: none"> • Air Compressor • Wheel balancer • CDI Tester • Tool Rack • Electric welding machine • Oxy-acetylene welding accessories • ABS analyzer • Multi-tester (VOM) • Motorcycle with ABS • Small Engine Mock-up <p>Personal Protective Equipment (PPE)</p> <ul style="list-style-type: none"> • Safety shoes • Cap • Gloves • Goggles • Gas mask • Shop uniform • Ear muff 	<ul style="list-style-type: none"> • Sandpaper (fine) • Engine oil (2T) • Engine oil (4T) • Gasoline • Diesel • Gear Oil • Grease • Brake fluid • Oil filter • Fuel filter • Sandpaper (coarse) • Final drive • Chain • Sprocket • Cleaning solvent • Trash can • Oiler • Oil pan <p>Instructional Materials/References</p> <ul style="list-style-type: none"> • Learning Guide • Repair Manual • Text book • Video Clips • Teachers Guide • Catalogues 	<ul style="list-style-type: none"> • Demonstration • Self-paced learning • Discussion • Individual and group practice • Project based method • On-the-job training • Film viewing 	<ul style="list-style-type: none"> • Interview/ Questioning • Written examination • Demonstration • Observation • Work samples

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

GLOSSARY

1. Motorcycle - Single passenger vehicle for operation on ordinary and typically having two wheels and a gasoline internal combustion engine.
2. 2-Stroke - Engine (also known as a Stroker) having two strokes per cycle. The combustion stroke occurs when the piston moves down allowing the exhaust gases to exit through an opening. The compression stroke is the upward movement of the piston where the air-fuel mixture is drawn in and the spark plug ignites the mixture causing an explosion, thereby forcing the piston back down again.
3. 4-Stroke - Engine that uses four strokes to complete a complete cycle. The four strokes are: Intake, compression, combustion, and exhaust. During the intake stroke, the intake valve opens and an air-fuel mixture enters the chamber above the piston. The piston moves down drawing the mixture in. The intake valve then closes and the piston moves up for the compression stroke compressing the mixture. The spark plug then ignites the mixture causing an explosion. The resulting force moves the piston down again for the combustion stroke. Then the exhaust valve opens as the piston moves upward for the exhaust stroke and all the exhaust gases are ported through the exhaust system.
4. Disc Brake - Brake mechanism consists of both a rotating portion called the Rotor and a stationary portion called the Caliper. The Rotor is attached to the wheel of the motorcycle. The Caliper assembly parts work against the Rotor to apply pressure to it thereby stopping the wheel from turning. It's difficult to say precisely when the components of a disc brake should be replaced since so much depends on how the motorcyclist uses the brakes.
5. Drum Brake - Brake mechanism in the older style of motorcycle brake. Most bikes use disc brakes these days. Drum brakes work by forcing brake shoes against the inside of rotating drums that is part of the wheel. Many motorcycle trikes use drum brakes for rear brakes.
6. Throttle - The throttle on a motorcycle is contained in the right grip on the handlebars. Twisting the throttle controls the speed of the engine.
7. Tachometer - The tachometer on a motorcycle tells the speed of the engine in revolutions per minute (RPM).
8. Capacitor Discharge Ignition (CDI) - Electronic ignition system designed to produce very high voltage, consisting of an exciter coil, a capacitor, diode, silicon controlled rectifier, and AC ignition coil.

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

CODE BOOK LEGEND

Sample: **TLE_IAMSES9-12AAS-Ia-1**

LEGEND		SAMPLE	
First Entry	Learning Area and Strand/ Subject or Specialization	Technology and Livelihood Education_ Industrial Arts Motorcycle/Small Engine Servicing NC II	TLE_ IA MSES
	Grade Level	9 to 12	9-12
Uppercase Letter/s	Domain/ Content/ Component/ Topic	Applying Appropriate Sealant/Adhesive	AAS
			-
Roman Numeral <i>*Zero if no specific Quarter</i>	Quarter	First Quarter	I
Lower case letter/s <i>*Put an en-dash (-) in between letters to indicate more than a specific week</i>	Week	Week one	a
			-
Arabic Number	Competency	Identify appropriate sealant/adhesive.	1

DOMAIN / COMPONENT	CODE
Applying Appropriate Sealant/Adhesive	AAS
Performing Mensuration and Calculation	PMC
Reading, Interpreting and Applying Specification and Manual	RIA
Using and Applying Lubricant/Coolant	UAL
Performing Shop Maintenance	PSM
Performing Periodic Maintenance	PPM
Servicing Fuel System	SFS
Servicing Lubrication System	SLS
Servicing Ignition System	SIS
Servicing Exhaust System	SES
Servicing Suspension System	SSS
Servicing Brake System	SBS
Servicing Wheels and Tires	SWT
Servicing Clutch System	SCS
Servicing Electrical System	SELS
Servicing Final Drive	SFD
Servicing Cooling System	SCOS
Overhauling Motorcycle/ Small Engine	OMS

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.

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
 (320 hours)

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
			4 sems	Masonry (NC II)	4 sems	Tile Setting (NC II)	4 sems

EXPLORATORY

* 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.

K TO 12 BASIC EDUCATION CURRICULUM
JUNIOR HIGH SCHOOL TECHNOLOGY AND LIVELIHOOD TRACK AND SENIOR HIGH SCHOOL – TECHNICAL-VOCATIONAL LIVELIHOOD TRACK
INDUSTRIAL ARTS - MOTORCYCLE/SMALL ENGINE SERVICING NC II
(320 hours)

Reference:

Technical Education and Skills Development Authority-Qualification Standards Office. *Training Regulations for Motorcycle/Small Engine Servicing NC II*. Taguig City, Philippines: TESDA, 2005.