

TRAINING REGULATIONS



MOTORCYCLE/SMALL ENGINE SERVICING NC II

**AUTOMOTIVE AND
LAND TRANSPORT SECTOR**

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

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AUTOMOTIVE/LAND TRANSPORT SECTOR

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TRAINING REGULATIONS FOR MOTORCYCLE/SMALL ENGINE SERVICING NC II

SECTION 1. MOTORCYCLE/SMALL ENGINE SERVICING NC II QUALIFICATION

The **MOTORCYCLE/SMALL ENGINE SERVICING NC II** Qualification consists of competencies that a person must achieve to install and service parts of motorcycle/small engine and to perform periodic maintenance. Servicing includes inspecting, diagnosing, cleaning and overhauling of mechanical and electrical parts, components, assemblies and sub-assemblies of the unit.

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

The Units of Competency comprising this Qualification include the following

CODE	BASIC COMPETENCIES
500311103	Participate in Workplace Communication
500311104	Work in a Team Environment
500311113	Practice Career Professionalism
500311114	Practice Occupational Health and Safety Procedures

CODE	COMMON COMPETENCIES
ALT723201	Apply Appropriate Sealant/Adhesive
ALT723202	Move and Position Vehicle
ALT311202	Perform Mensuration and Calculation
ALT723203	Read, Interpret and Apply Specifications and Manuals
ALT723204	Use and Apply Lubricants/Coolants
ALT723205	Perform Shop Maintenance
ALT311211	Prepare Job Estimate/Costing
ALT311212	Observe Quality Systems
ALT723313	Perform Periodic Maintenance

CODE	CORE COMPETENCIES
ALT723372	Service motorcycle/small engine system
ALT723373	Service Electrical System
ALT723374	Service Chassis
ALT723375	Overhaul Motorcycle/Small Engine

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

- ☐ Motorcycle/Small Engine Mechanic
- ☐ Small Engine Mechanic

SECTION 2. COMPETENCY STANDARDS

This section gives the details of the contents of the core units of competency required in **MOTORCYCLE/SMALL ENGINE SERVICING NC II**.

BASIC COMPETENCIES

UNIT OF COMPETENCY : PARTICIPATE IN WORKPLACE COMMUNICATION

UNIT CODE : 500311105

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Obtain and convey workplace information	1.1 Specific and relevant information is accessed from <i>appropriate sources</i> 1.2 Effective questioning, active listening and speaking skills are used to gather and convey information 1.3 Appropriate <i>medium</i> is used to transfer information and ideas 1.4 Appropriate non-verbal communication is used 1.5 Appropriate lines of communication with supervisors and colleagues are identified and followed 1.6 Defined workplace procedures for the location and <i>storage</i> of information are used 1.7 Personal interaction is carried out clearly and concisely	1.1 Effective communication 1.2 Different modes of communication 1.3 Written communication 1.4 Organizational policies 1.5 Communication procedures and systems 1.6 Technology relevant to the enterprise and the individual's work responsibilities	1.1 Follow simple spoken language 1.2 Perform routine workplace duties following simple written notices 1.3 Participate in workplace meetings and discussions 1.4 Complete work related documents 1.5 Estimate, calculate and record routine workplace measures 1.6 Ability to relate to people of social range in the workplace 1.7 Gather and provide information in response to workplace requirements
2. Participate in workplace meetings and discussions	2.1 Team meetings are attended on time 2.2 Own opinions are clearly expressed and those of others are listened to without interruption	2.1 Effective communication 2.2 Different modes of communication 2.3 Written communication	2.1 Follow simple spoken language 2.2 Perform routine workplace duties following simple written notices

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	2.3 Meeting inputs are consistent with the meeting purpose and established protocols 2.4 Workplace interactions are conducted in a courteous manner 2.5 Questions about simple routine workplace procedures and matters concerning working conditions of employment are asked and responded to 2.6 Meetings outcomes are interpreted and implemented	2.4 Organizational policies 2.5 Communication procedures and systems 2.6 Technology relevant to the enterprise and the individual's work responsibilities	2.3 Participate in workplace meetings and discussions 2.4 Complete work related documents 2.5 Estimate, calculate and record routine workplace measures 2.6 Ability to relate to people of social range in the workplace 2.7 Gather and provide information in response to workplace requirements
3. Complete relevant work related documents	3.1 Range of forms relating to conditions of employment are completed accurately and legibly 3.2 Workplace data is recorded on standard workplace forms and documents 3.3 Basic mathematical processes are used for routine calculations 3.4 Errors in recording information on forms/ documents are identified and properly acted upon 3.5 Reporting requirements to supervisor are completed according to organizational guidelines	3.1 Effective communication 3.2 Different modes of communication 3.3 Written communication 3.4 Organizational policies 3.5 Communication procedures and systems 3.6 Technology relevant to the enterprise and the individual's work responsibilities	3.1 Complete work related documents 3.2 Basic mathematical processes of addition, subtraction, division and multiplication 3.3 Gather and provide information in response to workplace requirements

RANGE OF VARIABLES

VARIABLE	RANGE
1. Appropriate sources	1.1. Team members 1.2. Suppliers 1.3. Trade personnel 1.4. Local government 1.5. Industry bodies
2. Medium	2.1. Memorandum 2.2. Circular 2.3. Notice 2.4. Information discussion 2.5. Follow-up or verbal instructions 2.6. Face to face communication
3. Storage	3.1. Manual filing system 3.2. Computer-based filing system
4. Forms	Personnel forms, telephone message forms, safety reports
5. Workplace interactions	5.1. Face to face 5.2. Telephone 5.3. Electronic and two way radio 5.4. Written including electronic, memos, instruction and forms, non-verbal including gestures, signals, signs and diagrams
6. Protocols	6.1. Observing meeting 6.2. Compliance with meeting decisions 6.3. Obeying meeting instructions

EVIDENCE GUIDE

1. Critical aspects of Competency	<p>Assessment requires evidence that the candidate:</p> <ol style="list-style-type: none"> 1.1. Prepared written communication following standard format of the organization 1.2. Accessed information using communication equipment 1.3. Made use of relevant terms as an aid to transfer information effectively 1.4. Conveyed information effectively adopting the formal or informal communication
2. Resource Implications	<p>The following resources should be provided:</p> <ol style="list-style-type: none"> 2.1. Fax machine 2.2. Telephone 2.3. Writing materials 2.4. Internet
3. Methods of Assessment	<p>Competency in this unit may be assessed through:</p> <ol style="list-style-type: none"> 3.1. Direct Observation 3.2. Oral interview and written test
4. Context for Assessment	<p>Competency may be assessed individually in the actual workplace or through accredited institution</p>

UNIT OF COMPETENCY : WORK IN TEAM ENVIRONMENT

UNIT CODE : 500311106

UNIT DESCRIPTOR : This unit covers the skills, knowledge and attitudes to identify role and responsibility as a member of a team.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Describe team role and scope	1.1 The <i>role and objective of the team</i> is identified from available <i>sources of information</i> 1.2 Team parameters, reporting relationships and responsibilities are identified from team discussions and appropriate external sources	1.1 Communication process 1.2 Team structure 1.3 Team roles 1.4 Group planning and decision making	1.1 Communicate appropriately, consistent with the culture of the workplace
2. Identify own role and responsibility within team	2.1 Individual role and responsibilities within the team environment are identified 2.2 Roles and responsibility of other team members are identified and recognized 2.3 Reporting relationships within team and external to team are identified	2.1 Communication process 2.2 Team structure 2.3 Team roles 2.4 Group planning and decision making	2.1 Communicate appropriately, consistent with the culture of the workplace
3. Work as a team member	3.1 Effective and appropriate forms of communications used and interactions undertaken with team members who contribute to known team activities and objectives 3.2 Effective and appropriate contributions made to complement team activities and objectives, based on individual skills and competencies and <i>workplace context</i>	3.1 Communication process 3.2 Team structure 3.3 Team roles 3.4 Group planning and decision making	3.1 Communicate appropriately, consistent with the culture of the workplace 3.2 Interacting effectively with others

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	3.3 Observed protocols in reporting using standard operating procedures 3.4 Contribute to the development of team work plans based on an understanding of team's role and objectives and individual competencies of the members		

RANGE OF VARIABLES

VARIABLE	RANGE
1. Role and objective of team	1.1. Work activities in a team environment with enterprise or specific sector 1.2. Limited discretion, initiative and judgement maybe demonstrated on the job, either individually or in a team environment
2. Sources of information	2.1. Standard operating and/or other workplace procedures 2.2. Job procedures 2.3. Machine/equipment manufacturer's specifications and instructions 2.4. Organizational or external personnel 2.5. Client/supplier instructions 2.6. Quality standards 2.7. OSH and environmental standards
3. Workplace context	3.1. Work procedures and practices 3.2. Conditions of work environments 3.3. Legislation and industrial agreements 3.4. Standard work practice including the storage, safe handling and disposal of chemicals 3.5. Safety, environmental, housekeeping and quality guidelines

EVIDENCE GUIDE

1. Critical aspects of Competency	<p>Assessment requires evidence that the candidate:</p> <ol style="list-style-type: none"> 1.1. Operated in a team to complete workplace activity 1.2. Worked effectively with others 1.3. Conveyed information in written or oral form 1.4. Selected and used appropriate workplace language 1.5. Followed designated work plan for the job 1.6. Reported outcomes
2. Resource Implications	<p>The following resources should be provided:</p> <ol style="list-style-type: none"> 2.1. Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2. Materials relevant to the proposed activity or tasks
3. Methods of Assessment	<p>Competency in this unit may be assessed through:</p> <ol style="list-style-type: none"> 3.1. Observation of the individual member in relation to the work activities of the group 3.2. Observation of simulation and or role play involving the participation of individual member to the attainment of organizational goal 3.3. Case studies and scenarios as a basis for discussion of issues and strategies in teamwork
4. Context for Assessment	<ol style="list-style-type: none"> 4.1. Competency may be assessed in workplace or in a simulated workplace setting 4.2. Assessment shall be observed while task are being undertaken whether individually or in group

UNIT OF COMPETENCY : PRACTICE CAREER PROFESSIONALISM

UNIT CODE : 500311107

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in promoting career growth and advancement.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1 Integrate personal objectives with organizational goals	<p>1.1 Personal growth and work plans are pursued towards improving the qualifications set for the profession</p> <p>1.2 Intra- and interpersonal relationships are maintained in the course of managing oneself based on performance evaluation</p> <p>1.3 Commitment to the organization and it's goal is demonstrated in the performance of duties</p>	<p>1.1 Work values and ethics (Code of Conduct, Code of Ethics, etc.)</p> <p>1.2 Company policies</p> <p>1.3 Company operations, procedures and standards</p> <p>1.4 Fundamental rights at work including gender sensitivity</p> <p>1.5 Personal hygiene practices</p>	<p>1.1 Appropriate practice of personal hygiene</p> <p>1.2 Intra and Interpersonal skills</p> <p>1.3 Communication skills</p>
2 Set and meet work priorities	<p>2.1 Competing demands are prioritized to achieve personal, team and organizational goals and objectives.</p> <p>2.2 Resources are utilized efficiently and effectively to manage work priorities and commitments</p> <p>2.3 Practices along economic use and maintenance of equipment and facilities are followed as per established procedures</p>	<p>2.1 Work values and ethics (Code of Conduct, Code of Ethics, etc.)</p> <p>2.2 Company policies</p> <p>2.3 Company operations, procedures and standards</p> <p>2.4 Fundamental rights at work including gender sensitivity</p> <p>2.5 Personal hygiene practices</p> <p>2.6 Time management</p>	<p>2.1 Appropriate practice of personal hygiene</p> <p>2.2 Intra and Interpersonal skills</p> <p>2.3 Communication skills</p> <p>2.4 Managing goals and time</p>
3 Maintain professional growth and development	<p>3.1 Trainings and career opportunities are identified and availed of based on job requirements</p> <p>3.2 Recognitions are sought/received and</p>	<p>3.1 Work values and ethics (Code of Conduct, Code of Ethics, etc.)</p> <p>3.2 Company policies</p>	<p>3.1 Appropriate practice of personal hygiene</p> <p>3.2 Intra and Interpersonal skills</p>

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	demonstrated as proof of career advancement 3.3 <i>Licenses and/or certifications</i> relevant to job and career are obtained and renewed	3.3 Company operations, procedures and standards 3.4 Fundamental rights at work including gender sensitivity 3.5 Personal hygiene practices	3.3 Communication skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. Evaluation	1.1 Performance Appraisal 1.2 Psychological Profile 1.3 Aptitude Tests
2. Resources	2.1 Human 2.2 Financial 2.3 Technology 2.3.2 Hardware 2.3.3 Software
3. Trainings and career opportunities	3.1 Participation in training programs 3.1.1 Technical 3.1.2 Supervisory 3.1.3 Managerial 3.1.4 Continuing Education 3.2 Serving as Resource Persons in conferences and workshops
4. Recognitions	4.1 Recommendations 4.2 Citations 4.3 Certificate of Appreciations 4.4 Commendations 4.5 Awards 4.6 Tangible and Intangible Rewards
5. Licenses and/or certifications	5.1 National Certificates 5.2 Certificate of Competency 5.3 Support Level Licenses 5.4 Professional Licenses

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Attained job targets within key result areas (KRAs) 1.2 Maintained intra - and interpersonal relationship in the course of managing oneself based on performance evaluation 1.3 Completed trainings and career opportunities which are based on the requirements of the industries 1.4 Acquired and maintained licenses and/or certifications according to the requirement of the qualification
2. Resource Implications	The following resources should be provided: 2.1 Workplace or assessment location 2.2 Case studies/scenarios
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Portfolio Assessment 3.2 Interview 3.3 Simulation/Role-plays 3.4 Observation 3.5 Third Party Reports 3.6 Exams and Tests
4. Context for Assessment	Competency may be assessed in the work place or in a simulated work place setting

UNIT OF COMPETENCY : PRACTICE OCCUPATIONAL HEALTH AND SAFETY PROCEDURES

UNIT CODE : 500311108

UNIT DESCRIPTOR : This unit covers the outcomes required to comply with regulatory and organizational requirements for occupational health and safety.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify hazards and risks	1.1 Safety regulations and workplace safety and hazard control practices and procedures are clarified and explained based on organization procedures 1.2 Hazards/risks in the workplace and their corresponding indicators are identified to minimize or eliminate risk/exposure to co-workers, workplace and environment in accordance with organization's procedures 1.3 Contingency measures during workplace accidents, fire and other emergencies are recognized and established in accordance with organization procedures	1.1 OSH procedures and practices and regulations 1.2 Personal hygiene practices 1.3 Hazards/risks identification and control 1.4 Organization safety and health protocol 1.5 Safety consciousness 1.6 Health consciousness	1.1 Practice of safety and health procedures and personal hygiene 1.2 Hazards/risks identification and control skills 1.3 Interpersonal skills 1.4 Communication skills
2 Evaluate hazards and risks	2.1 Terms of maximum tolerable limits which when exceeded will result in harm or damage are identified based on threshold limit values (TLV) 2.2 Effects of the hazards are determined	2.1 OSH procedures and practices and regulations 2.2 Personal hygiene practices 2.3 Hazards/risks identification and control 2.4 Threshold Limit Value -TLV 2.5 OSH indicators	2.1 Practice of personal hygiene 2.2 Hazards/risks identification and control skills 2.3 Interpersonal skills 2.4 Communication skills

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	2.3 OSH issues and/or concerns and identified safety hazards are reported to designated personnel in accordance with workplace requirements and relevant workplace OSH legislation	2.6 Organization safety and health protocol 2.7 Safety consciousness 2.8 Health consciousness	
3 Control hazards and risks	3.1 Occupational Safety and Health (OSH) procedures for controlling hazards/risks in workplace are consistently followed 3.2 Procedures for dealing with workplace accidents, fire and emergencies are followed in accordance with organization OSH policies 3.3 Personal protective equipment (PPE) is correctly used in accordance with organization OSH procedures and practices 3.4 Appropriate assistance is provided in the event of a workplace emergency in accordance with established organization protocol	3.1 OSH procedures and practices and regulations 3.2 PPE types and uses 3.3 Personal hygiene practices 3.4 Hazards/risks identification and control 3.5 OSH indicators 3.6 Organization safety and health protocol 3.7 Safety consciousness 3.8 Health consciousness	3.1 Practice of personal hygiene 3.2 Hazards/risks identification and control skills 3.3 Interpersonal skills 3.4 Communication skills
4 Maintain OSH awareness	4.1 Emergency-related drills and trainings are participated in as per established organization guidelines and procedures 4.2 OSH personal records are completed and updated in accordance with workplace requirements	4.1 OSH procedures and practices and regulations 4.2 PPE types and uses 4.3 Personal hygiene practices 4.4 OSH indicators 4.5 Organization safety and health protocol	4.1 Practice of personal hygiene 4.2 Interpersonal skills 4.3 Communication skills

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		4.6 Safety consciousness 4.7 Health consciousness	

RANGE OF VARIABLES

VARIABLE	RANGE
1. Safety and Health Regulations	May include but are not limited to: 1.1 Clean Air Act 1.2 National Building Code 1.3 Philippine Electrical Code 1.4 Fire Code of the Philippines 1.5 Waste management statutes and rules 1.6 Philippine Occupational Safety and Health Standards 1.7 DOLE OSH related issuances ECC regulations
2. Hazards/Risks	May include but are not limited to: 2.1 Physical hazards – impact, illumination, pressure, noise, vibration, temperature, radiation 2.2 Biological hazards - bacteria, viruses, plants, parasites, mites, molds, fungi, insects 2.3 Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors 2.4 Ergonomics 2.4.1 Physiological factors - over exertion/ excessive force, awkward/static positions, fatigue, direct pressure, varying metabolic cycles 2.4.2 Psychological factors - monotony, personal relationship, work out cycle
3. Contingency measures	May include but are not limited to: 3.1 Evacuation/ Rescue 3.2 Isolation 3.3 Decontamination 3.4 (Calling designed) emergency personnel
4. PPE	May include but are not limited to: 4.1 Mask 4.2 Gloves 4.3 Goggles 4.4 Hair Net/cap/bonnet 4.5 Face mask/shield 4.6 Ear muffs 4.7 Apron/Gown/coverall/jump suit 4.8 Anti-static suits 4.9 Safety Helmet 4.10 Safety Shoes 4.11 Body Harness and lifeline

VARIABLE	RANGE
5. Emergency-related drills and training	5.1 Fire drill 5.2 Earthquake drill 5.3 Basic life support/CPR 5.4 First aid 5.5 Spillage control 5.6 Decontamination of chemical and toxic 5.7 Disaster preparedness/management
6. OSH personal records	6.1 Medical/Health records 6.2 Incident reports 6.3 Accident reports 6.4 OSH-related training completed

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Explained clearly established workplace safety and hazard control practices and procedures 1.2 Identified hazards/risks in the workplace and its corresponding indicators in accordance with company procedures 1.3 Recognized contingency measures during workplace accidents, fire and other emergencies 1.4 Identified terms of maximum tolerable limits based on threshold limit value- TLV. 1.5 Followed Occupational Safety and Health (OSH) procedures for controlling hazards/risks in workplace 1.6 Used Personal Protective Equipment (PPE) in accordance with company OSH procedures and practices 1.7 Completed and updated OSH personal records in accordance with workplace requirements
2. Resource Implications	The following resources should be provided: 2.1 Workplace or assessment location 2.2 OSH personal records 2.3 PPE 2.4 Health records
3. Methods of Assessment	Competency may be assessed through: 3.1 Portfolio Assessment 3.2 Interview 3.3 Case Study/Situation
4. Context for Assessment	Competency may be assessed in the work place or in a simulated work place setting

COMMON COMPETENCIES

UNIT OF COMPETENCY : APPLY APPROPRIATE SEALANT/ADHESIVE

UNIT CODE : ALT723201

UNIT DESCRIPTOR : This competency unit covers the selection and application of sealant/adhesives.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify appropriate sealant/adhesive	1.1 <i>Sealant/adhesive</i> selected in line with job requirements and manufacturer's specification 1.2 <i>Sealant/adhesive checking</i> is performed to ensure that product is fit for use. 1.3 Identify safety precaution on each sealant/adhesive	1.1 ENGLISH/ COMMUNICATION 1.1.1 Procedures in interpreting manuals 1.2 SCIENCE 1.2.1 Various types and applications of sealant and adhesives	1.1 Selecting proper sealant and additives.
2. Prepare surface for sealant/adhesive	2.1 Surface materials are identified as per construction 2.2 Surface is cleaned and free of moisture, dust and other foreign matters to ensure maximum adhesion or seal.	2.1 ENGLISH/ COMMUNICATION 2.1.1 Procedures on in sealant/ adhesives application 2.1.2 Industry code of practice 2.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 2.2.1 Occupational Health and Safety (OHS) requirements 2.3 SCIENCE 2.3.1 Safe handling of sealant/ adhesive	2.1 Handling sealant/ adhesive 2.2 Cleaning the surface 2.3 Using tools and equipment

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3 Apply sealant/adhesive evenly	3.1 Sealant/adhesive is applied evenly on the surface in line with manufacturer's specification 3.2 Excess sealant/adhesive is removed by sanding or scrapping 3.3 Tools and equipment used to apply sealant/adhesive are appropriate to job requirements 3.4 Safety are observed and PPE are worn in accordance with industry Standard Operating Procedures (SOP) 3.5 Hazards associated with the use of sealant and adhesives are identified.	3.1 ENGLISH/ COMMUNICATION 3.1.1 Procedures in interpreting manuals 3.1.2 Procedures in sealant/ adhesive application 3.1.3 Industry code of practice 3.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 3.2.1 Occupational Health and Safety (OHS) requirements 3.3 SCIENCE 3.3.1 Safe handling of sealant/ adhesive	3.1 Handling sealant/adhesive 3.2 Applying sealant/adhesive 3.3 Cleaning the surface 3.4 Using tools and equipment
4 Store/Dispose of sealant/adhesive	4.1 Sealant/adhesive are stored as per prescribed procedure 4.2 Waste are disposed as per workshop SOP	4.1 ENGLISH/ COMMUNICATION 4.1.1 Industry code of practice 4.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 4.2.1 Occupational Health and Safety (OHS) requirements 4.3 SCIENCE 4.3.1 Safe handling of sealant/ adhesive	4.1 Storing sealant/adhesive 4.2 Practicing safe disposal of waste

RANGE OF VARIABLES

VARIABLE	RANGE
1. Sealant/Adhesive	May include: 1.1 Form in Place Gasket (FIPG) 1.2 Ribbon Sealer 1.3 Hametite 1.4 Silicon Body sealer 1.5 Prestite for Auto and Auto Aircon
2. Sealant/adhesive checking	May include: 2.1 Expiry date 2.2 Free of contamination 2.3 Cap/Covers 2.4 Tightly closed 2.5 Concentration
3. Tools and equipment	May include: 3.1 Putty knife 3.2 Scraper 3.3 Compressor 3.4 Steel brush 3.5 Paint brush 3.6 Rubber hammer 3.7 Hand tools Personal protective equipment include: 3.8 Gloves 3.9 Apron 3.10 Safety shoes 3.11 Goggles 3.12 Gas mask
4. Safety	May include: 4.1 Ventilation 4.2 Handling of Flammable/Irritating substances 4.3 Use of Personal Protective Equipment
5 Hazards	May include: 5.1 Fumes 5.2 Skin irritation 5.3 Burns

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires that the candidate: 1.1 Identified appropriate sealant/adhesives 1.2 Prepared surface for sealant/adhesive 1.3 Applied sealant/adhesive 1.4 Stored unused or dispose of used sealant/adhesive
2. Resource implications	The following resources should be provided: 2.1 Materials relevant to the activity 2.2 Appropriate tools and equipment 2.3 Real or simulated workplace
3. Methods of assessment	Competency should be assessed through: 3.1 Direct observation 3.2 Interview related to: 3.2.1 Safe and correct use of tools and equipment 3.2.2 Application of adhesive/sealant
4. Context of assessment	4.1 Competency assessment may occur in workplace or any appropriate simulated environment 4.2 Competency assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines

UNIT OF COMPETENCY : **MOVE AND POSITION VEHICLE**
UNIT CODE : **ALT723202**
UNIT DESCRIPTOR : This competency unit covers the knowledge, skills and attitudes needed to move and position vehicle.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms are elaborated in the Range of Variable</i>	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Prepare vehicle for driving	1.1 Pre-ride check up is performed based on vehicle manufacturer standard 1.2 Correct <i>check-up procedures</i> performed based on vehicle manufacturer standard	1.1 ENGLISH/ COMMUNICATION 1.1.1 Pre-ride check up procedures 1.1.2 Driver's code of conduct 1.2 TECHNOLOGY 1.2.1 Vehicle parts and accessories	1.1 Applying pre-ride check up procedures 1.3 Preparing vehicle for driving
2. Move and position vehicle	2.1 Select vehicle to be moved or re-position. 2.2 Drive the vehicle to appropriate location 2.3 Park vehicle following <i>parking safety techniques</i> and procedure	2.1 ENGLISH/ COMMUNICATION 2.1.1 Driver's code of conduct 2.1.2 Workshop signs and symbols 2.2 TECHNOLOGY 2.2.1 Vehicle parts and accessories	2.1 Parking Downhill, Uphill, Parallel 2.2 Shifting Gears 2.3 Maneuvering vehicle 2.4 Driving skills
3. Check the vehicle	3.1 Vehicle position is checked as per required 3.2 Vehicle is checked for external damages	3.1 ENGLISH/ COMMUNICATION 3.1.1 Driver's code of conduct 3.2 TECHNOLOGY 3.2.1 Vehicle parts and accessories 3.2.2 Vehicle inspection	3.1 Performing vehicle checking/ inspection

RANGE OF VARIABLES

VARIABLE	RANGE
1. Check up procedure	May include: 1.1 Oil level 1.2 Brake fluid 1.3 Clutch fluid 1.4 Coolant level 1.5 Battery (electrolyte) 1.6 Tire pressure 1.7 Position of driving gear 1.8 Lighting and warning devices
2. Parking safety techniques	2.1 Engaging of Park brake 2.2 Vehicle parking position 2.3 Front wheel position
3. Vehicles	May include: 3.1 Vehicles with automatic transmission 3.2 Vehicles with manual transmission

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires that the candidate: 1.1 Prepared vehicle for driving. 1.2 Moved and positioned vehicle 1.3 Checked the vehicle.
2. Resource implications	The following resources should be provided: 2.1 Driving range/area 2.2 Appropriate vehicle for driving 2.3 Vehicle accessories
3. Methods of assessment	Competency should be assessed through: 3.1 Through direct observation while driving 3.2 Written questions related to underpinning knowledge Assessment of underpinning knowledge and practical skills may be combined
4. Context of assessment	4.1 Assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines 4.2 Assessment of practical skills must be done in a workplace or simulated environment.

UNIT OF COMPETENCY: PERFORM MENSURATION AND CALCULATION**UNIT CODE : ALT311202****UNIT DESCRIPTOR** : This unit includes identifying caring, handling and using of measuring instruments.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variable	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Select measuring instruments	1.1 Object or component to be measured is identified 1.2 Correct specifications are obtained from relevant source 1.3 Appropriate measuring instrument is selected according to job requirements	1.1 MATH 1.1.1 Four Fundamental operations of mathematics 1.1.2 Formula for volume, area, perimeter and other geometric figures 1.2 TECHNOLOGY 1.2.1 Types of measuring instruments and its uses	1.1 Visualizing objects and shapes 1.2 Selecting measuring instruments
2 Carry out measurements and calculation	2.1 Measuring tools are selected in line with job requirements 2.2 Accurate measurements are obtained to job 2.3 Calculation needed to complete work tasks are performed using the four basic process of addition (+), subtraction (-), multiplication (x) and division (/). 2.4 Calculations involving fractions, percentages and mixed numbers are used to complete workplace tasks. 2.5 Numerical computation is self-checked and corrected for accuracy 2.6 Instruments are read to the limit of accuracy of the tool.	2.1 ENGLISH/ COMMUNICATION 2.1.1 Safe handling procedures in using measuring instruments 2.2 MATH 2.2.1 Four Fundamental operations of mathematics 2.2.2 Formula for volume, area, perimeter and other geometric figures 2.3 TECHNOLOGY 2.3.1 Types of measuring instruments and its uses	2.1 Caring and Handling measuring instruments 2.2 Calibrating and using measuring instruments 2.3 Performing calculation by Addition, Subtraction, Multiplication and Division 2.4 Visualizing objects and shapes 2.5 Interpreting formula for volume, area, perimeter and other geometric figures

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variable	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3 Maintain measuring instruments	3.1 Measuring instruments must kept free from corrosion 3.2 Measuring instruments not dropped to avoid damage 3.3 Measuring instruments cleaned before and after using.	3.1 ENGLISH/ COMMUNICATION 2.2.1 Safe handling procedures in using measuring instruments 3.2 TECHNOLOGY 3.2.1 Types of measuring instruments and its uses	3.1 Caring and Handling measuring instruments

RANGE OF VARIABLES

VARIABLE	RANGE
1. Measuring instruments	May include: 1.1 Multitester 1.2 Micrometer (In-out, depth) 1.3 Vernier caliper (Out, inside) 1.4 Dial Gauge with Mag. Std. 1.5 Plastigauge 1.6 Straight Edge 1.7 Thickness gauge 1.8 Torque Gauge 1.9 Small Hole gauge 1.10 Telescopic Gauge 1.11 Try square 1.12 Protractor 1.13 Combination gauge 1.14 Steel rule
2. Calculation	May include: 2.1 Volume 2.2 Area 2.3 Displacement 2.4 Inside diameter 2.5 Circumference 2.6 Length 2.7 Thickness 2.8 Outside diameter 2.9 Taper 2.10 Out of roundness 2.11 Oil clearance 2.12 End play/thrust clearance

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Selected measuring instruments 1.2 Carried-out measurements and calculations. 1.3 Maintained measuring instruments
2. Resource implications	The following resources should be provided: 2.1 Workplace location 2.2 Measuring instrument appropriate to servicing processes 2.3 Instructional materials relevant to the propose activity
3. Methods of assessment	Competency should be assessed by: 3.1 Observation with questioning 3.2 Written or oral examination 3.3 Interview 3.4 Demonstration with questioning
4. Context of assessment	4.1 Competency may be assessed in the workplace or in a simulated workplace 4.2 Competency assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines

UNIT OF COMPETENCY: READ, INTERPRET AND APPLY SPECIFICATION AND MANUALS.**UNIT CODE : ALT723203****UNIT DESCRIPTOR :** This unit deals with identifying, interpreting and applying service specification manuals, maintenance procedure manuals and periodic maintenance manual.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify and access manual/specification	1.1 Appropriate manuals are identified and accessed as per job requirements. 1.2 Version and date of manual is checked to ensure correct specification and procedure are identified.	1.1 ENGLISH/ COMMUNICATION 1.1.1 Types of manuals used in automotive industry 1.1.2 Identification of symbols used in the manuals 1.2 MATH 1.2.1 Identification of units of measurements 1.2.2 Unit conversion	1.1 Reading and comprehension skills 1.2 Identifying and accessing information and data
2 Interpret manuals	2.1 Relevant sections, chapters of manuals/specifications are located in relations to the work to be conducted 2.2 Information and procedure in the manual are interpreted in accordance to industry practices	2.1 ENGLISH/ COMMUNICATION 2.1.1 Types of manuals used in automotive industry 2.1.2 Identification of symbols used in the manuals 2.2 MATH 2.2.1 Identification of units of measurements 2.2.2 Unit conversion	2.1 Reading and comprehension skills 2.2 Accessing information and data

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Apply information in manual	3.1 Manual is interpreted according to job requirements 3.2 Work steps are correctly identified in accordance with manufacturer specification 3.3 Manual data is applied according to the given task 3.4 All correct sequencing and adjustments are interpreted in accordance with information contained on the manual or specifications	3.1 ENGLISH/ COMMUNICATION 3.1.1 Types of manuals used in automotive industry 3.1.2 Identification of symbols used in the manuals 3.2 MATH 3.2.1 Identification of units of measurements 3.2.2 Unit conversion	3.1 Reading and comprehension skills 3.2 Accessing information and data
4. Store manuals	4.1 Manual or specification is stored appropriately to prevent damage, ready access and updating of information when required in accordance with company requirements	4.1 ENGLISH/ COMMUNICATION 4.1.1 Types of manuals used in automotive industry	4.1 Caring/ handling of manuals 4.2 Applying storing procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Manuals	May include: 1.1 Repair manual 1.2 Maintenance Procedure Manual 1.3 Periodic Maintenance Manual

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires that the candidate: 1.1 Identified and accessed manual/specification 1.2 Interpreted manuals 1.3 Applied information in manuals 1.4 Stored manuals
2. Resource implications	The following resources should be provided: 2.1 All manuals/catalogues relative to Automotive 2.2 Job order, requisitions 2.3 Actual vehicle or simulator
3. Methods of assessment	Competency should be assessed through: 3.1 Observation with questioning 3.2 Interview
4. Context of assessment	4.1 Assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines 4.2 Assessment may be conducted in the workplace or a simulated environment

UNIT OF COMPETENCY: USE AND APPLY LUBRICANTS/COOLANT**UNIT CODE : ALT723204****UNIT DESCRIPTOR** : This unit identifies the competencies required to select and apply different types of lubricants

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify types of lubricants/coolant	1.1 Correct information on <i>lubrication schedule</i> is accessed and interpreted from appropriate manufacturers specifications <i>manuals</i> 1.2 Type and quantity of <i>lubricants/coolant</i> is identified as per job requirements	1.1 SCIENCE 1.1.1 Types/Classification of lubricants 1.1.2 Purpose of Lubrication (Problem and effects)	1.1 Classifying Lubricants/coolant
2 Use and apply lubricants/coolant	2.1 Correct procedure for change of lubricant is identified following manufacturer's specification or manual 2.2 Correct tools and equipment are selected and used in line with job requirements 2.3 Existing lubricants is removed and replaced with specified types and quantity of new materials in line with manufacturer's specification 2.4 Safe procedure and use of <i>PPE</i> is observed when removing or replacing lubricant 2.5 Used lubricants are disposed in accordance with environmental guidelines 2.6 Work is checked in line with company SOP.	2.1 ENGLISH/COMMUNICATION 2.1.1 Lubrication procedures 2.1.2 Identification of lubrication schedule 2.2 SCIENCE 2.2.1 Types/Classification of lubricants 2.2.2 Purpose of lubrication (problem and effects) 2.2.3 Cause and effects of gear oil dilution	2.1 Handling of oils (Gear, oil, engine oil) 2.2 Classifying Lubricants/coolant 2.3 Identifying lubricants schedule 2.4 Applying standard procedure of inspection repair

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3 Perform housekeeping activities	3.1 <i>Tools, equipment</i> and materials are properly stored as per company SOP 3.2 Workplace is free from waste materials	3.1 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 3.1.1 Hazards associated with lubrication 3.2 SCIENCE 3.2.1 Types/Classification of lubricants	3.1 Applying housekeeping procedures 3.2 Applying 5S

RANGE OF VARIABLES

VARIABLE	RANGE
1. Lubricant Schedule	May include: 1.1 Kilometers traveled used 1.2 No. of Hours used 1.3 Monthly 1.4 Visual checking
2. Manuals	May include: 2.1 Manufacturer's specification manual 2.2 Periodic Maintenance manual 2.3 Service Manual
3. Lubricants/ Coolant	May include: 3.1 Engine oil: 3.1.1 Diesel engine oil 3.1.2 Gasoline engine oil 3.1.3 Front fork oil type 3.2 Automatic Transmission Fluid 3.2.1 Destro II 3.2.2 T4 3.3 Gear oil lubricants: 3.3.1 Oil #90 3.3.2 Oil #140 3.3.3 Oil #30 3.3.4 Oil #40 3.4 Grease 3.4.1 Special (velocity joint)Molybdenum disulfate) 3.4.2 Ordinary 3.4.3 Multi-purpose oil 3.4.4 Contact point lubricant (grease) 3.5 Brake/Clutch System 3.5.1 Brake fluid 3.5.2 DOT3 / DOT A 3.6 Power Steering Fluid 3.6.1 Hydraulic Fluid 3.7 Radiator Coolant 3.7.1 Long last coolant 3.7.2 Type of coolant 3.8 A/C Compressor Oil Pag oil
4. Personal Protective Equipment (PPE)	May include: 4.1 Apron 4.2 Gloves 4.3 Goggles 4.4 Safety shoes
5. Tool and equipment	May include: 5.1 Hand tools 5.2 Oiler 5.3 Oil Dispenser 5.4 Grease gun

VARIABLE	RANGE
	5.5 Measuring tools 5.5.1 Vernier caliper 5.5.2 Beaker/graduated cylinder

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires that the candidate: 1.1 Identified types of lubricants and lubrication schedule. 1.2 Used and applied lubricants. 1.3 Performed housekeeping
2. Resource implications	The following resources should be provided: 2.1 Workplace: Real or simulated work area 2.2 Appropriate tools and equipment 2.3 Materials relevant to activity
3. Methods of assessment	Competency should be assessed through: 3.1 Demonstration with questioning 3.2 Written/Oral examination
4. Context of assessment	4.1 Competency elements must be assessed in a safe working environment 4.2 Assessment must be undertaken in accordance with the endorsed industry assessment guidelines 4.3 Assessment of Underpinning Knowledge and attitude and skills may be assessed on or off- the- job

UNIT OF COMPETENCY : **PERFORM SHOP MAINTENANCE**

UNIT CODE : **ALT723205**

UNIT DESCRIPTOR : This unit deals with inspecting and cleaning of work area including tools, equipment and facilities. Storage of tools/equipment and disposal of used materials are also incorporated in this competency

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Inspect/clean tools and work area	1.1 Cleaning solvent used as per workshop/tools cleaning requirement 1.2 Work area is checked and cleaned 1.3 Wet surface/spot in work area is wiped and dried	1.1 ENGLISH/ COMMUNICATION 1.1.1 Service Procedures 1.1.2 Relevant technical information 1.1.3 Workshop policies 1.1.4 Personal safety procedures 1.1.5 Vehicle safety requirements 1.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 1.2.1 5S or TQM 1.2.2 Positive work values 1.3 TECHNOLOGY 1.3.1 Safe handling of Equipment and tools	1.1 Handling/Storing of tools/equipment/ supplies and material 1.2 Disposing of wastes and fluid 1.3 Preparing inventory of s/m and tools and equipment 1.4 Monitoring of s/m and tools/equipment
2. Store/arrange tools and shop equipment	2.1 Tools/equipment are stored in their respective shelves/location 2.2 Corresponding labels are posted and visible 2.3 Tools are safely secured and logged in the records	2.1 ENGLISH/ COMMUNICATION 2.1.1 Personal safety procedures on Service Manual 2.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 2.2.1 Positive work values 2.3 SCIENCE 2.3.1 Fire extinguishers and fire	2.1 Handling/Storing of tools/equipment/ supplies and material 2.2 Preparing inventory of s/m and tools and equipment 2.3 Monitoring of s/m and tools/equipment

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		prevention 2.4 TECHNOLOGY 2.4.1 Safe handling of Equipment and tools	
3 Dispose wastes/used lubricants	3.1 Containers for used lubricants are visibly labeled 3.2 Wastes/used lubricants are disposed as per workshop SOP	3.1 ENGLISH/ COMMUNICATION 3.1.1 Relevant technical information 3.1.2 Workshop policies 3.1.3 Personal safety procedures 3.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 3.2.1 5S or TQM 3.2.2 Storage/ disposal of hazardous/ flammable materials 3.2.3 Positive work values	3.1 Disposing of wastes/ used lubricants and fluids
4 Report damaged tools/equipment	4.1 Complete inventory of tools/equipment is maintained 4.2 Damaged tools/equipment/facilities are identified and repair recommendation is given 4.3 Reports prepared has no error/discrepancy	5.4 ENGLISH/ COMMUNICATION 5.4.1 Relevant technical information 5.4.2 Workshop policies 5.4.3 Personal safety procedures 4.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 4.2.1 5S or TQM 4.2.2 Positive work values 4.3 SCIENCE 4.3.1 Fire extinguishers and fire prevention	4.1 Handling of tools/equipment 4.2 Preparing inventory of s/m and tools and equipment 4.3 Monitoring of s/m and tools/equipment 4.4 Preparing reports

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		4.4 TECHNOLOGY 4.4.1 Safe handling of Equipment and tools	

RANGE OF VARIABLES

VARIABLE	RANGE
1. Cleaning requirement	May include: 1.1 Cleaning solvent 1.2 Inventory of supplies, tools, equipment, facilities 1.3 List of mechanics/technicians 1.4 Rags 1.5 Broom 1.6 Map 1.7 Pail 1.8 Used oil container 1.9 Oiler 1.10 Dust/waste bin
2. Work Area	May include: 2.1 Workshop areas for servicing/repairing light and/or heavy vehicle and/or plant transmissions and/or outdoor power equipment 2.2 Open workshop/garage and enclosed, ventilated office area 2.3 Other variables may include workshop with: 2.3.1 Mess hall 2.3.2 Wash room 2.3.3 Comfort room

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires that the candidate: 1.1 Cleaned workshop tools/facilities 1.2 Maintained equipment, tools and facilities 1.3 Disposed wastes and used lubricants/fluid as per required procedure
2. Resource implications	The following resources should be provided: 2.1 Workplace: Real or simulated work area 2.2 Appropriate Tools & equipment 2.3 Materials relevant to the activity
3. Methods of assessment	Competency should be assessed through: 3.1 Written/Oral Questioning 3.2 Demonstration
4. Context of assessment	4.1 Competency must be assessed on the job or simulated environment. 4.2 The assessment of practical skills must take place after a period of supervised practice and repetitive experience.

UNIT OF COMPETENCY : **PREPARE JOB ESTIMATE/COSTING**

CODE : **ALT311211**

UNIT DESCRIPTOR : This competency unit covers the knowledge, skills and attitude in estimating/ costing automotive repair.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify nature/scope of work	1.1 Effective communication skills are applied to determine the nature and scope of work to be undertaken 1.2 Extent of service to be rendered is determined and documented in line with standard operating procedures (SOP)	1.1 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 1.1.1 Positive work values 1.2 TECHNOLOGY 1.2.1 Replaceable/ fabricated materials or spare parts in a vehicle 1.2.2 Automotive Repair Procedures and Techniques 1.2.3 Job estimates	1.1 Estimating repair works and activities
2 Prepare and present estimate	2.1 Type and quantity of supplies, materials and labor required to perform work are identified in line with job requirements 2.2 Cost of supplies, materials are obtained from suppliers 2.3 Total cost of required services is calculated in line with SOP 2.4 Estimate is presented to customer in line with SOP.	2.1 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 2.1.1 Positive work values 2.2 MATH 2.2.1 Consumer mathematics 2.3 TECHNOLOGY 2.3.1 Automotive Repair Procedures and Techniques 2.3.2 Job estimates	2.1 Computing using the Four Mathematical Operations 2.2 Estimating repair works and activities

RANGE OF VARIABLES

VARIABLE	RANGE
1. Communication	May include: 1.1 Listening to customer 1.2 Speaking with suppliers, customers and co-workers 1.3 Questioning
2. Suppliers	May include: 1.1 Distributors 1.2 Managers 1.3 Proprietors
3. Cost	May include: 3.1 Materials 3.2 Labor 3.3 Overhead

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Identified nature/scope of work 1.2 Prepared and presented estimate
2. Resource implications	The following resources should be provided: Appropriate tools such as calculator, paper, pen, and other measuring instruments relevant to activity
3. Method of assessment	Competency in this unit may be assessed through: 3.1 Observation with questioning 3.2 Presentation of Finished drawing
4. Context of assessment	4.1 Competency must be assessed in a room or any simulated places 4.2 Assessment must be given according to industry standard

UNIT OF COMPETENCY : **OBSERVE QUALITY SYSTEM**

CODE : **ALT311212**

UNIT DESCRIPTOR : This unit of competency covers the competence to conduct the final quality check on completed work or orders, report on the quality of processes and work outcomes, and implement improvements to work processes.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Conduct final quality check on completed work / orders	1.1 Completed work/ orders are checked for compliance with supplier, company or customer specifications 1.2 Documentation is authorized in accordance with company requirements 1.3 Feedback is provided to staff on the quality of their work with equal emphasis on strengths and weaknesses and opportunities for development	1.1 ENGLISH/ COMMUNICATION 1.1.1 Work planning and organization processes 1.1.2 Enterprise quality systems and procedures 1.1.3 Quality systems and application techniques in a work environment 1.1.4 Typical loss and damage control systems 1.1.5 Worksite information management systems 1.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 1.2.1 Occupational health and safety regulations/ requirements	1.1 Checking completed work/ orders 1.2 Preparing documentation and feedback report

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Report on the quality of processes and work outcomes	2.1 Documents are kept according to company <i>quality procedures</i> on outcomes of quality checks 2.2 <i>Quality problems</i> are identified according to company <i>performance indicators</i> 2.3 <i>Information</i> relating to the quality of processes and work outcomes is provided to appropriate persons on a regular basis	2.1 ENGLISH/ COMMUNICATION 2.1.1 Work planning and organization processes 2.1.2 Enterprise quality systems and procedures 2.1.3 Quality systems and application techniques in a work environment 2.1.4 Typical loss and damage control systems 2.1.5 Worksite information management systems 2.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 2.2.1 Occupational health and safety regulations/ requirements	2.1 Communication (written, verbal) 2.2 Storing/ safe keeping of documents 2.3 Identifying problems 2.4 Using mathematical ideas and techniques to document quantities and company sampling procedures 2.5 Establishing diagnostic processes which analyze problems and recommend solutions

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Implement improvements to work processes	3.1 Staff input is encouraged to generate possible solutions to quality problems 3.2 Options for solving quality problems are generated and the costs and benefits of each option are evaluated 3.3 Recommended solutions to quality problems are discussed with management 3.4 Improvements to work processes are implemented according to company policies and procedures	3.1 ENGLISH/ COMMUNICATION 3.1.1 Work planning and organization processes 3.1.2 Enterprise quality systems and procedures 3.1.3 Quality systems and application techniques in a work environment 3.1.4 Typical loss and damage control systems 3.1.5 Worksite information management systems 3.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 3.2.1 Occupational health and safety regulations/ requirements	3.1 Communication (Written, verbal) 3.2 Gathering options/ solutions for solving quality problems 3.3 Applying Interpretive and analytical diagnostic skills 3.4 Planning and organizing activities 3.5 Using mathematical ideas and techniques

RANGE OF VARIABLES

VARIABLE	RANGE
1. Quality procedures	May include: 1.1 Company quality system documentation 1.2 Work instructions/work productivity 1.3 Safe work procedures 1.4 Product specifications 1.5 Equipment maintenance schedules 1.6 Technical procedures and adopted or specifically prepared standards
2. Quality problems	May include: 2.1 Misdiagnosed faults 2.2 Jobs requiring rework 2.3 Jobs which do not meet customer requirements 2.4 Repairs which do not fix the problem within the allocated timeframe
3. Performance indicators	May include: Account for issues of time, quantity, quality and cost factors and may include establishing time targets for own work, identifying reasonable criteria for evaluating own work outcomes, identifying measures to avoid wastage, identifying reasonable criteria to judge internal and/or external customer satisfaction
4. Information/documents	May include: 4.1 Vehicle manufacturer practices 4.2 Company operating procedures 4.3 Supplier directories 4.4 Parts catalogues 4.5 Customer orders and industry/workplace codes of practice 4.6 Material safety data sheets (MSDS)

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: <ul style="list-style-type: none"> 1.1 Communicated effectively with others involved in or affected by the work 1.2 Identified quality system procedures and needs 1.3 Identified performance indicators 1.4 Conducted final quality checks on completed work orders 1.5 Reported on the quality of processes and work outcomes 1.6 Monitored and adjusted performance indicators to meet changing circumstances 1.7 Processed and implemented recommendations for change
2. Resource implications	The following resources should be provided: <ul style="list-style-type: none"> 2.1 A workplace or simulated workplace 2.2 Situations requiring worksite quality systems maintenance 2.3 Worksite quality policies and procedures 2.4 Worksite quality documents system 2.5 Materials, tooling and equipment
3. Method of assessment	Competency in this unit may be assessed through: <ul style="list-style-type: none"> 3.1 Direct Observation 3.2 Oral interview 3.3 Written Evaluation 3.4 Third Party Report
4. Context of assessment	Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions

UNIT OF COMPETENCY : **PERFORM PERIODIC MAINTENANCE**

UNIT CODE : **ALT723213**

UNIT DESCRIPTOR : This competency unit covers the ability to carry out periodic maintenance services in order to keep the motorcycle operating at peak performance, economy and to assure safety and reliability.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Confirm and troubleshoot items scheduled for maintenance	1.1 Customers complain/ requests are understood and symptoms confirmed by testing. 1.2 Previous maintenance record is reviewed and checked, if available. 1.3 <i>Basic / Special Tools and equipment</i> are used in accordance with Service Manual. 1.4 <i>Measuring Tools and equipment</i> are used in accordance with Service Manual. 1.5 <i>Personal Protective Equipment</i> (PPE) is used with Company Occupational Safety and Health (OSH) policies. 1.6 Work is completed with safety considerations, without causing damage to motorcycle and in accordance with <i>Company Standard Operating Procedure.</i>	1.1 ENGLISH/ COMMUNICATION 1.1.1 Use and interpret service manual 1.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 1.2.1 Occupational Health and Safety (OHS) requirements 1.2.2 Positive work values 1.3 TECHNOLOGY 1.3.1 Basic troubleshooting method and workshop operation procedure 1.3.2 Use of Basic and Special tools. 1.3.3 Use of Measuring Tools and equipment.	1.1 Communication (written, verbal) 1.2 Riding Skills. 1.3 Evaluating parts condition. 1.4 Applying standard procedure of inspection and servicing from service manual. 1.5 Handling of basic and special tools. 1.6 Handling of measuring tools and equipment. 1.7 Executing job order

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Inspect, clean and adjust items scheduled for Maintenance	<p>2.1 <i>Handling of motorcycles</i> is done in accordance with company Standard Operating Procedure.</p> <p>2.2 Basic/Special Tools and measuring tools are used in accordance with Service Manual.</p> <p>2.3 Personal Protective Equipment (PPE) is used according to job requirements.</p> <p>2.4 <i>Periodic Maintenance Items</i> are inspected, cleaned and adjusted in accordance with the schedule and procedures specified in the Service Manual.</p> <p>2.5 Necessary parts for replacement and/or repair are recommended.</p> <p>2.6 Work is completed with safety considerations without causing damage to motorcycle and in accordance with company Standard Operating Procedure.</p> <p>2.7 <i>Motorcycle systems</i> are Inspected, cleaned and adjustments made in accordance with company Standard Operating Procedure.</p>	<p>2.1 ENGLISH/ COMMUNICATION 2.1.1 Use and interpret service manual and parts catalog</p> <p>2.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 2.2.1 Occupational Health and Safety (OHS) requirements 2.2.2 Positive work values</p> <p>2.3 TECHNOLOGY 2.3.1 Use and handling of Basic and Special tools 2.3.2 Use and handling of Measuring Tools and equipment 2.3.3 Inspection and Servicing of Periodic Maintenance Items 2.3.4 Service Data and specification of the motorcycle 2.3.5 Periodic Maintenance Schedule Chart.</p>	<p>2.1 Applying disassembly, inspection and assembly procedures from service manual</p> <p>2.2 Evaluating parts condition</p> <p>2.3 Handling of tools</p> <p>2.4 Handling of measuring tools</p> <p>2.5 Communication (written, verbal)</p> <p>2.6 Executing job order</p>

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Lubricate with oil or grease items scheduled for maintenance	3.1 Basic/Special Tools and measuring tools are used in accordance with Service Manual. 3.2 Personal Protective Equipment (PPE) is used according to job requirements. 3.3 Periodic Maintenance Parts are lubricated in accordance with the schedule and procedures specified in the Service Manual. 3.4 Work is completed with safety considerations without causing damage to motorcycle and in accordance with company Standard Operating Procedure.	3.1 ENGLISH/ COMMUNICATION 3.1.1 Use and interpret service manual and parts catalog 3.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 3.2.1 Occupational Health and Safety (OHS) requirements 3.2.2 Positive work values 3.3 TECHNOLOGY 3.3.1 Use of Basic and Special tools. 3.3.2 Use of Measuring Tools and equipment. 3.3.3 Service data and specification of the motorcycle. 3.3.4 Periodic Maintenance Schedule Chart. 3.3.5 Inspection and Servicing of Periodic Maintenance Items.	3.1 Handling tools and equipment. 3.2 Communication (written, verbal) 3.3 Applying standard procedure of lubrication from service manual 3.4 Communication (written, verbal) 3.5 Executing job order 3.4 Evaluating parts condition

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
4. Replace items scheduled for maintenance	4.1 Basic/Special Tools and measuring tools are used in accordance with Service Manual. 4.2 Personal Protective Equipment (PPE) is used according to job requirements. 4.3 Periodic Maintenance Parts are replaced in accordance with the schedule and procedures specified in the Service Manual. 4.4 Work is completed with safety considerations without causing damage to motorcycle and in accordance with company Standard Operating Procedure.	4.1 ENGLISH/ COMMUNICATION 4.1.1 Use and interpret service manual and parts catalog 4.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 4.2.1 Occupational Health and Safety (OHS) requirements 4.2.2 Positive work values 4.3 TECHNOLOGY 4.3.1 Use of Basic and Special tools. 4.3.2 Use of Measuring Tools and equipment. 4.3.3 Service data and specification of the motorcycle. 4.3.4 Periodic Maintenance Schedule Chart. 4.3.5 Inspection and Servicing of Periodic Maintenance Items. 4.3.6 Recommended service limits for Periodic Maintenance Parts.	4.1 Applying procedures in diagnosing disassembly, inspection and assembly procedures from service manual 4.2 Evaluating parts condition 4.3 Handling of tools 4.4 Communication (written, verbal) 4.5 Executing job order

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
5. Tighten bolts and nuts scheduled for maintenance	5.1 Basic/Special Tools and measuring tools are used in accordance with Service Manual. 5.2 Personal Protective Equipment (PPE) is used according to job requirements. 5.3 Engine/chassis bolts and nuts are tightened in accordance with the schedule and procedures specified in the Service Manual. 5.4 Work is completed with safety considerations without causing damage to motorcycle and in accordance with company Standard Operating Procedure.	5.1 ENGLISH/ COMMUNICATION 5.1.1 Use and interpret service manual 5.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 5.2.1 Occupational Health and Safety (OHS) requirements 5.2.2 Positive work values 5.3 MATH 5.3.1 Torque chart for periodic maintenance parts 5.4 TECHNOLOGY 5.4.1 Use of Basic and Special tools. 5.4.2 Use of Measuring Tools and equipment. 5.4.3 Service data and specification of the motorcycle. 5.4.4 Periodic Maintenance Schedule Chart. 5.4.5 Inspection and Servicing of Periodic Maintenance Items.	5.1 Applying standard procedure of tightening bolts from service manual 5.2 Evaluating parts condition 5.3 Handling of tools 5.4 Communication (written, verbal) 5.5 Executing job order

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
6. Final inspection of items scheduled for maintenance	6.1 Conduct Motorcycle Systems check. 6.2 If necessary, Road test is conducted to ensure safe motorcycle operation. 6.3 Safety riding gear is used in accordance with Company Occupational Safety and Health (OSH) policies. 6.4 Maintenance record is accomplished and completed. 6.5 Tools and equipment are used in accordance with manufacturer's Service Manual. 6.6 Work is completed with safety considerations and without causing damage to motorcycle.	6.1 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 6.1.1 Occupational Health and Safety (OHS) requirements 6.1.2 Positive work values 6.2 TECHNOLOGY 6.2.1 Use of Basic and Special tools.	6.1 Riding Skills. 6.2 Applying standard procedure of inspection from service manual. 6.3 Handling of basic and special tools. 6.4 Executing job order 6.5 Communication (written, verbal)

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
7. Clean up work area	7.1 Materials that can be reused are collected and stored. 7.2 Tools and equipment are cleaned and inspected for serviceable condition and stored in accordance with workplace procedures. 7.3 Waste and scrap are removed following workplace and environmental procedures. 7.4 Work area is cleaned in accordance with workplace procedures	7.1 ENGLISH/ COMMUNICATION 7.1.1 Procedures for shop maintenance 7.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 7.2.1 Occupational Health and Safety (OHS) requirements 7.2.2 Classification of waste materials 7.2.3 Proper disposal of contaminated/ hazardous waste materials 7.2.4 DENR procedures on waste disposal 7.2.5 5S 7.2.6 Positive work values 7.3 TECHNOLOGY 3.6.1 Tools and equipment maintenance.	7.1 Applying DENR procedures on waste Disposal. 7.2 Applying Proper equipment maintenance. 7.3 Applying Service Shop Maintenance. 7.4 Handling of waste and scraps. 7.5 Following 5S 7.6 Handling of tools & equipment 7.7 Cleaning up work area

RANGE OF VARIABLES

VARIABLE	RANGE
1. Basic / Special Tools and equipment	<p>Basic Tools may include:</p> <ul style="list-style-type: none"> 1.1 Combination Pliers 1.2 Long nose pliers 1.3 Screw drivers 1.4 Open end wrench 1.5 Box end wrench 1.6 Socket set 1.7 Vise grip 1.8 Hexagon wrench set 1.9 Ball peen hammer 1.10 Plastic / Rubber Mallet 1.11 Adjustable wrench 1.12 Chisel <p>Special Tools may include:</p> <ul style="list-style-type: none"> 1.13 Oiler 1.14 Oil filter wrench 1.15 T-handle 1.16 Impact driver set 1.17 Snap ring pliers 1.18 Tappet adjust driver 1.19 Spark plug wrench 1.20 Engine Tachometer 1.21 Compression gauge 1.22 Oil pressure gauge 1.23 Tire depth gauge 1.24 Spoke nipple wrench 1.25 Vacuum Tester 1.26 Carburetor Synchronizer 1.27 Multi-Circuit Tester 1.28 Needle-point probe set 1.29 Mode Select Switch 1.30 Diagnostic Tool <p>Equipment may include:</p> <ul style="list-style-type: none"> 1.31 Working table 1.32 Pans 1.33 Bench vise 1.34 Bench grinder 1.35 Air Compressor 1.36 Pressure washer 1.37 Used oil drum
2. Measuring Tools and equipment	<p>May include:</p> <ul style="list-style-type: none"> 2.1 Steel rule 2.2 Vernier Caliper 2.3 Thickness Gauge 2.4 Micrometer 2.5 Torque wrench

VARIABLE	RANGE
3. Personal Protective Equipment	May include: 3.1 Safety shoes 3.2 Cap 3.3 Gloves 3.4 Goggles 3.5 Apron or mechanic suit
4. Company Standard Operating Procedure	May include: 4.1 Parts Requisition slip 4.2 Job order slip 4.3 Wearing of Personal protective equipment 4.4 Service manual 4.5 Parts catalog 4.6 Company work procedures 4.7 Company guidelines 4.8 Work instructions
5. Handling of motorcycles	May include: 5.1 Parking 5.2 Using of side stand 5.3 Using of center stand 5.4 Mounting on bike 5.5 Dismounting on bike 5.6 Moving 5.7 Transporting 5.8 Washing 5.9 Storage
6. Periodic Maintenance Items	May include: (Engine) 6.1 Battery 6.2 Cylinder head nuts, cylinder nuts, exhaust pipe bolts and nuts 6.3 Air cleaner element 6.4 Valve clearance 6.5 Spark plug 6.6 Fuel line 6.7 Engine oil 6.8 Engine oil filter 6.9 Throttle cable play 6.10 Clutch cable play 6.11 Idle speed 6.12 Exhaust control valve 6.13 Throttle valve synchronization 6.14 Secondary Air Induction System 6.15 Engine coolant 6.16 Radiator hose 6.17 Clutch hose 6.18 Clutch fluid 6.19 Evaporator Control System Inspection

VARIABLE	RANGE
	6.20 Evaporator hose 6.21 Compression Pressure 6.22 Oil Pressure 6.23 Diagnostic check (For Chassis) 6.24 Drive chain 6.25 Brakes 6.26 Brake cable 6.27 Brake pedal 6.28 Brake hose 6.29 Brake fluid 6.30 Tires 6.31 Steering 6.32 Rear suspension 6.33 Front fork oil Chassis bolts and nuts
7 Motorcycle Systems	May include: 7.1 (Engine) 7.1.1 Emission Control Devices 7.1.2 Engine Electrical Devices 7.1.3 Engine Mechanical 7.1.4 Engine Lubricating System 7.1.5 Engine Cooling System 7.1.6 Fuel System 7.1.7 Ignition System 7.1.8 Starting System 7.1.9 Charging System 7.1.10 Exhaust System 7.2 (For Chassis) 7.2.1 Suspension System 7.2.2 Drive System 7.2.3 Brake Control System 7.2.4 Anti-Lock Brake System (ABS) 7.2.5 Transmission / Clutch System 7.2.6 Steering System 7.2.7 Wiring System 7.2.8 Lighting System

EVIDENCE GUIDE

1. Critical aspects Competency	Assessment requires evidence that the candidate: 1.1 Confirmed and troubleshooted items specified for periodic maintenance 1.2 Inspected, cleaned and adjusted items specified for periodic maintenance 1.3 Lubricated with oil or grease items specified for periodic maintenance 1.4 Replaced items specified for periodic maintenance 1.5 Performed tightening of bolts and nuts specified in the periodic maintenance. 1.6 Performed final inspection of items specified for periodic maintenance 1.7 Cleaned up work area.
2. Resource implications	The following resources must be provided: 2.1 Workplace: Real or simulated work area 2.2 Appropriate tools and equipment 2.3 Materials relevant to the activity
3. Method of assessment	Competency must be assessed through: 3.1 Demonstration with Oral Questioning 3.2 Written/Oral examination
4. Context for assessment	4.1 Competency must be assessed on the job or simulated environment. 4.2 The assessment of practical skills must only take place after a period of supervised practice and repetitive experience.

CORE COMPETENCY

UNIT OF COMPETENCY : SERVICE MOTORCYCLE/SMALL ENGINE SYSTEM

UNIT CODE : ALT723372

UNIT DESCRIPTOR : This competency covers the knowledge and skills the ability to inspect, diagnose, adjust and service the fuel, intake and exhaust, lubrication, cooling, transmission and clutch system and its components where applicable to motorcycle/small engine units.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Service fuel system	<p>1.1 <i>Fuel system malfunction</i> is confirmed and diagnosed according to the symptoms</p> <p>1.2 <i>Fuel system components</i> are disassembled in accordance with Service Manual</p> <p>1.3 Defective parts are replaced and assembled in accordance with Service Manual</p> <p>1.4 Repaired fuel systems/ components are inspected according to standard specifications</p> <p>1.5 Final test is conducted to ensure safe and normal fuel system operation</p> <p>1.6 <i>Basic/Special/Measuring Tools and equipment</i> are used in accordance with Service Manual.</p> <p>1.7 <i>Personal Protective Equipment (PPE)</i> is used according to Occupational Safety and Health (OSH) policies.</p> <p>1.8 Work is completed with safety considerations, without causing damage to the <i>unit</i> and in accordance with <i>Company Standard Operating Procedure</i></p> <p>1.9 Personal safety and hygiene is observed</p>	<p>1.1 ENGLISH/ COMMUNICATION</p> <p>1.1.1 Procedures on Service Manual</p> <p>1.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS</p> <p>1.2.1 Occupational Safety and Health (OSH) requirements</p> <p>1.2.2 Exhaust Emission standard</p> <p>1.2.3 Types of Gasoline</p> <p>1.2.4 Waste Management and Segregation</p> <p>1.3 MATH</p> <p>1.3.1 Standard value of torque, clearances, limits</p> <p>1.3.2 Volume/pressure</p> <p>1.3.3 Engine Idling Revolution Per Minute (RPM)</p> <p>1.4 SCIENCE</p> <p>1.4.1 Principle of fuel system</p> <p>1.5 TECHNOLOGY</p> <p>1.5.1 Basic troubleshooting method and workshop operation procedure</p> <p>1.5.2 Types of fuel system</p> <p>1.5.3 Uses of Basic and Special tools</p>	<p>1.1 Diagnosing fuel system malfunction</p> <p>1.2 Riding Skills</p> <p>1.3 Applying standard procedure of inspection</p> <p>1.4 Communication (written, verbal)</p> <p>1.5 Handling of basic and special tools</p> <p>1.6 Handling of measuring tools and equipment</p> <p>1.7 Executing job order</p> <p>1.8 Practicing personal safety and hygiene</p>

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Service intake and exhaust system	<p>2.1 <i>Intake and exhaust system malfunction</i> is confirmed and diagnosed according to the symptoms</p> <p>2.2 <i>Intake and exhaust system components</i> are disassembled in accordance with Service Manual</p> <p>2.3 Defective parts are replaced and assembled in accordance with Service Manual</p> <p>2.4 Repaired intake and exhaust systems/ components are inspected according to standard specifications</p> <p>2.5 Final test is conducted to ensure safe and normal intake and exhaust system operation</p> <p>2.6 Basic/Special/Measuring Tools and equipment are used in accordance with Service Manual</p> <p>2.7 Personal Protective Equipment (PPE) is used according to Occupational Safety and Health (OSH) policies.</p> <p>2.8 Work is completed with safety considerations, without causing damage to the unit and in accordance with Company Standard Operating Procedure</p> <p>2.9 Personal safety and hygiene is observed</p>	<p>2.1 ENGLISH/ COMMUNICATION 2.1.1 Procedures on Service Manual</p> <p>2.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 2.2.1 Occupational Safety and Health (OSH) requirements 2.2.2 Exhaust Emission standard 2.2.3 Types of Gasoline 2.2.4 Waste Management and Segregation</p> <p>2.3 MATH 2.3.1 Standard value of torque, clearances, limits 2.3.2 Engine Idling Revolution Per Minute (RPM)</p> <p>2.4 SCIENCE 2.4.1 Principle of intake and exhaust system</p> <p>2.5 TECHNOLOGY 2.5.1 Basic troubleshooting method and workshop operation procedure 2.5.2 Types of intake and exhaust system 2.5.3 Uses of Basic and Special tools</p>	<p>2.1 Disassembling and assembling intake and exhaust system components</p> <p>2.2 Applying procedures in diagnosing disassembly, inspection and assembly procedures from service manual</p> <p>2.3 Evaluating parts condition</p> <p>2.4 Handling of tools</p> <p>2.5 Handling of measuring tools</p> <p>2.6 Communication (written, verbal)</p> <p>2.7 Executing job order</p> <p>2.8 Practicing personal safety and hygiene</p>

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Service lubrication system	3.1 Lubrication system malfunction is confirmed and diagnosed according to the symptoms 3.2 Lubrication system components are disassembled in accordance with Service Manual 3.3 Defective parts are replaced and assembled in accordance with Service Manual 3.4 Repaired lubrication systems/ components are inspected according to standard specifications 3.5 Engine is tested to ensure safe and normal engine operation 3.6 Basic/Special/Measuring Tools and equipment are used in accordance with Service Manual 3.7 Personal Protective Equipment (PPE) is used according to Occupational Safety and Health (OSH) policies. 3.8 Work is completed with safety considerations, without causing damage to the unit and in accordance with Company Standard Operating Procedure 3.9 Personal safety and hygiene is observed	3.1 ENGLISH/ COMMUNICATION 3.1.1 Procedures on Service Manual 3.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 3.2.1 Occupational Safety and Health and (OSH) requirements 3.2.2 Exhaust Emission standard 3.2.3 Waste Management and Segregation 3.3 MATH 3.3.1 Standard value of torque, clearances, limits 3.3.2 Engine Idling Revolution Per Minute (RPM) 3.3.3 Oil volume requirements 3.4 SCIENCE 3.4.1 Principle of lubrication system 3.4.2 Oil specifications 3.5 TECHNOLOGY 3.5.1 Basic troubleshooting method and workshop operation procedure 3.5.2 Types of lubrication system 3.5.3 Uses of Basic and Special tools	3.1 Disassembling and assembling lubrication system components 3.2 Applying procedures in diagnosing disassembly, inspection and assembly procedures from service manual 3.3 Evaluating parts condition 3.4 Handling of basic and special tools 3.5 Handling of measuring tools 3.6 Communication (written, verbal) 3.7 Executing job order 3.8 Practicing personal safety and hygiene

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
4 Service cooling system	4.1 <i>Cooling system malfunction</i> is confirmed and diagnosed according to the symptoms 4.2 <i>Cooling system components</i> are disassembled in accordance with Service Manual 4.3 Defective parts are replaced and assembled in accordance with Service Manual 4.4 Repaired cooling systems/ components are inspected according to standard specifications 4.5 Engine is tested to ensure safe and normal engine operation 4.6 Basic/Special/Measuring Tools and equipment are used in accordance with Service Manual 4.7 Personal Protective Equipment (PPE) is used according to Occupational Safety and Health (OSH) policies. 4.8 Work is completed with safety considerations, without causing damage to the unit and in accordance with Company Standard Operating Procedure 4.9 Personal safety and hygiene is observed	4.1 ENGLISH/ COMMUNICATION 4.1.1 Procedures on Service Manual 4.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 4.2.1 Occupational Safety and Health (OSH) requirements 4.2.2 Waste Management and Segregation 4.3 MATH 4.3.1 Standard value of torque, limits 4.3.2 Engine Idling Revolution Per Minute (RPM) 4.3.3 Oil and coolant volume requirements 4.4 SCIENCE 4.4.1 Principle of cooling system 4.4.2 Oil and coolant specifications 4.5 TECHNOLOGY 4.5.1 Basic troubleshooting method and workshop operation procedure 4.5.2 Types of cooling system 4.5.3 Uses of Basic and Special tools	4.1 Disassembling and assembling cooling system components 4.2 Applying procedures in diagnosing disassembly, inspection and assembly procedures from service manual 4.3 Evaluating parts condition 4.4 Handling of basic and special tools 4.5 Handling of measuring tools 4.6 Communication (written, verbal) 4.7 Executing job order 4.8 Practicing personal safety and hygiene

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
5 Service transmission and clutch system (for motorcycle only)	5.1 <i>Transmission and clutch system malfunction</i> is confirmed and diagnosed according to the symptoms 5.2 <i>Transmission and clutch system components</i> are disassembled in accordance with Service Manual 5.3 Defective parts are replaced and assembled in accordance with Service Manual 5.4 Repaired transmission and clutch systems/ components are inspected according to standard specifications 5.5 Final test is conducted to ensure safe and normal transmission and clutch system operation 5.6 Basic/Special/Measuring Tools and equipment are used in accordance with Service Manual 5.7 Personal Protective Equipment (PPE) is used according to Occupational Safety and Health (OSH) policies. 5.8 Work is completed with safety considerations, without causing damage to motorcycle and in accordance with Company Standard Operating Procedure 5.9 Personal safety and hygiene is observed	5.1 ENGLISH/ COMMUNICATION 5.1.1 Procedures on Service Manual 5.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 5.2.1 Occupational Safety and Health (OSH) requirements 5.2.2 Waste Management and Segregation 5.3 MATH 5.3.1 Standard value of torque, limits 5.3.2 Lubricating oil volume requirements 5.4 SCIENCE 5.4.1 Principle of transmission and clutch system 5.4.2 Oil specifications 5.5 TECHNOLOGY 5.5.1 Basic troubleshooting method and workshop operation procedure 5.5.2 Types of transmission and clutch system 5.5.3 Uses of Basic and Special tools	5.1 Disassembling and assembling transmission and clutch system components 5.2 Applying procedures in diagnosing disassembly, inspection and assembly procedures from service manual 5.3 Evaluating parts condition 5.4 Handling of basic and special tools 5.5 Handling of measuring tools 5.6 Communication (written, verbal) 5.7 Executing job order 5.8 Practicing personal safety and hygiene

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
6 Clean up work area	6.1 Materials that can be reused are collected and stored. 6.2 Tools and equipment are cleaned and inspected for serviceable condition and stored in accordance with workplace procedures. 6.3 Waste and scrap are removed following workplace and environmental procedures 6.4 Work area is cleaned in accordance with workplace procedures 6.5 Personal Protective Equipment (PPE) is used according to Occupational Safety and Health (OSH) policies. 6.6 Personal safety and hygiene is observed	6.1 ENGLISH/ COMMUNICATION 6.1.1 Procedures for Shop Maintenance 6.1.2 Company policies and procedures 6.1.3 Occupational Safety and Health (OSH) requirements 6.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 6.2.1 Classification of waste materials 6.2.2 Waste Segregation and Disposal 6.2.3 Occupational Safety and Health (OSH) Standards requirements 6.2.4 5 S 6.3 TECHNOLOGY 6.3.1 Tools and equipment maintenance	6.1 Observing environmental rules and regulations 6.2 Practicing equipment maintenance 6.3 Applying service shop maintenance 6.4 Cleaning up work area 6.5 Handling of waste and scraps 6.6 Following 5S 6.7 Practicing personal safety and hygiene

RANGE OF VARIABLES

VARIABLE	RANGE
1. Fuel System malfunction	May include: <ul style="list-style-type: none"> 1.1 Fuel leak 1.2 Starting difficulty 1.3 Idling or low-speed trouble 1.4 Medium or high-speed trouble 1.5 Hesitation on acceleration 1.6 Back fire / After fire 1.7 Lack of power 1.8 Surging 1.9 Abnormal knocking 1.10 Engine stalling after start 1.11 Engine stalling when throttle valve is opened 1.12 Engine stalling when throttle valve is closed 1.13 Engine stalling when load is applied 1.14 Overflow and fuel level fluctuations
2. Fuel System components	May include: <ul style="list-style-type: none"> 2.1 Fuel tank 2.2 Fuel lines 2.3 Fuel cock 2.4 Carburetor 2.5 Fuel pump 2.6 Fuel Pump Relay 2.7 Fuel filter 2.8 Fuel level gauge 2.9 Throttle body 2.10 Intake pipe 2.11 Throttle valve 2.12 Secondary Throttle Valve 2.13 Fuel injector 2.14 Pulsed Air Solenoid Valve 2.15 Intake Air Pressure Sensor 2.16 Intake Air Temperature Sensor 2.17 Crankshaft Position Sensor 2.18 Throttle Position Sensor 2.19 Atmospheric Pressure Sensor 2.20 Engine Coolant Temperature Sensor 2.21 HO2 (Heated Oxygen) Sensor 2.22 ECM (Engine Control Module) 2.23 Battery

VARIABLE	RANGE
3. Basic / Special Tools and equipment	<p>Basic Tools may include:</p> <ul style="list-style-type: none"> 3.1 Combination Pliers 3.2 Long nose pliers 3.3 Screw drivers 3.4 Open end wrench 3.5 Box end wrench 3.6 Socket set 3.7 Vise grip 3.8 Hexagon wrench set 3.9 Ball peen hammer 3.10 Plastic / Rubber Mallet 3.11 Adjustable wrench 3.12 Chisel <p>Special Tools may include:</p> <ul style="list-style-type: none"> 3.13 Oiler 3.14 T-handle 3.15 Impact driver set 3.16 Snap ring pliers 3.17 Vacuum Tester 3.18 Carburetor Synchronizer 3.19 Multi-Circuit Tester 3.20 Tachometer 3.21 Needle-point probe set 3.22 Mode Select Switch 3.23 Diagnostic Tool <p>Measuring Tools may include:</p> <ul style="list-style-type: none"> 3.24 Steel rule 3.25 Vernier Caliper 3.26 Torque wrench 3.27 Graduated Cylinder <p>Equipment may include:</p> <ul style="list-style-type: none"> 3.28 Working table 3.29 Pans 3.30 Bench vise 3.31 Bench grinder 3.32 Battery Charger 3.33 Pressure washer 3.34 Injector cleaner
4. Personal Protective Equipment	<p>May include:</p> <ul style="list-style-type: none"> 4.1 Safety shoes 4.2 Cap 4.3 Gloves 4.4 Goggles 4.5 Apron or mechanic suit
5. Unit	<p>May include:</p> <ul style="list-style-type: none"> 5.1 Motorcycle 5.2 Small Engine <ul style="list-style-type: none"> • Stationary/Multipurpose engine

VARIABLE	RANGE
6. Company Standard Operating Procedure	May include: 6.1 Parts Requisition slip 6.2 Job order slip 6.3 Wearing of Personal protective equipment 6.4 Service manual 6.5 Parts catalog 6.6 Company work procedures 6.7 Company health & safety guidelines 6.8 Work instructions
7. Intake and exhaust system malfunction	May include: 7.1 Starting difficulty 7.2 Engine poor idling 7.3 Engine stalling 7.4 Engine runs poorly in high speed range 7.5 Engine insufficient power 7.6 Engine overheating 7.7 Heavy exhaust smoke. 7.8 Spark plug abnormal fouling 7.9 Abnormal noise of muffler 7.10 After fire 7.11 Backfire
8. Intake and exhaust system components	Intake System components may include: 8.1 Air cleaner case 8.2 Air filter element 8.3 Gaskets 8.4 Intake manifold 8.5 Engine breather 8.6 Pair Exhaust System components may include: 8.7 Exhaust pipe 8.8 Gaskets 8.9 Connector 8.10 O-ring 8.11 Muffler 8.12 Baffle pipe (Silencer) 8.13 Oxygen Sensor 8.14 Pulsed Secondary Air Injection System (PAIR) 8.15 Catalytic converter 8.16 Exhaust Control System (Exhaust Control Valve / Exhaust Control Valve Actuator) 8.17 Secondary air control solenoid valve 8.18 Secondary air lead valve 8.19 Emission control devices
9. Lubrication system malfunction	May include: 9.1 Oil leak 9.2 Engine overheating 9.3 Engine seizure 9.4 Abnormal engine noise

VARIABLE	RANGE
	9.5 Abnormal wear of engine parts
10.Lubrication system components	May include: 10.1 Oil pan (bottom of crankcase) 10.2 Oil tank 10.3 Oil pump 10.4 Oil hole/passages 10.5 Oil filter/strainer 10.6 Oil cooler tank

VARIABLE	RANGE
11.Cooling system malfunction	May include: 11.1Coolant leak 11.2Contaminated coolant 11.3Engine overheating
12.Cooling system components	May include: 12.1Cooling fins 12.2Engine cooling/auxiliary fan 12.3Radiator Cap 12.4Radiator Hoses 12.5Radiator tank 12.6Reservoir tank 12.7Coolant Temperature Sensor/Thermosensor 12.8Radiator fan 12.9Water pump 12.10 Thermostat 12.11 Radiator shroud 12.12 Coolant 12.13 Mechanical/water seal
13.Transmission and clutch malfunction	May include: 13.1 Leakage 13.2 Dragging clutch 13.3 Burning smell 13.4 Transmission slippage 13.5 Hard gear shifting 13.6 Transmission noise 13.7 Clutch noise 13.8 Clutch slippage 13.9 Jerking problem
14.Transmission and clutch components	May include: 14.1 Clutch system from 50 cc to 1500 cc 14.2 Conventional clutch system 14.3 Hydraulic clutch 14.4 Centrifugal clutch

EVIDENCE GUIDE

1. Critical aspects Competency	Assessment requires evidence that the candidate: 1.8 Serviced fuel system 1.9 Serviced intake and exhaust system 1.10 Serviced lubrication system 1.11 Serviced cooling system 1.12 Serviced transmission and clutch system 1.13 Cleaned up work area.
2. Resource implications	The following resources must be provided: 2.1 Workplace: Real or simulated work area 2.2 Appropriate tools and equipment 2.3 Materials relevant to the activity 2.4 Service manual
3. Method of assessment	Competency must be assessed through: 3.1 Demonstration with Oral Questioning 3.2 Written/Oral examination
4. Context for assessment	4.1 Competency must be assessed on the job or simulated environment. 4.2 The assessment of practical skills must only take place after a period of supervised practice and repetitive experience.

UNIT OF COMPETENCY : SERVICE ELECTRICAL SYSTEM

UNIT CODE : ALT723373

UNIT DESCRIPTOR : This unit covers the ability to diagnose, inspect adjust and service the electrical system of a motorcycle, specifically, the starting, ignition, lighting, and the charging components.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Confirm and troubleshoot electrical system	<p>1.1 Electrical system malfunction is confirmed and diagnosed in accordance with service manual</p> <p>1.2 Electrical System defects are checked in accordance with Service Manual</p> <p>1.3 Electrical components defects are checked in accordance with Service Manual</p> <p>1.4 Basic / Special Tools and equipment are used in accordance with Service Manual</p> <p>1.5 Measuring Tools and equipment are used in accordance with Service Manual</p> <p>1.6 Personal Protective Equipment (PPE) is used according to Occupational Safety and Health (OSH) policies</p> <p>1.7 Work is completed with safety considerations, without causing damage to motorcycle and in accordance with Company Standard Operating Procedure.</p>	<p>1.1 ENGLISH/ COMMUNICATION</p> <p>1.1.1 Procedures on Service Manual</p> <p>1.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS</p> <p>1.2.1 Occupational Safety and Health (OSH) requirements</p> <p>1.2.2 Positive work values</p> <p>1.3 TECHNOLOGY</p> <p>1.3.1 Basic troubleshooting method and workshop operation procedure.</p> <p>1.3.2 Principle and operation of electrical system component</p> <p>1.3.3 Use of basic and special tools</p> <p>1.3.4 Use of measuring tools and equipment</p>	<p>1.1 Communication (written, verbal)</p> <p>1.2 Evaluating parts condition</p> <p>1.3 Applying standard procedure of inspection and servicing from service manual</p> <p>1.4 Handling of basic and special tools</p> <p>1.5 Handling of measuring tools and equipment</p> <p>1.6 Executing job order</p> <p>1.7 Diagnosing electrical system malfunction</p>

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Disassemble/ Assemble Electrical components	2.1 Basic/special tools and measuring tools are used in accordance with Service Manual. 2.2 Personal Protective Equipment (PPE) is used according to Occupational Safety and Health (OSH) policies. 2.3 Electrical components are inspected in accordance with Service Manual. 2.4 Necessary parts for replacement and/or repair are recommended. 2.5 Defective electrical components are replaced and assembled in accordance with Service Manual. 2.6 Work is completed with safety considerations without causing damage to motorcycle and in accordance with company Standard Operating Procedure.	2.1 ENGLISH/ COMMUNICATION 2.1.1 Procedures on Service Manual 2.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 2.2.1 Occupational Safety and Health (OSH) requirements 2.2.2 Positive work values 2.3 TECHNOLOGY 2.3.1 Use of basic and special tools 2.3.2 Use of measuring tools and equipment 2.3.3 Servicing of electrical systems in the engine and body	2.1 Applying disassembly, inspection and assembly procedures from service manual. 2.2 Evaluating parts condition. 2.3 Handling of basic/ special tools 2.4 Handling of measuring tools 2.5 Communication (written, verbal) 2.6 Executing job order

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Final inspection of electrical system	3.1 Torque check for bolts and nuts is conducted in accordance with service manual 3.2 Electrical connectors, couplers and clamps are properly fitted in accordance to service manual 3.3 If necessary, Road test is conducted to ensure correction of trouble 3.4 Safety riding gear is used in accordance with Company Occupational Safety and Health (OSH) policies 3.5 Tools and equipment are used in accordance with manufacturer's Service Manual 3.6 PPE is used in according to Occupational Safety and Health (OSH) policies 3.7 Work is completed with safety considerations and without causing damage to motorcycle	3.1 ENGLISH/ COMMUNICATION 3.1.1 Procedures on Service Manual 3.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 3.2.1 Occupational Safety and Health (OSH) requirements 3.2.2 Positive work values 3.3 TECHNOLOGY 3.3.1 Handling of basic and special tools 3.3.2 Tightening torque specifications and thread inspection of bolts.	3.1 Applying standard procedure of inspection from service manual. 3.2 Handling of basic and special tools 3.3 Executing job order 3.4 Inspecting the electrical System 3.5 Communication(written, verbal)

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
4. Clean up work area	4.1 Materials that can be reused are collected and stored. 4.2 Tools and equipment are cleaned and inspected for serviceable condition and stored in accordance with workplace procedures. 4.3 Waste and scrap are removed following workplace and environmental procedures 4.4 PPE is used according to Occupational Safety and Health (OSH) policies 4.5 Work area is cleaned in accordance with workplace procedures	4.1 ENGLISH/ COMMUNICATION 4.1.1 Procedures for shop maintenance 4.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 4.2.1 Occupational Safety and Health (OSH) requirements 4.2.2 DENR procedures on waste Disposal 4.2.3 Proper disposal of contaminated / hazardous waste materials. 4.2.4 Classification of waste materials. 4.2.5 5S 4.2.6 Positive work values 4.3 TECHNOLOGY 4.3.1 Basic troubleshooting method and workshop 4.3.2 Tools and equipment maintenance.	4.1 Applying DENR procedures on waste Disposal. 4.2 Applying Proper equipment maintenance. 4.3 Applying Service Shop Maintenance. 4.4 Cleaning up work area 4.5 Handling of tools & equipment 4.6 Handling of waste and scraps. 4.7 Following 5S

RANGE OF VARIABLES

VARIABLE	RANGE
1. Electrical System malfunction	<p>May include:</p> <p>Electrical System malfunction in the engine</p> <ul style="list-style-type: none"> 1.1 Poor engine performance 1.2 Ignition system failure 1.3 Charging system failure 1.4 Starting system failure 1.5 Fuel Injection (FI) system failure <p>Electrical Systems in the body</p> <ul style="list-style-type: none"> 1.6 Illumination and signaling devices failure 1.7 Warning device failure 1.8 Meters and gauges failure 1.9 Switch failure 1.10 Faulty Wiring system
2. Electrical System	<p>May include:</p> <ul style="list-style-type: none"> 2.1 Electrical Systems in the engine <ul style="list-style-type: none"> 2.1.1 Starting devices 2.1.2 Ignition devices 2.1.3 Charging devices 2.1.4 Battery 2.2 Electrical Systems in the body <ul style="list-style-type: none"> 2.2.1 Illumination devices 2.2.2 Horn 2.2.3 Meters and gauges 2.2.4 Switches 2.2.5 Wiring System 2.2.6 Fuel Injection (FI) system

VARIABLE	RANGE
3. Electrical components	<p>May include:</p> <p>3.1 Electrical Systems in the engine</p> <p>3.1.1 Starting devices</p> <p>3.1.1.1 Starter motor</p> <p>3.1.1.2 Starter clutch switch</p> <p>3.1.1.3 Starter relay</p> <p>3.1.1.4 Starter circuits</p> <p>3.1.1.5 Starter mechanisms</p> <p>3.1.1.6 Interlock mechanisms</p> <p>3.1.1.7 Starter switch</p> <p>3.1.1.8 Side stand switch</p> <p>3.1.1.9 Tip over/Angle sensor</p> <p>3.1.2 Ignition devices</p> <p>3.1.2.1 Ignition coil</p> <p>3.1.2.2 High-tension cord</p> <p>3.1.2.3 Capacitor Discharge Ignition unit</p> <p>3.1.2.4 Spark plug</p> <p>3.1.2.5 Cap, Spark plug</p> <p>3.1.2.6 Ignition switch</p> <p>3.1.2.7 Engine stop switch</p> <p>3.1.2.8 Drive Mode Selector</p> <p>3.1.2.9 Immobilizer</p> <p>3.1.2.10 Immobilizer antenna</p> <p>3.1.2.11 Signal generator</p> <p>3.1.2.12 Igniter</p> <p>3.1.2.13 Engine Control Module/ Unit</p> <p>3.1.2.14 Crankshaft Position Sensor</p> <p>3.1.2.15 Throttle Position Sensor</p> <p>3.1.2.16 Side stand switch</p> <p>3.1.2.17 Fuse</p> <p>3.1.2.18 Battery</p> <p>3.1.2.19 Lean/ Tilt/ Tip over angle sensor</p> <p>3.1.2.20 AC magneto / Flywheel</p> <p>3.1.3 Charging devices</p> <ul style="list-style-type: none"> • AC Generator • Regulator rectifier • Battery • Fuse <p>3.2 Electrical Systems in the body</p> <p>3.2.1 Illumination and signaling devices</p> <ul style="list-style-type: none"> • Headlight • Taillight • Brake light • Turn Signal lights • License plate light • Fuses <p>3.2.2 Horn, Meters and Gauges</p> <p>3.2.3 Wiring System</p>

VARIABLE	RANGE
4. Basic / Special Tools and equipment	<p>4.1 Basic Tools may include:</p> <ul style="list-style-type: none"> 4.1.1 Combination Pliers 4.1.2 Long nose pliers 4.1.3 Screw drivers 4.1.4 Open end wrench 4.1.5 Box end wrench 4.1.6 Socket set 4.1.7 Vise grip 4.1.8 Hexagon wrench set 4.1.9 Ball peen hammer 4.1.10 Plastic / Rubber Mallet 4.1.11 Adjustable wrench 4.1.12 Chisel <p>4.2 Special Tools may include:</p> <ul style="list-style-type: none"> 4.2.1 Oiler 4.2.2 T-handle 4.2.3 Impact driver set <p>4.3 Equipment may include:</p> <ul style="list-style-type: none"> 4.3.1 Working table 4.3.2 Pans 4.3.3 Bench vise 4.3.4 Bench grinder 4.3.5 Pressure washer
5. Measuring Tools and equipment	<p>May include:</p> <ul style="list-style-type: none"> 5.1 Multi-Circuit Tester 5.2 Needle-point probe set 5.3 Mode Select Switch 5.4 Diagnostic Tool 5.5 Torque wrench
6. Personal Protective Equipment	<p>May include:</p> <ul style="list-style-type: none"> 6.1 Safety shoes 6.2 Cap 6.3 Gloves 6.4 Goggles 6.5 Apron or mechanic suit
7. Company Standard Operating Procedure	<p>May include:</p> <ul style="list-style-type: none"> 7.1 Parts Requisition slip 7.2 Job order slip 7.3 Wearing of Personal protective equipment 7.4 Service manual 7.5 Parts catalog 7.6 Company work procedures 7.7 Company guidelines 7.8 Work instructions

EVIDENCE GUIDE

1. Critical aspects Competency	Assessment requires evidence that the candidate: 1.1 Confirmed and troubleshooted electrical system. 1.2 Disassembled / assembled electrical components. 1.3 Performed final inspection of electrical system. 1.4 Cleaned up work area.
2. Resource implications	The following resources must be provided: 2.1 Workplace: Real or simulated work area 2.2 Appropriate tools and equipment 2.3 Materials relevant to the activity 2.4 Service manual
3. Method of assessment	Competency must be assessed through: 3.1 Demonstration with Oral Questioning 3.2 Written/Oral examination
4. Context for assessment	4.1 Competency must be assessed on the job or simulated environment. 4.2 The assessment of practical skills must only take place after a period of supervised practice and repetitive experience.

UNIT OF COMPETENCY : SERVICE CHASSIS
UNIT CODE : ALT723374
UNIT DESCRIPTOR : This competency covers the ability to diagnose, inspect, adjust and service the steering and suspension, brake, final drive system, wheels and tires and its components.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variable	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Service steering and suspension system	<p>1.1 <i>Steering and suspension system malfunction</i> is confirmed and diagnosed according to the symptoms</p> <p>1.2 <i>Steering and suspension system components</i> are disassembled in accordance with Service Manual</p> <p>1.3 Defective parts are replaced and assembled in accordance with Service Manual</p> <p>1.4 Repaired steering and suspension systems/ components are inspected according to standard specifications</p> <p>1.5 Final test is conducted to ensure safe and normal steering and suspension system operation</p> <p>1.6 <i>Basic/Special/Measuring Tools and equipment</i> are used in accordance with Service Manual.</p> <p>1.7 <i>Personal Protective Equipment (PPE)</i> is used according to Occupational Safety and Health (OSH) policies.</p> <p>1.8 Work is completed with safety considerations, without causing damage to motorcycle and in accordance with <i>Company Standard Operating Procedure</i></p>	<p>1.1 ENGLISH/ COMMUNICATION</p> <p>1.1.1 Procedures on Service Manual</p> <p>1.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS</p> <p>1.2.1 Occupational Safety and Health (OSH) requirements</p> <p>1.2.2 Waste Management and Segregation</p> <p>1.3 MATH</p> <p>1.3.1 Standard value of torque, clearances, limits</p> <p>1.4 SCIENCE</p> <p>1.4.1 Principle of steering and suspension system</p> <p>1.5 TECHNOLOGY</p> <p>1.5.1 Basic troubleshooting method and workshop operation procedure</p> <p>1.5.2 Uses of Basic and Special tools</p>	<p>1.1 Diagnosing steering and suspension system malfunction</p> <p>1.2 Riding Skills</p> <p>1.3 Applying standard procedure of inspection/repair</p> <p>1.4 Communication (written, verbal)</p> <p>1.5 Handling of basic and special tools</p> <p>1.6 Handling of measuring tools and equipment</p> <p>1.7 Executing job order</p> <p>1.8 Practicing personal safety and hygiene</p>

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variable	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	1.9 Personal safety and hygiene is observed		
2. Service final drive system	2.1 <i>Final drive system malfunction</i> is confirmed and diagnosed according to the symptoms 2.2 <i>Final drive system components</i> are disassembled in accordance with Service Manual 2.3 Defective parts are replaced and assembled in accordance with Service Manual 2.4 Repaired final drive systems/ components are inspected according to standard specifications 2.5 Final test is conducted to ensure safe and normal final drive system operation 2.6 Basic/Special/Masuring Tools and equipment are used in accordance with Service Manual 2.7 Personal Protective Equipment (PPE) is used according to Occupational Safety and Health (OSH) policies. 2.8 Work is completed with safety considerations, without causing damage to motorcycle and in accordance with Company Standard Operating Procedure 2.9 Personal safety and hygiene is observed	2.1 ENGLISH/ COMMUNICATION 2.1.1 Procedures on Service Manual 2.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 2.2.1 Occupational Safety and Health (OSH) requirements 2.2.2 Waste Management and Segregation 2.3 MATH 2.3.1 Standard value of torque, limits 2.3.2 Lubricating oil volume requirements 2.4 SCIENCE 2.4.1 Principle of final drive system 2.4.2 Oil specifications 2.5 TECHNOLOGY 2.5.1 Basic troubleshooting method and workshop operation procedure 2.5.2 Types of final drive system 2.5.3 Uses of Basic and Special tools	2.1 Disassembling and assembling final drive system components 2.2 Applying procedures in diagnosing disassembly, inspection and assembly procedures from service manual 2.3 Evaluating parts condition 2.4 Handling of basic and special tools 2.5 Handling of measuring tools 2.6 Communication (written, verbal) 2.7 Executing job order 2.8 Practicing personal safety and hygiene

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variable	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3 Service brake system	3.1 <i>Brake system malfunction</i> is confirmed and diagnosed according to the symptoms 3.2 <i>Brake system components</i> are disassembled in accordance with Service Manual 3.3 Defective parts are replaced and assembled in accordance with Service Manual 3.4 Repaired brake system/ components are inspected according to standard specifications 3.5 Final test is conducted to ensure safe and normal brake system operation 3.6 Basic/Special/Measuring Tools and equipment are used in accordance with Service Manual. 3.7 Personal Protective Equipment (PPE) is used according to Occupational Safety and Health (OSH) policies. 3.8 Work is completed with safety considerations, without causing damage to motorcycle and in accordance with Company Standard Operating Procedure 3.9 Personal safety and hygiene is observed	3.1 ENGLISH/ COMMUNICATION 3.1.1 Procedures on Service Manual 3.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 3.2.1 Occupational Safety and Health (OHS) requirements 3.2.2 Waste Management and Segregation 3.3 MATH 3.3.1 Standard value of torque, clearances, limits 3.4 SCIENCE 3.4.1 Principle of brake system 3.5 TECHNOLOGY 3.5.1 Basic troubleshooting method and workshop operation procedure 3.5.2 Uses of Basic and Special tools	3.1 Diagnosing brake system malfunction 3.2 Riding Skills 3.3 Applying standard procedure of inspection/repair 3.4 Communication (written, verbal) 3.5 Handling of basic and special tools 3.6 Handling of measuring tools and equipment 3.7 Executing job order 3.8 Practicing personal safety and hygiene

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variable	REQUIRED KNOWLEDGE	REQUIRED SKILLS
4 Service wheels and tires	<p>4.1 <i>Wheels and tires malfunction</i> is confirmed and diagnosed according to the symptoms</p> <p>4.2 <i>Wheels and tires components</i> are disassembled in accordance with Service Manual</p> <p>4.3 Defective parts are replaced and assembled in accordance with Service Manual</p> <p>4.4 Repaired wheels and tires components are inspected according to standard specifications</p> <p>4.5 Final test is conducted to ensure safe and normal wheels and tires operation</p> <p>4.6 Basic/Special/Measuring Tools and equipment are used in accordance with Service Manual.</p> <p>4.7 Personal Protective Equipment (PPE) is used according to Occupational Safety and Health (OSH) policies.</p> <p>4.8 Work is completed with safety considerations, without causing damage to motorcycle and in accordance with Company Standard Operating Procedure</p> <p>4.9 Personal safety and hygiene is observed</p>	<p>4.1 ENGLISH/ COMMUNICATION 3.1.1 Procedures on Service Manual</p> <p>4.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 4.2.1 Occupational Safety and Health (OHS) requirements 4.2.2 Waste Management and Segregation</p> <p>4.3 MATH 4.3.1 Standard value of torque, clearances, limits</p> <p>4.4 SCIENCE 4.4.1 Principle of wheels and tires</p> <p>4.5 TECHNOLOGY 4.5.1 Basic troubleshooting method and workshop operation procedure 4.5.2 Uses of Basic and Special tools</p>	<p>4.1 Diagnosing wheels and tires malfunction</p> <p>4.2 Riding Skills</p> <p>4.3 Applying standard procedure of inspection/repair</p> <p>4.4 Communication (written, verbal)</p> <p>4.5 Handling of basic and special tools</p> <p>4.6 Handling of measuring tools and equipment</p> <p>4.7 Executing job order</p> <p>4.8 Practicing personal safety and hygiene</p>

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variable	REQUIRED KNOWLEDGE	REQUIRED SKILLS
5 Clean up work area	5.1 Materials that can be reused are collected and stored. 5.2 Tools and equipment are cleaned and inspected for serviceable condition and stored in accordance with workplace procedures. 5.3 Waste and scrap are removed following workplace and environmental procedures 5.4 Work area is cleaned in accordance with workplace procedures 5.5 Personal Protective Equipment (PPE) is used according to Occupational Safety and Health (OSH) policies 5.6 Personal safety and hygiene is observed	5.1 ENGLISH/ COMMUNICATION 5.1.1 Procedures for Shop Maintenance 5.1.2 Company policies and procedures 5.1.3 Occupational Safety and Health (OSH) requirements 5.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 5.2.1 Classification of waste materials 5.2.2 Waste Segregation and Disposal 5.2.3 Occupational Safety and Health (OSH) Standards requirements 5.2.4 5 S 5.3 TECHNOLOGY 5.3.1 Tools and equipment maintenance	5.1 Observing environmental rules and regulations 5.2 Applying service shop maintenance 5.3 Handling of waste and scraps 5.4 Following 5S 5.5 Practicing personal safety and hygiene

RANGE OF VARIABLES

VARIABLE	RANGE
1. Steering and suspension system malfunction	<p>Steering malfunction may include:</p> <ul style="list-style-type: none"> 1.1 Unstable steering 1.2 Hard steering 1.3 Loose steering <p>Suspension malfunction may include:</p> <ul style="list-style-type: none"> 1.4 Too soft front or rear suspension (bottoming) 1.5 Too stiff front or rear suspension 1.6 Noisy front or rear suspension. 1.7 Wobble of front or rear wheel. 1.8 Oil leak at front or rear suspension.
2. Steering and suspension system components	<p>Steering components may include:</p> <ul style="list-style-type: none"> 2.1 Handlebar 2.2 Handlebar holder 2.3 Steering stem nut and lock nuts 2.4 Steering stem upper and lower bracket 2.5 Steering races and balls set 2.6 Steering damper <p>Suspension components may include:</p> <ul style="list-style-type: none"> 2.7 Front fork Assembly 2.8 Spring, front fork 2.9 Rear shock 2.10 Swing arm 2.11 Swing arm bushings 2.12 Pivot shaft 2.13 Suspension linkages 2.14 Damping rod 2.15 Oil seal, O-ring 2.16 Suspension bushing
3. Basic / Special Tools and equipment	<p>Basic Tools may include:</p> <ul style="list-style-type: none"> 3.1 Combination Pliers 3.2 Long nose pliers 3.3 Screw drivers 3.4 Open end wrench 3.5 Box end wrench 3.6 Socket set 3.7 Vise grip 3.8 Hexagon wrench set 3.9 Ball peen hammer 3.10 Plastic / Rubber Mallet 3.11 Adjustable wrench 3.12 Chisel <p>Special Tools may include:</p> <ul style="list-style-type: none"> 3.13 Oiler

VARIABLE	RANGE
	3.14 T-handle 3.15 Impact driver set 3.16 Snap ring pliers 3.17 Steering stem wrench 3.18 Steering race installer 3.19 Sliding shaft hammer 3.20 Graduated cylinder 3.21 Vernier caliper 3.22 Torque wrench Equipment may include: 3.23 Working table 3.24 Pans /Parts tray 3.25 Bench vise 3.26 Bench grinder 3.27 Battery charger 3.28 Pressure washer
4. Personal Protective Equipment	May include: 4.1 Safety shoes 4.2 Cap 4.3 Gloves 4.4 Goggles 4.5 Apron or mechanic suit 4.6 Safety mask
5. Company Standard Operating Procedure	May include: 5.1 Parts Requisition slip 5.2 Job order slip 5.3 Wearing of Personal protective equipment 5.4 Service manual 5.5 Parts catalog 5.6 Company work procedures 5.7 Company guidelines 5.8 Work instructions
15. Final drive system malfunction	May include: 15.1 Poor power transmission 15.2 Abnormal drive chain noise 15.3 Dragging rear wheel operation 15.4 Continuous variable transmission (CVT) noise
16.Final drive system components	May include: 13.1 CVT gear set 13.2 Drive belt 13.3 Drive pulley 13.4 Drive Assembly 13.5 Rear wheel sprocket 13.6 Drive chain 13.7 Clutch carrier assembly 13.8 Roller weight

VARIABLE	RANGE
6. Brake system malfunction	May include: 6.1 Insufficient braking power 6.2 Brake noise 6.3 Excessive brake pedal stroke 6.4 Excessive brake lever stroke 6.5 Dragging brakes 6.6 Brake fluid leak
7. Brake system components	<i>Mechanical Drum Brakes</i> may include: 7.1 Front and rear brake panel 7.2 Front and rear brake drum 7.3 Front and rear brake drum bearings 7.4 Front and rear brake shoe 7.5 Brake shoe return springs 7.6 Brake cam shafts 7.7 Drum bearings 7.8 Torque link 7.9 Brake rod 7.10 Brake pedal 7.11 Brake lever/s 7.12 Brake cable/s <i>Hydraulic Disc Brakes</i> may include: 7.13 Brake caliper assembly 7.14 Brake master cylinder 7.15 Brake pads 7.16 Brake disc plates 7.17 Brake hoses
8. Wheels and tires malfunction	May include: 8.1 Wheel wobble 8.2 Unstable handling 8.3 Wheel noise
9. Wheels and tires components	May include: 9.1 Tire 9.2 Inner tube 9.3 Rims/ Mags / spokes 9.4 Axles 9.5 Bearings 9.6 Seals 9.7 Tire valve 9.8 Hub and rubber damper

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: <ul style="list-style-type: none"> 1.1 Serviced steering and suspension system 1.2 Serviced brake system 1.3 Serviced final drive system 1.4 Serviced wheels and tires 1.5 Cleaned up work area
2. Resource implications	The following resources must be provided: <ul style="list-style-type: none"> 2.1 Workplace: Real or simulated work area 2.2 Appropriate tools and equipment 2.3 Service Manual/Parts Catalogue
3. Method of assessment	Competency must be assessed through: <ul style="list-style-type: none"> 3.1 Demonstration with Questioning 3.2 Written/Oral examination
4. Context of assessment	<ul style="list-style-type: none"> 4.1 Competency must be assessed on the job or simulated environment. 4.2 The assessment of practical skills must only take place after a period of supervised practice and repetitive experience.

UNIT OF COMPETENCY : OVERHAUL MOTORCYCLE/SMALL ENGINE

UNIT CODE : ALT723375

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in overhauling the motorcycle/small engine.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Remove engine from the unit	1.1 <i>External components</i> were detached and engine was removed in accordance with service manual. 1.2 Lubricants/Fluid drained before disconnecting engine components 1.3 <i>Personal Protective Equipment (PPE)</i> is used according to Occupational Safety and Health (OSH) policies 1.4 <i>Tools and equipment</i> are used in accordance with manufacturer's <i>manual</i> 1.5 Work is completed with safety considerations and without causing damage to the unit	1.1 ENGLISH/ COMMUNICATION 1.1.1 Procedures for Shop Maintenance 1.1.2 Company policies and procedures Understanding procedures on service manual 1.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 1.2.1 Classification of waste materials 1.2.2 Waste Segregation and Disposal 1.2.3 Occupational Safety and Health (OSH) Standards requirements 1.2.4 5 S 1.2.5 Occupational Safety and Health (OSH) requirements 1.3 TECHNOLOGY 1.3.1 Use Tools and equipment 1.3.2 Principles on operation of engine	1.1 Applying procedures specified in the service manual 1.2 Handling of parts, tools and equipment 1.3 Handling of unit 1.4 Using PPE

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variable	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Disassemble engine	2.1 Engine is disassembled and sequenced for overhaul in accordance with service manual 2.2 Tools and equipment are used in accordance with service manual 2.3 Defective components/parts are checked and confirmed in accordance with standard specification in service manual. 2.4 Personal Protective Equipment (PPE) is used according to Occupational Safety and Health (OSH) policies 2.5 Work is completed with safety considerations and without causing damage to the unit	2.1 ENGLISH/ COMMUNICATION 2.1.1 Procedures for Shop Maintenance 2.1.2 Company policies and procedures Understanding procedures on service manual 2.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 2.2.1 Classification of waste materials 2.2.2 Waste Segregation and Disposal 2.2.3 Occupational Safety and Health (OSH) requirements 2.2.4 5 S 2.3 MATH 2.3.1 Standard value of clearances and service limits 2.4 TECHNOLOGY 2.4.1 Use of Tools and equipment 2.4.2 Principles on operation of engine	2.1 Handling of unit 2.2 Applying standard procedures for engine disassembly as specified in service manual. 2.3 Confirming defective components/parts 2.4 Handling of parts, tools and equipment 2.5 Applying precision measurements.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Assemble Engine (Parts and Components)	<p>3.1 Defective parts are replaced in accordance with standard specification in service manual.</p> <p>3.2 Engine Components are assembled and sequenced in accordance with service manual</p> <p>3.3 Special and Measuring Tools are used in accordance with Service manual</p> <p>3.4 Personal Protective Equipment (PPE) is used according to Occupational Safety and Health (OSH) policies</p> <p>3.5 Work is completed with safety considerations and without causing damage to the unit</p>	<p>3.1 ENGLISH/ COMMUNICATION</p> <p>3.1.1 Procedures for Shop Maintenance</p> <p>3.1.2 Company policies and procedures Understanding procedures on service manual</p> <p>3.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS</p> <p>3.2.1 Classification of waste materials</p> <p>3.2.2 Waste Segregation and Disposal</p> <p>3.2.3 Occupational Safety and Health (OSH) requirements</p> <p>3.2.4 5 S</p> <p>3.3 MATH</p> <p>3.3.1 Standard value of torque, clearances and service limits</p> <p>3.4 TECHNOLOGY</p> <p>3.4.1 Use of Tools and equipment</p> <p>3.4.2 Principles on operation of engine</p> <p>3.4.3 Procedures on assembling parts and components</p>	<p>3.1 Handling of unit</p> <p>3.2 Applying manufacturers standards and specification indicated in service manual</p> <p>3.3 Handling of parts, tools and equipment</p> <p>3.4 Interpreting of Service manual and parts catalogue</p>

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
4 Re-install engine to frame	4.1 Engine is re-installed to frame in accordance with Service Manual. 4.2 Engine mounting bolts and nuts are installed and tightened in accordance to required torque value as specified in Service Manual 4.3 External components are reconnected to the engine in accordance with Service Manual 4.4 Tools and equipment are used in accordance with manufacturer's manual 4.5 New lubricants and coolants are filled in accordance to Service Manual 4.6 Personal Protective Equipment (PPE) is used according to Occupational Safety and Health (OSH) policies 4.7 Work is completed with safety considerations and without causing damage to the unit	4.1 ENGLISH/ COMMUNICATION 4.1.1 Procedures for Shop Maintenance 4.1.2 Company policies and procedures Understanding procedures on service manual 4.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 4.2.1 Classification of waste materials 4.2.2 Waste Segregation and Disposal 4.2.3 Occupational Safety and Health (OSH) requirements 4.2.4 5 S 4.3 TECHNOLOGY 4.3.1 Use Tools and equipment 4.3.2 Principles on operation of engine	1.5 Applying procedures specified in the service manual 1.6 Handling of parts, tools and equipment 1.7 Handling of unit 4.1 Using PPE

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variable	REQUIRED KNOWLEDGE	REQUIRED SKILLS
5 Test engine performance	5.1 <i>Motorcycle/ small engine</i> is started/ warmed up to normal operating temperature 5.2 Final check is performed and <i>necessary adjustments</i> are made in accordance with Service Manual 5.3 Tools are used in accordance with manufacturer's manual 5.4 Personal Protective Equipment (PPE) is used according to Occupational Safety and Health (OSH) policies 5.5 Work is completed with safety considerations and without causing damage to the unit	5.1 ENGLISH/ COMMUNICATION 5.1.1 Procedures on necessary adjustment as specified in the service manual 5.1.2 Company policies and procedures Understanding procedures on service manual 5.1.3 Pre-delivery Inspection (PDI) 5.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 5.2.1 Occupational Safety and Health (OSH) requirements 5.2.2 5 S 5.2.3 Emission standards under Phil. Clean Air Act 5.3 TECHNOLOGY 5.3.1 Use Tools and equipment 5.3.2 Principles on operation of engine	5.1 Riding Skills 5.2 Handling of tools 5.3 Handling of unit 5.4 Applying standard adjustments as specified in the service manual. 5.5 Applying standard procedures for Final Inspection. 5.6 Using PPE

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
6 Clean up work area	6.1 Materials that can be reused are collected and stored 6.2 Tools and equipment are cleaned and inspected in accordance with workplace procedures 6.3 <i>Waste and scrap</i> are disposed following workplace and environmental procedures 6.4 Personal Protective Equipment (PPE) is used according to Occupational Safety and Health (OSH) policies 6.5 Work area is cleaned in accordance with workplace procedures	6.1 ENGLISH/ COMMUNICATION 6.1.1 Procedures for Shop Maintenance 6.1.2 Company policies and procedures 6.2 ENVIRONMENTAL ISSUES AND OTHER CONCERNS 6.2.1 Classification of waste materials 6.2.2 Waste Segregation and Disposal 6.2.3 Occupational Safety and Health (OSH) requirements 6.2.4 5 S 6.3 TECHNOLOGY 6.3.1 Tools and equipment maintenance	6.1 Observing environmental rules and regulations 6.2 Applying service shop maintenance 6.3 Handling of waste and scraps 6.4 Following 5S 6.5 Practicing personal safety and hygiene

RANGE OF VARIABLES

VARIABLE	RANGE
1. External components	May include: 1.1 Muffler/ exhaust pipe 1.2 Carburetor 1.3 Cables (Clutch, Choke,Throttle) 1.4 Fluid hoses 1.5 Air Cleaner box 1.6 Starter Motor 1.7 Engine Sprocket/ drive chain 1.8 EFI Sensors 1.9 Ground wires 1.10 Emission control devices 1.11 Handle bar 1.12 Levers/pedals
2. Personal Protective Equipment (PPE)	May Include: 2.1 Goggle 2.2 Gloves 2.3 Safety Shoes 2.4 Cap 2.5 Apron 2.6 Mask
3. Tools and equipment	May Include: 3.1 Pliers 3.2 Screw drivers 3.3 Open and close end wrench 3.4 Socket Wrench 3.5 Oiler 3.6 Measuring instruments (Vernier , micrometer, 3-pt. Micrometer, tachometer, telescope gauge dial tester indicator, plasti- gauge, torque wrench, feeler gauge) 3.7 Dynamometer 3.8 Parts Washer 3.9 Working Table with engine stand.
4. Manual	May include: 4.1 Service Manual 4.2 Parts Catalogue 4.3 DENR Clean Air Act

VARIABLE	RANGE
5. Engine components	Must Include: 5.1 Cylinder Head 5.2 Cylinder Block 5.3 Crank case 5.4 Piston & Ring Set 5.5 Cam shafts 5.6 Clutch Assembly 5.7 Transmission Assembly 5.8 Kick Starter Components 5.9 Starter Motor and gears 5.10 Crankshaft assembly and side bearing rotor/magneto
6. Special and Measuring tools	May include: Special Tools: 6.1 Magneto Puller 6.2 Bearing Remover 6.3 Bearing Installer 6.4 Crankcase Separating Tool 6.5 Universal Holder 6.6 EFI Diagnostic Tool 6.7 Clutch Lock Nut Wrench 6.8 Oil Seal Installer 6.9 Crankshaft Bearing Remover 6.10 Magneto Holder 6.11 Connecting rod holder 6.12 Injector cleaner 6.13 Hydrometer 6.14 V. block 6.15 Press machine Measuring Tools 6.16 Filler gauge 6.17 Vernier caliper 6.18 Micrometer 6.19 Tachometer 6.20 Plastic gauge 6.21 Oil pressure gauge 6.22 Compression gauge 6.23 Dial gauge
7. Motorcycle/small engine	May include: Motorcycle: 7.1 4 stroke or 2 stroke 7.2 Single cylinder or multi-cylinder 7.3 50 cc to 1500 cc (displacement) Small engine: 7.5 Stationary/Multipurpose engine

VARIABLE	RANGE
8. Necessary adjustments	May include: 8.1 Clutch lever play adjustment 8.2 Carburetor Air Fuel Mixture 8.3 Engine Idle Speed setting 8.4 Drive Chain Slack 8.5 Throttle Cable Free Play Clearance 8.6 Brake Lever/Pedal Clearance 8.7 Valve clearance
9. Waste and Scrap	May include: 9.1 Used oils 9.2 Used Rugs 9.3 Defective Engine Components 9.4 Used hand gloves

EVIDENCE GUIDE

1. Critical aspects Competency	Assessment requires evidence that the candidate: 1.1 Removed engine from the frame 1.2 Disassembled engine 1.3 Assembled engine parts and components 1.4 Re-installed engine to frame 1.5 Tested- engine performance 1.6 Cleaned up work area
2. Resource implications	The following resources must be provided: 2.1 Workplace: Real or simulated work area 2.2 Appropriate tools and equipment 2.3 Materials relevant to the activity 2.4 Service manuals
3. Method of assessment	Competency must be assessed through: 3.1 Demonstration with Questioning 3.2 Written/Oral examination
4. Context of assessment	4.1 Competency must be assessed on the job or simulated environment. 4.2 The assessment of practical skills must only take place after a period of supervised practice and repetitive experience.

SECTION 3 TRAINING ARRANGEMENTS

These standards are set to provide Technical and Vocational Education and Training (TVET) providers with information and other important requirements to consider when designing training programs for Motorcycle/Small Engine Servicing NC II.

They include information on curriculum design; training delivery; trainee entry requirements; tools and equipment; training facilities; and trainer's qualification.

3.1 CURRICULUM DESIGN

TESDA shall provide the training on the development of competency-based curricula to enable training providers develop their own curricula with the components mentioned below.

Delivery of knowledge requirements for the basic, common and core units of competency specifically in the areas of mathematics, science/technology, communication/language and other academic subjects shall be contextualized. To this end, TVET providers shall develop a Contextual Learning Matrix (CLM) to accompany their curricula.

Course Title: MOTORCYCLE/SMALL ENGINE SERVICING **NC Level:** NC II

Nominal Training Duration:	18	Hours (Basic)
	88	Hours (Common)
	<u>544</u>	<u>Hours (Core)</u>
	650	Hours

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; service engine system; service electrical system; service chassis and overhaul motorcycle engine.

This course is also designed to equip the individual the basic and common knowledge, skills and attitudes of the motorcycle mechanic in accordance with industry standards.

To obtain this, all units prescribed for this qualification must be achieved

BASIC COMPETENCIES

(18 HOURS)

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
1. Participate in workplace communication	1.1 Obtain and convey workplace information	<ul style="list-style-type: none"> Describe Organizational policies 	<ul style="list-style-type: none"> Group discussion 	<ul style="list-style-type: none"> Oral evaluation 	4 Hrs.
		<ul style="list-style-type: none"> Read: <ul style="list-style-type: none"> Effective communication 	<ul style="list-style-type: none"> Lecture 	<ul style="list-style-type: none"> Written examination 	
		<ul style="list-style-type: none"> Written communication 			
		<ul style="list-style-type: none"> Communication procedures and systems 			
		<ul style="list-style-type: none"> Identify: <ul style="list-style-type: none"> Different modes of communication 			
		<ul style="list-style-type: none"> Medium of communication 			
		<ul style="list-style-type: none"> Flow of communication 			
		<ul style="list-style-type: none"> Available technology relevant to the enterprise and the individual's work responsibilities 	<ul style="list-style-type: none"> Demonstration 	<ul style="list-style-type: none"> Observation 	
		<ul style="list-style-type: none"> Prepare different Types of question 			
		<ul style="list-style-type: none"> Gather different sources of information 			
		<ul style="list-style-type: none"> Apply storage system in establishing workplace information 			
		<ul style="list-style-type: none"> Demonstrate Telephone courtesy 			

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	1.2 Complete relevant work related documents	<ul style="list-style-type: none"> Describe Communication procedures and systems 	<ul style="list-style-type: none"> Group discussion 	<ul style="list-style-type: none"> Oral evaluation 	
		<ul style="list-style-type: none"> Read: <ul style="list-style-type: none"> Meeting protocols 	<ul style="list-style-type: none"> Lecture 	<ul style="list-style-type: none"> Written examination 	
		<ul style="list-style-type: none"> Nature of workplace meetings 	<ul style="list-style-type: none"> Lecture 	<ul style="list-style-type: none"> Written examination 	
		<ul style="list-style-type: none"> Workplace interactions 			
		<ul style="list-style-type: none"> Barriers of communication 			
		<ul style="list-style-type: none"> Complete work related documents 	<ul style="list-style-type: none"> Demonstration 	<ul style="list-style-type: none"> Observation 	
		<ul style="list-style-type: none"> Read instructions on work related forms/documents 	<ul style="list-style-type: none"> Lecture 	<ul style="list-style-type: none"> Written examination 	
		<ul style="list-style-type: none"> Practice: 			
		<ul style="list-style-type: none"> Estimate, calculate and record routine workplace measures 	<ul style="list-style-type: none"> Demonstration 	<ul style="list-style-type: none"> Observation 	
		<ul style="list-style-type: none"> Basic mathematical processes of addition, subtraction, division and multiplication 			
		<ul style="list-style-type: none"> Demonstrate office activities in: <ul style="list-style-type: none"> workplace meetings and discussions scenario 	<ul style="list-style-type: none"> Role play 	<ul style="list-style-type: none"> Oral evaluation Observation 	
		<ul style="list-style-type: none"> Perform workplace duties scenario following simple written 	<ul style="list-style-type: none"> Role play 	<ul style="list-style-type: none"> Oral evaluation Observation 	

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		notices			
		• Follow simple spoken language	• Demonstration	• Observation	
		• Identify the different Non-verbal communication	• Lecture	• Written examination	
		• Demonstrate ability to relate to people of social range in the workplace	• Demonstration	• Observation	
		• Gather and provide information in response to workplace requirements	• Demonstration	• Observation	
	1.3 Participate in workplace meeting and discussion	• Identify: <ul style="list-style-type: none"> ○ types of workplace documents and forms 	• Lecture	• Written examination	
		○ kinds of workplace report			
		○ Available technology relevant to the enterprise and the individual's work responsibilities			
		• Read and follow instructions in applying basic mathematical concepts			
		• Follow simple spoken language	• Demonstration	• Observation	
		• Demonstrate ability to relate to people of social range in the workplace	• Demonstration	• Observation	
		• Gather and provide information in response to workplace			

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		requirements			
2. Work in a team environment	2.1 Describe and identify team role and responsibility in a team.	<ul style="list-style-type: none"> Describe the team role and scope 	<ul style="list-style-type: none"> Group discussion 	<ul style="list-style-type: none"> Oral evaluation 	4 Hrs.
		<ul style="list-style-type: none"> Read <ul style="list-style-type: none"> Definition of Team 	<ul style="list-style-type: none"> Lecture 	<ul style="list-style-type: none"> Written examination 	
		<ul style="list-style-type: none"> Difference between team and group 			
		<ul style="list-style-type: none"> Objectives and goals of team 	<ul style="list-style-type: none"> Lecture 	<ul style="list-style-type: none"> Written examination 	
		<ul style="list-style-type: none"> Identify different sources of information 			
	2.2 Describe work as a team	<ul style="list-style-type: none"> Describe team goals and objectives 	<ul style="list-style-type: none"> Group discussion 	<ul style="list-style-type: none"> Oral evaluation 	
		<ul style="list-style-type: none"> Perform exercises in setting team goals and expectations scenario 	<ul style="list-style-type: none"> Role play 	<ul style="list-style-type: none"> Oral evaluation Observation 	
		<ul style="list-style-type: none"> Identify <ul style="list-style-type: none"> individual role and responsibility 	<ul style="list-style-type: none"> Lecture 	<ul style="list-style-type: none"> Written examination 	
		<ul style="list-style-type: none"> Practice Interacting effectively with others 	<ul style="list-style-type: none"> Group discussion 	<ul style="list-style-type: none"> Oral evaluation 	
		<ul style="list-style-type: none"> Read: 	<ul style="list-style-type: none"> Lecture 	<ul style="list-style-type: none"> Written examination 	
		<ul style="list-style-type: none"> Fundamental rights at work including gender sensitivity 			

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> Understanding individual competencies relative to teamwork 			
		<ul style="list-style-type: none"> Types of individuals 			
		<ul style="list-style-type: none"> Role of leaders 			
3. Practice career professionalism	3.1 Integrate personal objectives with organizational goals	<ul style="list-style-type: none"> Describe performance evaluation 	<ul style="list-style-type: none"> Group discussion 	<ul style="list-style-type: none"> Oral evaluation 	6 Hrs.
		<ul style="list-style-type: none"> Read: <ul style="list-style-type: none"> Work values and ethics (Code of Conduct, Code of Ethics, etc.) 	<ul style="list-style-type: none"> Lecture 	<ul style="list-style-type: none"> Written examination 	
		<ul style="list-style-type: none"> Understanding personal objectives 			
		<ul style="list-style-type: none"> Understanding organizational goals 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 	
		<ul style="list-style-type: none"> Demonstrate Intra and Interpersonal skills at work 	<ul style="list-style-type: none"> Demonstration 	<ul style="list-style-type: none"> Observation 	
		<ul style="list-style-type: none"> Demonstrate personal commitment in work 			
	3.2 Set and meet work priorities	<ul style="list-style-type: none"> Describe company policies, operations, procedures and standards 	<ul style="list-style-type: none"> Group discussion 	<ul style="list-style-type: none"> Oral evaluation 	

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Read:	• Lecture	• Written examination	
		○ Time Management			
		○ Basic strategic planning concepts			
		○ Resource utilization and management			
		• Apply managing goals and time	• Demonstration	• Observation	
		• Practice:	• Demonstration	• Observation	
		○ economic use of resources and facilities			
		○ time management			
	3.3 Maintain professional growth and development	• Describe company recognition and incentives	• Group discussion	• Oral evaluation	
		• Read:	• Lecture	• Written examination	
		○ Career development opportunities			
		○ Information on relevant licenses and or certifications			

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> personal career development needs 	<ul style="list-style-type: none"> Lecture 	<ul style="list-style-type: none"> Written examination 	
		<ul style="list-style-type: none"> Identify career opportunities 			
		<ul style="list-style-type: none"> Determine personal career development needs 	<ul style="list-style-type: none"> Group discussion 	<ul style="list-style-type: none"> Oral evaluation 	
4. Practice occupational health and safety procedures	4.1 Identify hazard and risks	<ul style="list-style-type: none"> Describe OHS procedures, practices and regulations 	<ul style="list-style-type: none"> Group discussion 	<ul style="list-style-type: none"> Oral evaluation 	6 Hrs.
		<ul style="list-style-type: none"> Read 	<ul style="list-style-type: none"> Lecture 	<ul style="list-style-type: none"> Written examination 	
		<ul style="list-style-type: none"> OHS indicators 			
		<ul style="list-style-type: none"> Organizational contingency practices 			
		<ul style="list-style-type: none"> Practice hazards/risks identification and control 			
	4.2 Evaluate hazard and risks	<ul style="list-style-type: none"> Describe effects of safety hazards 	<ul style="list-style-type: none"> Group discussion 	<ul style="list-style-type: none"> Oral evaluation 	
		<ul style="list-style-type: none"> Read 	<ul style="list-style-type: none"> Lecture 	<ul style="list-style-type: none"> Written examination 	
		<ul style="list-style-type: none"> Threshold Limit Value –TLV 			
		<ul style="list-style-type: none"> Practice reporting safety hazards 	<ul style="list-style-type: none"> Role play 	<ul style="list-style-type: none"> Observation 	
		<ul style="list-style-type: none"> Demonstrate evaluating hazards and risks using communication equipment 	<ul style="list-style-type: none"> Demonstration 	<ul style="list-style-type: none"> Observation 	

Unit of Competency	Learning Outcomes	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	4.3 Control hazards and risks	<ul style="list-style-type: none"> Describe : <ul style="list-style-type: none"> Organization safety and health protocol 	<ul style="list-style-type: none"> Group discussion 	<ul style="list-style-type: none"> Oral evaluation 	
		<ul style="list-style-type: none"> Company emergency procedure practices 			
		<ul style="list-style-type: none"> Practice personal hygiene 	<ul style="list-style-type: none"> Demonstration 	<ul style="list-style-type: none"> Observation 	
		<ul style="list-style-type: none"> Practice drills on responding to emergency 	<ul style="list-style-type: none"> Demonstration Simulation 	<ul style="list-style-type: none"> Observation 	
	4.4 Maintain occupational health and safety awareness	<ul style="list-style-type: none"> Identify emergency-related drills information 	<ul style="list-style-type: none"> Lecture 	<ul style="list-style-type: none"> Written examination 	
		<ul style="list-style-type: none"> Practice occupational safety and health standards on personal records in the workplace 			
		<ul style="list-style-type: none"> Practice emergency related drills in the workplace 	<ul style="list-style-type: none"> Demonstration Simulation 	<ul style="list-style-type: none"> Observation 	

**COMMON COMPETENCIES
(88 Hours)**

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
1. Apply appropriate sealant/adhesive	1.1 Identify appropriate sealant/adhesive	<ul style="list-style-type: none"> • Identify the types and application of sealant and adhesive • Apply procedures from service manual • Select appropriate sealant/adhesive 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration 	<ul style="list-style-type: none"> • Observation • Practical Examination 	1 Hr.
	1.2 Prepare surface for sealant/adhesive	<ul style="list-style-type: none"> • Apply company occupational safety and health (OSH) policies • Apply company standard operating procedure • Demonstrate personal safety and hygiene • Practice proper use of tools and equipment • Identify surface materials as per construction • Clean surface • Practice proper application of sealant/adhesive 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration 	<ul style="list-style-type: none"> • Observation • Practical Examination 	1 Hr.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
	1.3 Apply sealant/adhesive evenly	<ul style="list-style-type: none"> • Apply company occupational safety and health (OSH) policies • Apply company standard operating procedure • Demonstrate personal safety • Identify threats in using sealant and adhesive • Use of proper tools and equipment's • Apply exact amount of sealant/adhesive • Remove excess amount of sealant adhesive • Apply procedures from service manual 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration 	<ul style="list-style-type: none"> • Observation • Practical Examination 	1 Hr.
	1.4 Store/Dispose of sealant/adhesive	<ul style="list-style-type: none"> • Practice proper storage of sealant/adhesive • Apply proper waste segregation and disposal • Apply company occupational safety and health (OSH) policies • Demonstrate personal safety 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration 	<ul style="list-style-type: none"> • Observation • Practical Examination 	1 Hr.
2. Move and position vehicle	2.1 Prepare vehicle for driving	<ul style="list-style-type: none"> • Demonstrate personal safety and hygiene • Conduct correct pre-ride check-up • Demonstrate drivers code of conduct 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration 	<ul style="list-style-type: none"> • Observation • Practical Examination 	2 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> Identify vehicle parts and accessories 			
	2.2 Move and position vehicle	<ul style="list-style-type: none"> Identify workshop signs and symbols Demonstrate drivers code of conduct Identify vehicle parts and accessories Position vehicle Park the vehicle 	<ul style="list-style-type: none"> Lecture Discussion Demonstration 	<ul style="list-style-type: none"> Observation Practical Examination 	2 Hrs.
	2.3 Check the vehicle	<ul style="list-style-type: none"> Demonstrate drivers code of conduct Check the vehicle position Check the external condition of vehicle 	<ul style="list-style-type: none"> Lecture Discussion Demonstration 	<ul style="list-style-type: none"> Observation Practical Examination 	1 Hr.
3. Perform mensuration and calculation	3.1 Select measuring instruments	<ul style="list-style-type: none"> Explain the fundamentals operations of mathematics Understand the formula for volume, area, perimeter and other geometric figures Identify the object or components to be measure Identify types of measuring instruments Apply correct specification Select appropriate measuring instrument 	<ul style="list-style-type: none"> Lecture Discussion Demonstration 	<ul style="list-style-type: none"> Observation Practical Examination 	4 Hrs.
	3.2 Carry out measurements and calculation	<ul style="list-style-type: none"> Explain the fundamentals operations of mathematics 	<ul style="list-style-type: none"> Lecture Discussion Demonstration 	<ul style="list-style-type: none"> Observation Practical Examination 	24 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Understand the formula for volume, area, perimeter and other geometric figures • Identify the types of measuring instrument • Calibrate measuring instrument • Demonstrate proper handling of measuring instrument • Select appropriate measuring instrument • Practice correct and accurate measuring • Calculate task • Read the instrument accurately • Practice safety handling of measuring instruments 			
	3.3 Maintain measuring instruments	<ul style="list-style-type: none"> • Practice safety handling of measuring instruments • Identify types of measuring instrument • Demonstrate proper handling of measuring instrument • Clean measuring instruments 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration 	<ul style="list-style-type: none"> • Observation • Practical Examination 	1 Hr.
4. Read, interpret and apply specifications and manuals	4.1 Identify and access manual/ specification	<ul style="list-style-type: none"> • Identify Types of Manual and version. • Interpret the use of manuals for identifying section chapter related to Job requirement. 	<ul style="list-style-type: none"> • Lecture • Discussion 	<ul style="list-style-type: none"> • Written Test • Interview 	1 Hr.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
	4.2 Interpret manuals	<ul style="list-style-type: none"> • Identify section/chapter on manual relevant to job requirement • Interpret procedures on manual relevant to job requirement • Interpret specification, measurements and units conversion 	<ul style="list-style-type: none"> • Lecture • Discussion 	<ul style="list-style-type: none"> • Written Test • Interview 	1 Hr.
	4.3 Apply information in manual	<ul style="list-style-type: none"> • Apply procedures on manual as per job requirement • Apply standard specification, limits, measurement required for the job to be conducted • Interpret specification, measurements and units conversion 	<ul style="list-style-type: none"> • Lecture • Discussion 	<ul style="list-style-type: none"> • Written Test • Interview 	1 Hr.
	4.4 Store manuals	<ul style="list-style-type: none"> • Apply procedures for storing manuals 	<ul style="list-style-type: none"> • Lecture • Discussion 	<ul style="list-style-type: none"> • Written Test • Interview 	1 Hr.
5. Use and apply lubricants/coolant	5.1 Identify types of lubricants/coolant	<ul style="list-style-type: none"> • Identify types/classification of lubricants/coolant • Interpret purpose of lubrication (effects and problem) • Identify Lubricants/coolants to be used as per job requirements. • Apply standard specification and quantity required relevant to job requirement. • Apply procedures on waste disposal 	<ul style="list-style-type: none"> • Lecture • Demonstration 	<ul style="list-style-type: none"> • Written Test • Demonstration 	1 Hr.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
	5.2 Use and apply lubricants/coolant	<ul style="list-style-type: none"> • Use of OSH • Apply procedures for changing lubricants/coolants • Identify standard specification of lubricants/coolants • apply standard capacity of lubricants/coolants requirement • apply 5s • Apply procedures on waste disposal 	<ul style="list-style-type: none"> • Lecture • Demonstration 	<ul style="list-style-type: none"> • Written Test • Demonstration 	1 Hr.
	5.3 Perform housekeeping activities	<ul style="list-style-type: none"> • Apply Standard procedures on workshop maintenance • Apply standard procedures on tools and equipment maintenance • Apply 5s 	<ul style="list-style-type: none"> • Lecture • Demonstration 	<ul style="list-style-type: none"> • Written Test • demonstration 	1 Hr.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
6. Perform shop maintenance	6.1 Inspect/clean tools and work area	<ul style="list-style-type: none"> • Apply Company standard operating procedure • Apply company occupational safety and health (OSH) policies • Identify Types of solvent to be used for cleaning • Apply handling of tools, equipment, supplies and materials • Apply 5s • Apply procedures for waste disposal 	<ul style="list-style-type: none"> • Lecture • Discussion 	<ul style="list-style-type: none"> • Written Test • Practical exam 	1 Hr.
	6.2 Store/arrange tools and shop equipment	<ul style="list-style-type: none"> • Apply Company standard operating procedure • Apply company occupational safety and health (OSH) policies • Apply procedures on Tools and equipment maintenance and storing • Apply inventory list for tools and equipment for monitoring purpose 	<ul style="list-style-type: none"> • Lecture • Discussion 	<ul style="list-style-type: none"> • Written Test • Practical exam 	1 Hr.
	6.3 Dispose wastes/used lubricants	<ul style="list-style-type: none"> • Apply Company standard operating procedure • Apply company occupational safety and health (OSH) policies • Apply procedures on used lubricants and waste segregation • Apply 5s 	<ul style="list-style-type: none"> • Lecture • Discussion 	<ul style="list-style-type: none"> • Written Test • Practical exam 	1 Hr.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Apply procedures on waste disposal 			
	6.4 Report damaged tools/equipment	<ul style="list-style-type: none"> • Apply Company standard operating procedure • Apply company occupational safety and health (OSH) policies • Apply procedures on Tools and equipment maintenance and storing • Apply inventory list for tools and equipment for monitoring purpose <p>Apply procedures on reporting of damaged tools and equipment</p>	<ul style="list-style-type: none"> • Lecture • Discussion 	<ul style="list-style-type: none"> • Written Test • Practical exam 	1 Hr.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
7. Prepare Job estimate /costing	7.1 Identify nature /scope of work	<ul style="list-style-type: none"> • Apply effective communication skills to determine the nature and scope of work to be undertaken • Identify the extent of service to be rendered is determined and documented in line with standard operating procedures (SOP) • Understand current Environmental issues and other concerns • Apply positive work values • Identify Replaceable/ fabricated materials or spare parts in a vehicle • Understand Automotive Repair Procedures and Techniques • Apply Job estimates • Conduct estimating repair works and activities 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration 	<ul style="list-style-type: none"> • Demonstration • Written Examination • Practical Examination • Oral Questioning 	2 Hrs.
	7.2 Prepare and present estimate	<ul style="list-style-type: none"> • Identify types and quantity of supplies, materials and labor required • Identify the cost of supplies/materials obtained from suppliers • Identify the calculated total cost of required service • Explain estimated cost to customer 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration 	<ul style="list-style-type: none"> • Demonstration • Written Examination • Practical Examination • Oral Questioning 	2 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Understand current Environmental issues and other concerns • Apply positive work values • Apply consumer mathematics • Understand Automotive Repair Procedures and Techniques • Apply Job estimates • Use four mathematical operations • Conduct estimating repair works and activities 			
8. Observe Quality System	8.1 Conduct final quality check on completed work / orders	<ul style="list-style-type: none"> • Identify completed work/orders • Identify authorized documents • Provide feedback to staff on the quality of their work <ul style="list-style-type: none"> ▪ Understand Work planning and organization processes ▪ Understand Enterprise quality systems and procedures ▪ Understand Quality systems and application techniques in a work environment ▪ Understand Typical loss and damage control systems ▪ Understand Worksite information management systems • Understand current Environmental issues and other concerns 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration 	<ul style="list-style-type: none"> • Written Examination • Practical Examination • Oral Questioning 	3 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Understand Occupational Health and Safety regulations/requirements • Check completed work/orders • Prepare documentation and feedback reports 			
	8.2 Report on the quality of processes and work outcomes	<ul style="list-style-type: none"> • Identify documents based on company quality procedures on outcomes of quality checks • Identify quality problems • Identify information related to the quality of processes and work outcomes <ul style="list-style-type: none"> ▪ Understand Work planning and organization processes ▪ Understand Enterprise quality systems and procedures ▪ Understand Quality systems and application techniques in a work environment ▪ Understand Typical loss and damage control systems ▪ Understand Worksite information management systems • Understand current Environmental issues and other concerns • Understand Occupational Health and Safety regulations/requirements • Apply communication skills 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration 	<ul style="list-style-type: none"> • Written Examination • Practical Examination • Oral Questioning 	3 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Apply storing/safekeeping of documents • Identify problems • Use mathematical ideas and techniques • Establish diagnostic processes which analyze problems and recommend solutions 			
	8.3 Implement improvements to work processes	<ul style="list-style-type: none"> ▪ Provide staff feedback to generate possible solution to quality problems ▪ Identify alternatives/options for solving quality problems ▪ Discuss recommended solutions to quality problems ▪ Implement improvements to work processes ▪ Understand Work planning and organization processes ▪ Understand Enterprise quality systems and procedures ▪ Understand Quality systems and application techniques in a work environment ▪ Understand Typical loss and damage control systems ▪ Understand Worksite information management systems • Understand current 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration 	<ul style="list-style-type: none"> • Written Examination • Practical Examination • Oral Questioning 	1 Hr.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		Environmental issues and other concerns <ul style="list-style-type: none"> • Understand Occupational Health and Safety regulations/requirements • Apply communication skills • Gather options/ solutions for solving quality problems • Apply Interpretive and analytical diagnostic skills • Conduct Planning and organizing activities • Use mathematical ideas and techniques 			
9. Perform Periodic Maintenance	9.1 Confirm and diagnose items scheduled for maintenance	<ul style="list-style-type: none"> • Apply company standard operating procedure • Apply company occupational safety and health (OSH) policies • Apply written and oral communication • Apply proper handling of motorcycle • Apply procedures from service manual • Apply basic troubleshooting method and workshop operation procedure • Use basic/special/measuring tools and equipment • Identify items with periodic maintenance 	<ul style="list-style-type: none"> • Lecture • Discussion <ul style="list-style-type: none"> • Lecture • Discussion • Demonstration 	<ul style="list-style-type: none"> • Written Test • Interview <ul style="list-style-type: none"> • Written Test • Interview • Demonstration 	8 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Use of maintenance chart/table • Apply standard value of clearances, limits • Apply operating principle of motorcycle system/components • Diagnose malfunction of maintenance items or parts • Perform road test 			
	9.2 Inspect, clean or adjust items scheduled for maintenance	<ul style="list-style-type: none"> • Apply company occupational safety and health (OSH) policies • Apply basic troubleshooting method and workshop operation procedure • Apply waste management and segregation • Perform inspection of maintenance items or parts • Perform cleaning or adjustment of maintenance items or parts • Classify waste materials • Apply waste segregation and disposal • Apply 5S • Observe environmental rules and regulations • Apply procedures from service manual • Use basic/special/measuring tools and equipment • Apply standard value of 	<ul style="list-style-type: none"> • Lecture • Discussion <ul style="list-style-type: none"> • Lecture • Discussion • Demonstration 	<ul style="list-style-type: none"> • Written Test • Interview <ul style="list-style-type: none"> • Written Test • Interview • Demonstration 	8 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		clearances, limits <ul style="list-style-type: none"> Identify items needed for scheduled maintenance Apply operating principle of motorcycle system/components Identify the defect of .maintenance parts 			
	9.3 Lubricate with oil or grease items scheduled for maintenance	<ul style="list-style-type: none"> Apply company occupational safety and health (OSH) policies Classify waste materials Apply waste segregation and disposal Apply 5S Observe environmental rules and regulations Apply procedures from service manual Identify different types of lubricants Apply operating principle of motorcycle system/components Check actual operation of lubricated parts 	<ul style="list-style-type: none"> Lecture Discussion <ul style="list-style-type: none"> Lecture Discussion Demonstration 	<ul style="list-style-type: none"> Written Test Interview <ul style="list-style-type: none"> Written Test Interview Demonstration 	2 Hrs.
	9.4 Replace items scheduled for maintenance	<ul style="list-style-type: none"> Apply company occupational safety and health (OSH) policies Classify waste materials Apply waste segregation and disposal Apply 5S 	<ul style="list-style-type: none"> Lecture Discussion 	<ul style="list-style-type: none"> Written Test Interview 	8 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Observe environmental rules and regulations • Apply procedures from service manual • Use basic/special tools and equipment • Apply operating principle of motorcycle system/components • Replace defective part and assemble or install new parts 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration 	<ul style="list-style-type: none"> • Written Test • Interview • Demonstration 	
	9.5 Tighten bolts and nuts scheduled for maintenance	<ul style="list-style-type: none"> • Apply company occupational safety and health (OSH) policies • Apply procedures from service manual • Use basic/measuring tools and equipment • Apply standard value of torque • Apply operating principle of motorcycle system/components • Tighten bolts to specified torque 	<ul style="list-style-type: none"> • Lecture • Discussion <ul style="list-style-type: none"> • Lecture • Discussion • Demonstration 	<ul style="list-style-type: none"> • Written Test • Interview <ul style="list-style-type: none"> • Written Test • Interview • Demonstration 	1 Hr.
	9.6 Final inspection of items scheduled for maintenance	<ul style="list-style-type: none"> • Apply company standard operating procedure • Apply company occupational safety and health (OSH) policies • Apply written and oral communication • Observe environmental rules and regulations • Cleanup of work area and apply 5S 	<ul style="list-style-type: none"> • Lecture • Discussion <ul style="list-style-type: none"> • Lecture • Discussion 	<ul style="list-style-type: none"> • Written Test • Interview <ul style="list-style-type: none"> • Written Test • Interview 	1 Hr.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Apply procedures from service manual • Use basic/special/measuring tools and equipment • Apply basic troubleshooting method and workshop operation procedure • Apply operating principle of motorcycle system/components • Apply proper handling of motorcycle • Confirm the correct operation of the motorcycle • Perform road test 	<ul style="list-style-type: none"> • Demonstration 	<ul style="list-style-type: none"> • Demonstration 	

**CORE COMPETENCIES
(544 Hours)**

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
1. Service motorcycle/small engine system	1.1 Service fuel system	<ul style="list-style-type: none"> • Apply company occupational safety and health (OSH) policies • Apply company standard operating procedures • Apply procedures on service manual • Apply procedures for shop maintenance • Identify types of fuel system • Differentiate types of gasoline • Define exhaust emission standard • Describe principle of fuel system • Diagnose fuel system malfunction • Apply basic/special/measuring tools and equipment • Apply basic troubleshooting method and workshop operation procedure • Disassemble fuel system component • Replace and assemble defective parts • Apply standard value of torque, clearances, limits 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration/ Hands-on 	<ul style="list-style-type: none"> • Written Test • Interview • Demonstration • Observation 	29 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Check engine idling revolution per minute (RPM) • Apply occupational safety and health requirements • Observe environmental rules and regulations • Apply 5S • Apply tools and equipment maintenance 			
	1.2 Service intake and exhaust system	<ul style="list-style-type: none"> • Apply company occupational safety and health (OSH) policies • Apply company standard operating procedures • Apply procedures from service manual • Define exhaust emission standard • Explain the types of intake and exhaust system • Differentiate types of gasoline • Explain the principle of intake and exhaust system • Apply basic, special and measuring tools • Diagnose intake and exhaust system malfunction • Disassemble intake and exhaust system components • Evaluate parts condition • Replace and assemble defective parts 	<ul style="list-style-type: none"> • Lecture • Demonstration/ Hands-on • Discussion 	<ul style="list-style-type: none"> • Written Test • Interview • Demonstration • Observation • Practical Examination • Oral questioning 	24 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Apply standard value of torque, clearances and limits 			
	1.3 Service lubrication system	<ul style="list-style-type: none"> • Apply company occupational safety and health (OSH) policies • Apply company standard operating procedure • Explain the principle of lubrication system • Describe the types of lubrication system • Diagnose lubrication system malfunction • Disassemble lubrication system components • Evaluate parts condition • Replace and assemble the defective parts of lubrication system • Test oil pressure • Apply basic, special and measuring tools • Apply standard value of torque, clearances and limits • Observe environmental rules and regulations • Apply 5S • Apply tools and equipment maintenance 	<ul style="list-style-type: none"> • Lecture • Demonstration/ Hands-on • Discussion 	<ul style="list-style-type: none"> • Written Test • Practical Examination • Observation • Oral questioning 	24 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
	1.4 Service cooling system	<ul style="list-style-type: none"> • Apply company occupational safety and health (OSH) policies • Apply company standard operating procedures • Explain the principle of lubrication system • Identify the types of cooling system • Apply basic, special and measuring tools • Diagnose cooling system malfunction • Evaluate parts condition • Replace and assemble the defective parts of cooling system • Apply standard value of torque, clearances and limits • Apply 5S • Apply tools and equipment maintenance 	<ul style="list-style-type: none"> • Lecture • Demonstration/ Hands-on • Discussion 	<ul style="list-style-type: none"> • Written Test • Practical Examination • Observation • Oral questioning 	9 Hrs.
	1.5 Service transmission, and clutch system (for motorcycle)	<ul style="list-style-type: none"> • Apply company occupational safety and health (OSH) policies • Apply company standard operating procedures • Explain principle of transmission and clutch system 	<ul style="list-style-type: none"> • Lecture • Demonstration/ Hands-on • Discussion 	<ul style="list-style-type: none"> • Written Test • Practical Examination • Observation • Oral questioning 	29 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Identify types of transmission and clutch system • Apply basic, special and measuring tools • Diagnose the transmission and clutch system malfunction • Disassemble the transmission, and clutch system components • Evaluate parts condition • Replace and assemble the defective parts of transmission and clutch system • Apply standard value of torque, clearances and limits • Observe environmental rules and regulations • Apply 5S • Apply tools and equipment maintenance • Apply service shop maintenance 			
	1.6 Clean-up work area	<ul style="list-style-type: none"> • Enumerate steps in cleaning-up work area • Apply company occupational safety and health (OSH) policies • Apply company standard operating procedures • Apply 5S 	<ul style="list-style-type: none"> • Lecture • Demonstration/ Hands-on • Discussion 	<ul style="list-style-type: none"> • Written Test • Practical Examination • Observation • Oral questioning 	5 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Apply tools and equipment maintenance • Apply service shop maintenance 			
2. Service electrical system	2.1 Confirm and troubleshoot electrical system	<ul style="list-style-type: none"> • Apply company standard operating procedures • Apply company occupational safety and health (OSH) policies • Apply procedures from service manual • Explain operating principle of electrical system such as charging system, ignition system, lighting system, starting system, and fuel injection system • Apply basic/special/measuring tools and equipment • Identify electrical system malfunctions and related components • Apply standard value of tolerances, limits • Diagnose electrical system malfunctions 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration/ Hands-on 	<ul style="list-style-type: none"> • Written Test • Interview • Demonstration 	29 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
	2.2 Disassemble/assemble electrical components	<ul style="list-style-type: none"> • Apply company standard operating procedures • Apply basic troubleshooting method and workshop operation procedures • Apply procedures from service manual • Explain operating principle of electrical system and components • Apply basic/special/measuring tools and equipment • Apply standard value of tolerances, limits • Identify defects of electrical components • Remove and disassemble electrical system components • Replace defective part and assemble/install new parts 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration/ Hands-on 	<ul style="list-style-type: none"> • Written Test • Interview • Demonstration 	19 Hrs.
	2.3 Final inspection of electrical system	<ul style="list-style-type: none"> • Apply company standard operating procedures • Apply procedures from service manual • Apply basic/special/measuring tools and equipment • Apply basic troubleshooting method and workshop operation procedures • Apply standard value of torque, clearances, limits 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration/ Hands-on 	<ul style="list-style-type: none"> • Written Test • Interview • Demonstration 	19 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> Inspect electrical system actual operation Apply 5S Apply tools and equipment maintenance Apply service shop maintenance 			
	2.4 Clean-up work area	<ul style="list-style-type: none"> Enumerate steps in cleaning-up work area Apply company occupational safety and health (OSH) policies Apply company standard operating procedures Apply 5S Apply tools and equipment maintenance Apply service shop maintenance 	<ul style="list-style-type: none"> Lecture Demonstration/ Hands-on Discussion 	<ul style="list-style-type: none"> Written Test Practical Examination Observation Oral questioning 	3 Hrs.
3. Service chassis	3.1 Service steering and suspension system	<ul style="list-style-type: none"> Apply Company standard operating procedures Apply company occupational safety and health (OSH) policies Explain procedures for shop maintenance Explain procedures on Service Manual Describe Principle of Steering and Suspension system 	<ul style="list-style-type: none"> Lecture Discussion Demonstration/ Hands-on 	<ul style="list-style-type: none"> Written Test Interview Oral Questioning Practical examination Demonstration 	49 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Identify Types of Suspension system • Identify steering components and it's functions • Identify Suspension components and it's functions • Diagnose Steering and suspension malfunction • Apply procedures of disassembly and assembly of steering and suspension system • Apply procedures of replacing defective parts • Apply of Basic/Special/Measuring tools and equipment • Apply standard torques values, clearance and limits • Perform Final Inspection of steering and suspension system • Conduct road test • Apply Procedures for Shop Maintenance • Apply 5S • Apply tools and equipment maintenance • Observe environmental rules and regulations 			

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
	3.2 Service final drive system (for motorcycle)	<ul style="list-style-type: none"> • Apply company occupational safety and health (OSH) policies • Apply company standard operating procedures • Explain principle final drive system • Identify types of final drive system • Apply basic, special and measuring tools • Diagnose the final drive system malfunction • Disassemble the final drive components • Evaluate parts condition of final drive system • Replace and assemble the defective parts of final drive system • Apply standard value of torque, clearances and limits • Observe environmental rules and regulations • Apply 5S • Apply tools and equipment maintenance • Apply service shop maintenance 	<ul style="list-style-type: none"> • Lecture • Demonstration/ Hands-on • Discussion 	<ul style="list-style-type: none"> • Written Test • Practical Examination • Observation • Oral questioning 	19 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
	3.3 Service Brake System	<ul style="list-style-type: none"> • Apply company standard operating procedures • Apply company occupational safety and health (OSH) policies • Explain procedures on service manual • Explain procedures for shop maintenance • Explain principle operation of brake system • Identify types of brake system • Identify brake system components and it's functions • Diagnose brake system malfunction • Apply procedures for disassembly and assembly of brake system • Apply procedures for repairing brake system • Apply of basic/special/measuring tools and equipment • Apply standard torques values, clearances and limits • Apply standard adjustment/settings for brake system • Perform final Inspection of brake system 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration/ Hands-on 	<ul style="list-style-type: none"> • Written Examination • Interview • Oral Questioning • Practical examination • Demonstration 	34 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Conduct road test • Apply procedures for shop maintenance • Apply 5S • Apply tools and equipment maintenance • Observe environmental rules and regulations 			
	3.4 Service Wheels and Tires	<ul style="list-style-type: none"> • Apply Company standard operating procedure • Apply company occupational safety and health (OSH) policies • Explain procedures on service manual • Explain procedures for shop maintenance • Explain principle operation of wheels & tires • Identify types of wheels & tires • Identify wheels & tires components and it's functions • Diagnose wheels & tires malfunction • Apply procedures for disassembly and assembly of wheels & tires 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration/ Hands-on 	<ul style="list-style-type: none"> • Written Test • Interview • Oral Questioning • Practical examination • Demonstration 	24 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Apply procedures for repair/replacement of defective parts of wheels & tires • Apply basic/special/ measuring tools and equipment • Apply standard torques values, clearances and limits • Perform final inspection of wheels & tires • Conduct road test • Apply procedures on shop maintenance • Apply 5S • Apply tools and equipment maintenance • Observe environmental rules and regulations 			
	3.5 Clean-up work area	<ul style="list-style-type: none"> • Enumerate steps in cleaning-up work area • Apply company occupational safety and health (OSH) policies • Apply company standard operating procedures • Apply 5S • Apply tools and equipment maintenance • Apply service shop maintenance 	<ul style="list-style-type: none"> • Lecture • Demonstration/ Hands-on • Discussion 	<ul style="list-style-type: none"> • Written Test • Practical Examination • Observation • Oral questioning 	4 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
4. Overhaul Motorcycle/ Small Engine	4.1 Remove engine from the unit	<ul style="list-style-type: none"> • Apply company standard operating procedures • Apply company occupational safety and health (OSH) policies • Explain procedures for shop maintenance • Explain procedures on service manual • Explain principle operation of motorcycle/small engine • Identify types of engine • Apply procedures for removal of external components • Apply procedures for engine removal • Apply of basic/special/ measuring tools and equipment • Apply procedures on shop maintenance • Apply 5S • Apply tools and equipment maintenance • Observe environmental rules and regulations 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration/ Hands-on 	<ul style="list-style-type: none"> • Written Test • Interview • Oral Questioning • Practical Examination • Demonstration 	43 Hrs.
	4.2 Disassemble Engine	<ul style="list-style-type: none"> • Apply Company standard operating procedure • Apply company occupational safety and health (OSH) policies 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration/ Hands-on 	<ul style="list-style-type: none"> • Written Test • Interview • Oral Questioning • Practical examination • Demonstration 	61 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Explain procedures on service manual • Explain procedures for shop maintenance • Identify types of engine • Identify engine components and its functions • Apply procedures for engine disassembly • Apply of basic/special/measuring tools and equipment • Apply procedures in handling of parts • Apply procedures in handling of tools & equipment • Apply procedures for shop maintenance • Apply 5S • Apply tools and equipment maintenance • Observe environmental rules and regulations 			
	4.3 Assemble Engine (Parts and Components)	<ul style="list-style-type: none"> • Apply company standard operating procedures • Apply company occupational safety and health (OSH) policies • Explain procedures on service manual • Explain procedures for shop maintenance 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration/ Hands-on 	<ul style="list-style-type: none"> • Written Test • Interview • Oral Questioning • Practical examination • Demonstration 	65 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Explain principle operation of motorcycle/small engine • Apply procedures for engine assembly • Apply standard torques values, clearances and limits • Apply procedures in handling of parts • Apply procedures in handling of tools & equipment • Apply procedures for shop maintenance • Apply 5S • Apply tools and equipment maintenance 			
	4.4 Re-install engine to frame	<ul style="list-style-type: none"> • Apply company standard operating procedures • Apply company occupational safety and health (OSH) policies • Explain procedures on service manual • Explain procedures for shop maintenance • Apply procedures for engine installation • Apply procedures for installation of external components • Apply procedures in handling of parts 	<ul style="list-style-type: none"> • Lecture • Discussion • Discussion • Demonstration/ Hands-on 	<ul style="list-style-type: none"> • Written Test • Interview • Oral Questioning • Practical examination • Demonstration 	43 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Apply procedures in handling of tools & equipment • Apply standard torques values, clearances and limits • Perform final inspection for engine installation • Apply procedures for shop maintenance • Apply 5S • Apply tools and equipment maintenance 			
	4.5 Test engine performance	<ul style="list-style-type: none"> • Apply company standard operating procedures • Apply company occupational safety and health (OSH) policies • Explain emission standard under Philippine Clean Air Act • Explain procedure for pre-delivery inspection • Apply procedures for final checking and standard adjustments • Perform pre-delivery Inspection • Perform road test • Apply procedures for shop maintenance • Apply 5S 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration/ Hands-on 	<ul style="list-style-type: none"> • Written Test • Interview • Oral Questioning • Practical examination • Demonstration 	8 Hrs.

Unit of Competency	Learning Outcomes	Learning Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Apply tools and equipment maintenance • Observe environmental rules and regulations 			
	4.6 Clean-up work area	<ul style="list-style-type: none"> • Enumerate steps in cleaning-up work area • Apply company occupational safety and health (OSH) policies • Apply company standard operating procedures • Apply 5S • Apply tools and equipment maintenance • Apply service shop maintenance 	<ul style="list-style-type: none"> • Lecture • Demonstration/ Hands-on • Discussion 	<ul style="list-style-type: none"> • Written Test • Practical Examination • Observation • Oral questioning 	4 Hrs.

3.2 TRAINING DELIVERY

1. The delivery of training shall adhere to the design of the curriculum. Delivery shall be guided by the principles of competency-based TVET.
 - a. Course design is based on competency standards set by the industry or recognized industry sector; (Learning system is driven by competencies written to industry standards)
 - b. Training delivery is learner-centered and should accommodate individualized and self-paced learning strategies;
 - c. Training can be done on an actual workplace setting, simulation of a workplace and/or through adoption of modern technology.
 - d. Assessment is based in the collection of evidence of the performance of work to the industry required standards;
 - e. Assessment of competency takes the trainee's knowledge and attitude into account but requires evidence of actual performance of the competency as the primary source of evidence.
 - f. Training program allows for recognition of prior learning (RPL) or current competencies;
 - g. Training completion is based on satisfactory performance of all specified competencies.
2. The competency-based TVET system recognizes various types of delivery modes, both on-and off-the-job as long as the learning is driven by the competency standards specified by the industry. The following training modalities and their variations/components may be adopted singly or in combination with other modalities when designing and delivering training programs:

2.1 Institution - Based:

- Dual Training System (DTS)/Dualized Training Program (DTP) which contain both in-school and in-industry training or fieldwork components. Details can be referred to the Implementing Rules and Regulations of the DTS Law and the TESDA Guidelines on the DTP;
- The traditional classroom-based or in-center instruction may be enhanced through use of learner-centered methods as well as laboratory or field-work components.

2.2 Enterprise-Based:

- **Formal Apprenticeship** – Training within employment involving a contract between an apprentice and an enterprise on an approved apprenticeable occupation.
- **Informal Apprenticeship** - is based on a training (and working) agreement between an apprentice and a master craftsperson wherein the agreement may be written or oral and the master craftsperson commits to training the apprentice in all the skills relevant to his or her trade over a significant period of time, usually between one and four years, while the apprentice commits to contributing productively to the work of the business. Training is integrated into the production process and apprentices learn by working alongside the experienced craftsperson.
- **Enterprise-based Training**- where training is implemented within the company in accordance with the requirements of the specific company. Specific guidelines on this mode shall be issued by the TESDA Secretariat.

3.3 TRAINEE ENTRY REQUIREMENTS

Trainees or students should possess the following requirements:

Can communicate both oral and written;
Can perform basic mathematical computation.
At least Senior High School (Grade 11) level ;
At least holder of Student Permit or LTO license (Restriction Code 1)

3.4 LIST OF TOOLS, EQUIPMENT AND MATERIALS MOTORCYCLE/SMALL ENGINE SERVICING – NC II

Recommended list of tools, equipment and materials for the training of 25 trainees for Motorcycle/Small Engine Servicing – NC II

BASIC TOOLS

NO.	QTY.	DESCRIPTION
1	2	T-type box wrench (8mm) (L 310mm)
2	2	T-type box wrench (10mm) (L 310mm)
3	2	T-type box wrench (12mm) (L 310mm)
4	2	T-type box wrench (14mm) (L 310mm)
5	2	T-type box wrench (17mm) (L 310mm)
6	2	T-type screw driver (- No. 3)
7	2	T-type screw driver (+ No.2)
8	2	T-type screw driver (+ No. 3)
9	2	Offset wrench (08x09mm) (L-182mm)
10	2	Offset wrench (10x12mm) (L-217mm)
11	2	Offset wrench (12x14mm) (L-218mm)
12	2	Offset wrench (14x17mm) (L-245mm)
13	2	Offset wrench (17x19mm) (L-290mm)
14	2	Offset wrench (22x24mm) (L-324mm)
15	2	Open end wrench (06x07mm) (L-127mm)
16	2	Open end wrench (08x09mm) (L-145mm)
17	2	Open end wrench (10x12mm) (L-161mm)
18	2	Open end wrench (12x14mm) (L-174mm)

NO.	QTY.	DESCRIPTION
28	2	Phillips screw driver (+ No.3) (L-150mm)
29	2	Wiring Flat Screw driver (200mm)
30	2	Carburetor Screwdriver (295mm)
31	2	Flat screw driver stubby (L-25mm)
32	2	Phillips screw driver stubby (No. 2) (L-25mm)
33	2	Intensified flat screw driver (290mm)
34	2	Combination pliers (200mm)
35	2	Snap ring pliers (opening type) (L-7 in.)
36	2	Snap ring pliers (closing type) (L-7 in.)
37	2	Cutting pliers (150mm)
38	2	Long nose pliers (150mm)
39	2	Ball peen hammer (450 g)
40	2	Copper hammer (450 g)
41	2	Plastic Soft face hammer (450 g)
42	2	Impact driver set (6 PCS.) (L-145mm)
43	2	Socket wrench set (18pcs) (8- 27mm)(1/2 Dr.)
44	2	Deep socket wrench set (10pcs) (10- 24mm)(1/2 DR.)
45	1	Spark plug wrench set Compact (6pcs)(3/8 drive)

NO.	QTY.	DESCRIPTION	NO.	QTY.	DESCRIPTION
19	2	Open end wrench (14x17mm) (L-194mm)	46	1	Adjustable wrench (L-305mm)
20	2	Open end wrench (22x24mm) (L-246mm)	47	1	Pipe wrench (L-300mm)
21	2	Combination wrench (8mm) (L-124mm)	48	1	Locking Plier – Curved jaw (Vise grip)- 210mm
22	2	Combination wrench (10mm) (L-143mm)	49	2	Hexagon–key wrench set > High grade L-shape Long ball point (8>9 pcs.)(1.5-10mm)
23	2	Combination wrench (12mm) (L-160mm)	50	2	Scraper stainless (30mm wide)
24	2	Combination wrench (14mm) (L-180mm)	51	2	Chisel (10mm wide) (L-140mm)
25	2	Combination wrench (17mm) (L-206mm)	52	2	Center- punch (4mm) (L-120mm)
26	2	Flat screw driver (100mm)	53	2	Nipple wrench (Spoke wrench)
27	2	Flat screw driver (-150mm)	54	1	Hacksaw
	2	Phillips screw driver (No.2) (L-100mm)			

SPECIAL TOOLS (Depend on the brand of motorcycle/small engine to be used)

NO.	QTY.	DESCRIPTION	NO.	QTY.	DESCRIPTION
1	1	Connecting rod holder	14	1	Sprocket holder
2	1	Crankshaft installer	15	1	Crankcase separator
3	1	Attachment, crankshaft installer	16	1	Clutch spring hook
4	1	Spacer, crankshaft installer	17	1	Clutch spring compressor
5	1	Piston pin puller	18	1	Clutch sleeve hub holder
6	1	Attachment, piston pin puller	19	1	Drive chain cutting and joint tool set
7	1	Universal clamp wrench	20	1	Rotor remover set
8	1	Bearing / Gear remover	21	1	Rotor holder
9	1	Valve spring compressor and attachments or equivalent	22	1	Steering race and swing arm bearing installer
10	1	Tappet depressor			
11	1	Piston ring compressor			
12	1	Tweezers			
13	1	Valve adjuster driver			

MEASURING TOOLS

NO.	QTY.	DESCRIPTION	NO.	QTY.	DESCRIPTION
1	2	Thickness gauge	23	1	Surface plate (300x300x50mm)
2	1	Vernier Caliper (150mm)	24	1	Steel V-block set (75mm)
3	1	Vernier Caliper (200mm)	25	1	Steel V-block set (100mm)
4	1	Vernier Caliper (300mm)	26	1	Multi-circuit tester
5	1	Micrometer (25-50mm)	27	1	Engine tachometer
6	1	Micrometer (50-75mm)	28	1	Timing light
7	1	Micrometer (75-100mm)	29	1	Carburetor balancer set
8	1	Micrometer (0-25mm)	30	1	Compression gauge

NO.	QTY.	DESCRIPTION
9	1	Cylinder gauge set
10	1	Rod: 65mm cylinder bore
11	1	Rod: 75mm cylinder bore
12	1	Dial gauge (0-1mm)
13	1	Dial gauge (10-34mm)
14	1	Dial gauge (0-10mm)
15	1	Magnetic stand
16	1	Micrometer stand
17	1	Tire depth guage (0-30mm)
18	1	Torque wrench (0-120kg-cm)
19	1	Torque wrench (100-900kg-cm)
20	1	Torque wrench (500-2800kg-cm)
21	1	Torque wrench (700-4200kg-cm)
22	1	Torque wrench (0-15kg-cm)

NO.	QTY.	DESCRIPTION
31	1	Attachment, compression pressure gauge
32	1	Adopter, compression gauge
33	1	Oil pressure gauge
34	1	Adopter, oil pressure gauge
35	1	Tire pressure gauge
36	1	Graduated cylinder
37	1	Battery load tester
38	1	Hydrometer
39	1	Straight edge

EQUIPMENT

NO.	QTY.	DESCRIPTION
1	1	Motorcycle unit (Carburetor type)
2	1	Motorcycle unit (Fuel Injection type)
3	1	Small Engine (Multi-purpose engine)
4	1	Battery charger
5	1	Bench vise
6	1	Bench grinder
7	1	Air compressor, 2HP
8	1	Air impact tool
9	3	Working table
10	1	Table for battery charger
11	1	Special tools board hanger
12	2	Tool box
13	1	Trouble light
14	1	Mechanical jack
15	2	Parts rack
16	2	Overhauling engine stand
17	1	Bike lifter or equivalent

MATERIALS

NO.	QTY.	DESCRIPTION
1	1	Oil beaker
2	1	Funnel
3	2	Oiler
4	1	Grease
5	1	WD40
6	3	Sandpaper
7	2	Steel brush
8	2	Wire brush
9	(2 kgs)	Rags
10	10	Rectangular steel tray
11	2	Circular steel tray
12	1	Used oil drum
13	(1 sack)	Saw dust
14	1	Mop
15	1	Broom
16	1	Dust pan
17	1	Trash can

PERSONAL PROTECTION DEVICES

NO.	QTY.	DESCRIPTION
1	25	Safety shoes
2	25	Apron
3	25	Goggles
4	25	Cap
5	25	Gloves
6	25	Gas mask
7	1	<u>First Aid Kit</u>
8	1	<u>Fire Extinguisher</u>

TRAINING MATERIALS

NO.	QTY.	DESCRIPTION
1		Service manuals
2		Parts catalogs
3		Reference books
4		Videos
5		Modules / Power point presentation

NOTE: The training program for Small Engine Servicing shall cover the following core competencies 1) Service motorcycle/small engine system 2) Service electrical system 3) Overhaul motorcycle/small engine and the curriculum design for Section 3.

3.5 TRAINING FACILITIES

The automotive workshop must be made of reinforced concrete or steel structure. The size must be suited on the requirements of the competencies. The class size of 25 students/trainees is reserved for the lecture room and the practical demonstration area for carrying out minor workshop activities. Most of the learning activities are performed individually in the students/trainees work area.

SPACE REQUIREMENT	SIZE IN METERS	AREA IN SQ. METERS	TOTAL AREA IN SQ. METERS
Building (permanent)	15.00 x 17.00	255	255.00
Trainee Working Space	2.00 x 2.00 per trainee	4.00 per trainee	72.00
Lecture Room	9.00 x 9.00	81.00	81.00
Learning Resource Center	5.00 x 8.00	40.00	40.00
Facilities/Equipment/ Circulation Area	-	-	62.00

3. TRAINERS QUALIFICATION

- Holder of National TVET Trainer Certificate Level I (NTTC Level I) in Motorcycle/Small Engine Servicing NC II
- Must be computer literate
- Must be physically and mentally fit
- Must have at least 2 years job/industry experience (Motorcycle/Small Engine Servicing/ Automotive Servicing)

3.7 INSTITUTIONAL ASSESSMENT

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

SECTION 4 ASSESSMENT AND CERTIFICATION ARRANGEMENTS

Competency Assessment is the process of collecting evidence and making judgments whether competency has been achieved. The purpose of assessment is to confirm that an individual can perform to the standards expected at the workplace as expressed in relevant competency standards.

The assessment process is based on evidence or information gathered to prove achievement of competencies. The process may be applied to an employable unit(s) of competency in partial fulfillment of the requirements of the national qualification.

4.1 NATIONAL ASSESSMENT AND CERTIFICATION ARRANGEMENTS

- 4.1.1 A National Certificate (NC) is issued when a candidate has demonstrated competence through project-type assessment covering all the competencies that comprise the Training Regulations for **Motorcycle/Small Engine Servicing NC II** as follows:

BASIC COMPETENCIES
Participate in workplace communication
Work in team environment
Practice career professionalism
Practice occupational health and safety procedures
COMMON COMPETENCIES
Apply Appropriate Sealant/Adhesive
Move and Position Vehicle
Perform Mensuration and Calculation
Read, Interpret and Apply Specifications and Manuals
Use and Apply Lubricant/Coolant
Perform Shop Maintenance
Prepare Job Estimate/Costing
Observe Quality Systems
Perform Periodic Maintenance
CORE COMPETENCIES
Service Motorcycle/Small Engine System
Service Electrical System
Service Chassis
Overhaul Motorcycle/Small Engine

- 4.1.2 Candidates who want to be assessed only in the area of small engine servicing shall be awarded a COC with a title of Small Engine Mechanic after undergoing and passing assessment for the following core competencies.

4.1.2.1 Service motorcycle/ small engine system

4.1.2.2 Service electrical system

4.2.1.3 Overhaul motorcyle//small engine

The assessment for the above core units shall cover only small engines.

- 4.1.3 Candidates wanting to be certified will have to be assessed in accordance with the requirements identified in the evidence guide of the relevant unit/s of competency.

- 4.1.4 Candidates applying for competency assessment and certification for Motorcycle/Small Engine Servicing NC II:

4.1.4.1 Graduates of formal education or non-formal training from institutions

4.1.4.2 Experienced workers (wage-employed or self-employed)

- 4.1.5 Holders of National Certificate (NC) / Certificate of Competency (COC) for the abovementioned qualifications are required to undergo re-assessment under the amended Training Regulations (TR) upon expiration of their NC or COC.

- 4.1.6 Conduct of assessment and issuance of certificates shall follow the procedures manual and implementing guidelines developed for the purpose.

- 4.1.7 The guidelines on assessment and certification are discussed in detail in the “Procedures Manual on Assessment and Certification” and “Guidelines on the Implementation of the “Philippine TVET Competency Assessment and Certification System (PTCACS)”.

4.2 COMPETENCY ASSESSMENT REQUISITE

- 4.2.1 Self-Assessment Guide. The self-assessment guide (SAG) is accomplished by the candidate prior to actual competency assessment. SAG is a pre-assessment tool to help the candidate and the assessor determine what evidence is available, where gaps exist, including readiness for assessment.

This document can:

- a. Identify the candidate's skills and knowledge
- b. Highlight gaps in candidate's skills and knowledge
- c. Provide critical guidance to the assessor and candidate on the evidence that need to be presented
- d. Assist the candidate to identify key areas in which practice is needed or additional information or skills that should be gained prior`

4.2.2 Accredited Assessment Center. Only Assessment Center accredited by TESDA is authorized to conduct competency assessment. Assessment centers undergo a quality assured procedure for accreditation before they are authorized by TESDA to manage the assessment for National Certification.

4.2.3 Accredited Competency Assessor. Only accredited competency assessor is authorized to conduct assessment of competence. Competency assessors undergo a quality assured system of accreditation procedure before they are authorized by TESDA to assess the competencies of candidates for National Certification.

COMPETENCY MAP MOTORCYCLE/SMALL ENGINE SERVICING NC II

BASIC COMPETENCIES	Receive and respond to workplace communication	Work with others	Demonstrate work values	Practice basic housekeeping procedures	Participate in workplace communication	Work in a team environment	Practice career professionalism	Practice occupational health and safety procedures	Lead in workplace communication	Lead small team
	Develop and practice negotiation skills	Solve problems related to workplace activities	Use mathematical concepts and techniques	Use relevant technologies	Utilize specialized communication skills	Develop team and individual	Apply problem solving techniques in the workplace	Collect, analyze and organize information	Plan and organize work	Promote environmental protection

COMMON COMPETENCIES	Apply appropriate sealant/adhesive	Move and position vehicle	Perform mensuration and calculation	Read, interpret and apply specifications and manuals	Use and apply lubricant/coolant	Perform shop maintenance	Prepare job estimate/costing	Observe quality systems	Perform periodic maintenance
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CORE COMPETENCIES	Service motorcycle/small engine system	Service electrical system	Service chassis	Overhaul motorcycle/small engine	Perform Periodic Maintenance	Service Carburetor and Fuel System	Service Lubrication System	Service Ignition System	Service and Repair Brake System	Service Wheels and Tires
	Service clutch system	Service final drive	Service & repair exhaust system	Service & repair suspension system	Service & repairs cooling system					

DEFINITION OF TERMS

1. Motorcycle	A two or three wheeled vehicle powered by a gasoline fed reciprocating internal combustion engine from 50 cm ³ engine displacement and above.
2. Small engine	A stationary engine whose framework does not move when the engine operates. It may drive a variety of immobile equipment such as pumps and generators.
3. 2-stroke engine	A 2-stroke, or 2-cycle engine is a type of internal combustion engine which completes a power cycle with two strokes (up and down movements) of the piston during only one crankshaft revolution.
4. 4-stroke engine	A 4-stroke, or 4-cycle engine is a type of internal combustion engine which completes a power cycle with 4 strokes (up and down movements) of the piston during only one crankshaft revolution.
5. Multi-cylinder engines	Is a reciprocating internal combustion engine with multiple cylinders.
6. Fuel system	System responsible for the supply of fuel into the engine for combustion.
7. Intake system	System responsible for the supply of air into the engine for combustion.
8. Exhaust system	System responsible for the control and directs burned exhaust gases into the atmosphere.
9. Lubrication system	System responsible for the continuous supply of oil during engine operation not only to prevent wear to moving parts of the engine and transmission but also to cool, remove impurities and to neutralize chemically active products of combustion in the engine.
10. Cooling system	System responsible to maintain working temperature of the engine while in operation to prevent overheating and wear of engine parts.
11. Clutch and Transmission system	System responsible to convert the power produced by the engine into the desirable torque needed by the rear wheel.

12. Final Drive system	System responsible to transmit power from transmission gears to rear wheel
13. Starting system	Electrical system responsible to turn the crankshaft in order to start the engine.
14. Ignition system	Electrical system responsible to create a spark at the combustion chamber at the right moment to burn the air-fuel mixture inside.
15. Lighting and signaling system	Electrical system responsible to operate the lighting and signaling devices mounted or integrated to the front, rear and sides of the motorcycle.
16. Charging system	Electrical System responsible to maintain the charge in the motorcycle battery which provides the main source of electrical energy to supply lighting and other electrical devices such as horn.
17. Steering system	System responsible to maneuver or change direction of the movement of the motorcycle.
18. Suspension system	System responsible to keep the tires in contact with the road surface, to provide steering stability with good handling and to support the whole motorcycle and ensure comfort of the rider and passenger.
19. Brake system	System responsible to slow-down or stop the motorcycle when it is moving.
20. Basic tools	Common tools used to disassemble and assemble common machine parts.
21. Special tools	Tools that are specially designed to enable disassembly and assembly of a particular part that is not possible with the use of basic tools. These tools are recommended to ensure quick service and correct maintenance.
22. Measuring tools	Tools or instruments needed to measure length, width, height, diameter, depth, gaps, rotational speed, deflection, temperature, pressure, electrical current, voltage, resistance, etc.
23. 5S	A basic housekeeping activity to create a safe working environment and to realize an atmosphere of productivity. The 5S's stands for the acronym for the Japanese words – Seiri, Seiton, Seisou, Seiketsu and Shitsuke.

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