Curriculum for Motorcycle Mechanic

(6 Months)

Contents

Overall objective

To prepared and train a student to become a motorcycle mechanic to earn a respectable living and learners will be able to work as skilled worker.

Competencies gained after completion of course:

1. To apply safety precaution.
2. Explain the common hand tools, special tools and measuring tools.
3. Select, use and handle auto motive hand tools work shop tools, equipments efficiently.
4. Observe safety measures.
5. Basic mathematically calculation.
6. Explain the internal combustion engine and external combustion engine.
7. Explain the four strokes and two strokes engine of motorcycle.
8. Remove, dismantle, inspect, refit install engine parts.
9. Set the valve timing of four strokes motorcycle engine.
10. Explain purpose of different system of motorcycle.
11. Service and maintenance of fuel system / cooling system / lubrication system / starting system and ignition system.
12. Service and maintenance of clutch / gear box and drive chain.
13. Service and maintenance steering and suspension system / brake system and wheel
14. Service and maintenance charging system and battery.
15. Install and repair / maintenance of electric wiring / replacing bulbs horns fuse.
16. Service / tuning and overhauling of motorcycle engine.
17. Diagnose the engine troubles.

Job opportunities available immediately and in the future:

The pass outs of this course would be able to:

- Work in manufacturing industry / assembling plant of motorcycle.
- Work in repairing / service shops of motorcycle.
- Start own shop of motorcycle repair / service / maintenance.
- Government department.
- Motorcycle dealerships.
- Spare parts stores.

Curriculum Salient Points

Entry level:

Middle / preferable Metric.
Admission is subject to passing a general aptitude test.

Class size:

16 – 20 Trainees.

Duration of course:

06 – Months
800 hours
40 hours per week
06 days a week
07 hours per day
Except Friday 05 hours

Training methodology:

Practical	80 %
Theory	20 %

Medium of instruction:

Urdu / English

Evaluation:

Attendance, sessional / final test

Grade:

Theory:	Pass marks	40 %
Practical:	Pass marks	60 %

Very good	93 ----- 100 %
Good	79 ------ 92 %
Average	60 ------78 %
Fail	0 ------ 59 %

Overview about the program – Curriculum for Motorcycle mechanic

Module Title and Aim	Learning Units	Theory hours	Workplace hours
Module 1- Auto motive workshop basic. Aim: To apply the safety precaution and use the tool properly	1.1 Describe and apply safety precaution and safe riding 1.2 Use of tools and tools introduction. 1.3 Basic mettle work exercise 1.4 Explain history of motorcycle	20	140
Module 2 - Application of related study. Aim: Apply mathematically and drawing basic role in general routine and market	2.1 Technical mathematic exercise 2.2 Technical drawing	40	10
Module 3 - Power generation system Aim: Understand the working of motor cycle engine and repair /maintain the engine and all systems.	3.1 Introduction repair and maintain motorcycle engine 3.2 Introduction / repair and maintain motor cycle fuel system. 3.3 Introduction repair and maintain lubrication system of motorcycle. 3.4 Introduction repair and maintain motorcycle cooling system. 3.5 Service of engine exhaust system. 3.6 Introduction repair and maintain motorcycle ignition system.	43	150
Module 4 - Power transmission system. Aim: Understand the working of power transmission system and repair / maintain all components of transmission.	4.1 Introduction and repair and maintain motorcycle clutch assembly. 4.2 Introduction and repair and maintain motorcycle gear box 4.3 Service transmission chain assembly. 4.4 Service mechanical starting system.	15	105
Module 5 - Chassis of motorcycle Aim: to understand / diagnose and service steering / suspension and break system.	5.1 Introduction / repair and maintain steering and suspension system. 5.2 Introduction / repair and maintain motorcycle braking system and wheels.		
Module 6 - Electrical system of motorcycle Aim: electrical system of motorcycle system / to diagnose and repair all electrical system.	6.1 Introduction / repair and maintain motorcycle charging system. 6.2 Repair and maintain lighting system and accessories.	7	35
Module 7 – Service of motorcycle and engine overhauling Aim: Understand / service of the motorcycle / complete overhauling of engine / diagnosing engine fault.	7.1 Service work of motorcycle. 7.2 Engine tuning 7.3 Engine top overhauling. 7.4 Procedure of complete engine overhauling. 7.5 Fault finding and their remedies	15	120

Motorcycle Mechanic Curriculum Contents (Teaching and Learning Guide)

Module 1 title: Auto motive workshop basic
Objective of module: To apply the safety precaution and use the tool properly.
Duration: - 160 hours Theory: - 20 hours Practical: - 140 hours

Learning units	Learning outcomes	Learning elements	Duration	Material required	Learning place
1.1 Describe and apply safety precaution and safe riding	• Develop safe working habits • Evaluate and control hazard and risk. • Maintain occupational health and safety awareness.	• Describe personal safety. • Describe tools for safety. • Explain motorcycle safety. • Demonstrate safety riding for motorcycle. • Explain safety during service work of motorcycle.	04 hours 04 hours 02 hours 05 hours 05 hours	• Relevant teaching aid. • Service manual.	Classroom, workshop / lab.
1.2 Use of tools and tools introduction.	• Select / use and handle the hand tools properly. • Identify and use the work shop tools efficiently and safely. • Select measuring instrument and carry out measurement and calculation.	• Uses of general tools screw drivers, spanners, wrenches, Allen key, pliers, pullers, hammer. • Uses of special tools. tappet adjuster, fly wheel puller, clutch holder, valve guide remover, valve guide driver, valve spring compressor, pin spanner, ball race driver, bearing driver (rear / front) fork seal driver, rear / front shock absorber, disassembling tool, timing gear removing puller and refitting tools. • Use of measuring tools. Steel foot rules, vernier calipers micrometer, dial gauges, cylinder gauges, thickness gauges, tire pressure gauge, torque wrenches, compression gauge, vacuum gauge, Wire gauge	25 hours 25 hours 25 hours	• General tools. • Special tools. • Measuring tools.	Classroom, workshop / lab.
1.3 Basic mettle work exercise	• To apply the basic machine shop hands technique.	• Cutting exercise (with hand hacksaw) • Filing exercise • Drilling exercise • Threading exercise (with dies / taps) • Extraction exercise	10 hours 15 hours 15 hours 10 hours	• Mild steel 25x40x100. • Unthreaded hexagon bolt. • Hacksaw blade.	Classroom, workshop / lab.

			05 hours		
1.4 Explain history of motorcycle	• To increase interest and knowledge in motor cycle technology.	• Explain the history of two stroke motorcycle. • Explain the history of four stroke motorcycle. • Identify the motorcycle parts.	04 hours 04 hours 02 hour	• Motorcycle history sheet	Classroom, workshop / lab.

Module 2 title: Application of related study
Objective of module: Apply mathematically and drawing basic role in general routine and market.
Duration: 50 hours Theory: 40 hours Practical: 10 hours

Learning units	Learning outcomes	Learning elements	Duration	Material required	Learning place
2.1 Technical mathematic exercise	• To solve the mathematically problems related to trade	• Calculating addition, subtraction, multiplication, division and calculating with brackets. • Calculation of percentage / percentage value and basic value. • Units of technical engineering. S I units, length, circumference areas, volumes, units of time. • Calculate the circumference, circular areas, and cylinder volumes. • Calculate fuel consumption per liter. • Explain / calculate electrical units, ohm's law, capacity of battery	05 hours 02 hours 03 hours 10 hours 02 hours 03 hours	• Out line and Note book	Class room
2.2 Technical drawing	• Identify and draw the diagram / symbols of motorcycle system.	• Describe and meaning, importance use of technical drawing. • Describe the type of basic line. • Describe angles, triangles and circle element. • Draw basic lines. • Draw different type of angles, triangle and elements of circle. • Draw the different symbols relating to motorcycle field.	06 hours 02 hours 07 hours 03 hours 04 hours 03 hours	• Drawing book / led pencil	Class room

Module 3 title: Power generation system (engine)
Objective of the Module: Understand the working of motor cycle engine and repair /maintain the engine and all systems.
Duration: 193 hours Theory: 43 hours Practice: 150 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Material Required	Learning Place
3.1: Introduction repair and maintain motorcycle engine	• Explain the operating principle of two stroke and four stroke engine and its components. • Repair and maintain all system of engine.	• Describe working principle of two stroke cycle and four stroke cycle engines. • Describe engine components and their function. • Identify cylinder head and valves. • Explain engine valve timing and its importance. • Systematic method of removing an engine from a motorcycle. • Disassembling two stroke and four stroke engine • Checking parts wear, crack, bending, rust, corrosion, water and oil leaks, color, carbon, overheating, balance, clearance. • Checking of engine parts with micrometer dial gauge and feeler gauge. • Assembling an engine. • Setting and checking of engine valve timing. • Setting and checking ignition timing	04 hours 06 hours 02 hours 02 hours 08 hours 07 hours 05 hours 06 hours 02 hours 02 hours	• White board / • Marker • Tool kit • Petrol • Engine overhauling kit • Kerosene oil • Micrometer dial gauge and feeler gauge. • ignition timing gun	Class room Work shop / lab
3.2: Introduction / repair and maintain motor cycle fuel system.	• This competency covers the ability to service the fuel system and make repair and adjustment on its components.	• Explain working principle of fuel system • Describe the main components of fuel system. • Explain working principle of carburetor. • Explain the types of carburetor. • Explain the carburetor circuits. • Explain the trouble shooting of fuel system. • Service / checking / maintain components of fuel system of motor cycle. • Disassembling and assembling the carburetor.	02 hours 02 hours 02 hours 02 hours 02 hours 10 hours 08 hours 07 hours	• White board / • Marker • Tool kit • Carburetor repair kit petrol • Petrol • RPM meter	Class room Work shop / lab

		• Inspection / service all parts of carburetor. • Adjust the fuel level in carburetor. • Setting of air fuel ratio. • Adjustment of air fuel mixture. • Check engine RPM at idling speed.	04 hours 02 hours 02 hours 02 hours		
3.3. Introduction repair and maintain lubrication system of motorcycle.	• This competency covers the ability to service the lubrication system. It includes the inspection of engine oil level, checking of air pump, oil filter and oil pressure.	• Explain the purpose of lubrication system. • Describe the types of lubrication system. • Describe the working principle and importance of oil pump. • Remove and disassembling oil pump. • Inspection of oil pump. • Assembling / refilling oil pump. • Checking /cleaning of oil strainer / oil passages. • Checking oil pressure. • Changing engine oil / checking oil level. • Inspection / replacement of oil seals.	02 hours 02 hours 02 hours 10 hours 02 hours 07 hours 03 hours 02 hours 03 hours 03 hours	• White board / • Marker • Tool kit • Oil pressure gauge • Engine oil • Seal set	Class room Work shop / lab
3.4: Introduction repair and maintain motorcycle cooling system.	• Describe operation and perform the required service to water and air cooling system and their components.	• Explain purpose and function/ types of motorcycle cooling system. • Explain air cooling / water cooling system. • Describe the main components of water cooling system. • Service of air cooling system. • Servicing / checking of water pump. • Servicing of radiator / radiator cap. • Flushing the radiator. • Checking of thermo state valve and fan.	01 hour 01 hour 02 hours 02 hours 04 hours 03 hours 03 hours 03 hours	White board / Marker Flushing solvent Thermo meter	Class room Work shop / lab
3.5: Service of engine exhaust system.	• Describe the exhaust system operation and required service.	• Explain the purpose of exhaust system • Service cylinder block/cylinder head exhaust port / pipe. • Service / cleaning exhaust muffler.	01 hour 05 hours 05 hours	Tool kit	Work shop / lab
3.6: Introduction repair and maintain	• Describe the operation and	• Explain the purpose of ignition system. • Explain the type of ignition system.	02 hour 02 hour	White board / Marker	Class room

motorcycle ignition system.	perform the required service to ignition system and their components.	• Describe construction and function of ignition system components. • Adjustment C.B point gap. • Checking of magnet ignition system. • Test of coil ignition system parts. • Checking of C.D.I system. • Checking of pulsar coil resistance. • Checking of ignition coil. • Checking of condenser. • Checking physical condition of spark plug / testing of spark plug. • Checking and adjusting spark plug gap.	04 hours 05 hours 03 hours 04 hours 03 hours 04 hours 03 hours 02 hours 04 hours 02 hours	• Feeler gauge • Ignition timing gun • Ohm meter • Gap adjusting gauge	Work shop / lab

Module 4 title: Power transmission system
Objective of module: - Understand the working of power transmission system and repair / maintain all components of transmission.
Duration: 120 hours Theory: 15 hours Practical: 105 hours

Learning units	Learning outcomes	Learning elements	Duration	Material required	Learning place
4.1 Introduction and repair and maintain motorcycle clutch assembly.	• Perform the required service to clutch mechanism and their components.	• Describe working principle of clutch and its purpose and types. • Identify various components of clutch and their functions. • Disassembling clutch units. • Physical inspection and checking of various parts of clutch. • Changing clutch plates and pressure plates. • Assembling clutch units. • Replacement clutch cable and wire.	03 hours 03 hours 06 hours 10 hours 04 hours 06 hours 04 hours	• Clutch cable / wire • Clutch plate • Clutch lever / spring • Pressure plate • Clutch bearing • Clutch cover gas kit • Kerosene oil • Mobile oil • Grease	Class room Work shop / lab
4.2 Introduction and repair and maintain motorcycle gear box	• Perform the required service to gear box and their components.	• Describe gear box and its purpose. • Explain working principle of different types of gear box. • Identify gear box components. • Explain chain sprocket and drive chain. • Removing and disassembling gear box. • Inspection of gears, shaft and washers. • Reassembling / refitting of gear box.	02 hours 02 hours 02 hours 01 hour 15 hours 10 hours 15 hours	• Kerosene oil	Class room Work shop / lab
4.3 Service transmission chain assembly.	• To replace the drive chain sprocket set.	• Replacement of chain sprockets set. • Remove the chain link. • Remove and refitting chain lock.	08 hours 04 hours 03 hours	• Chain sprocket set. • Chain lock • Sprocket bolt / net and lock	Class room Work shop / lab
4.4 Service mechanical starting system.	• Perform the required service to starting system.	• Remove the kick and spindle. • Physical examination of kick and kick spindle. • Refitting kick and spring. • Introduction of self-starter system. • Repair of self-starter.	05 hours 04 hours 05 hours 02 hours 06 hours	• Kick spindle and seal.	Class room Work shop / lab

Module 5 title: Chassis of motorcycle
Objective of module: - to understand / diagnose and service steering / suspension and break system.
Duration: 100 hours Theory: 20 hours Practical: 80 hours

Learning units	Learning outcomes	Learning elements	Duration	Material required	Learning place
5.1 Introduction / repair and maintain steering and suspension system.	• Perform the required service to steering and suspension system.	• Describe purpose and layout of steering mechanism. • Explain purpose of suspension system. • Explain purpose and types of shock absorbers. • Replacement of handle ball and cap. • Adjustment of free play in steering column. • Inspection of front / rear fork suspension (shock absorber) • Remove front / rear shock absorber. • Service of front / rear shock absorber. • Replace oil seal / refilling oil of front shock absorber. • Replace swing arm bush.	04 hours 02 hours 04 hours 07 hours 03 hours 03 hours 05 hours 10 hours 07 hours 05 hours	• Kerosene oil. • Grease • Steering ball and cap set • Shock absorbers seal set and oil • Swing arm bush	Class room Work shop / lab
5.2 Introduction / repair and maintain motorcycle braking system and wheels.	• Perform the required service to front rear brake system and wheels.	• Explain brake function and types of motorcycle brakes system. • Describe the function of disk brake. • Checking of brake mechanism. • Replacement brake shoe. • Replacement rubber pad. • Checking / service of disc brake. • Replace disk pad. • Service of master cylinder. • Adjusting of brake (rear / front)	06 hours 04 hours 05 hours 03 hours 02 hours 10 hours 05 hours 07 hours 02 hours	• Brake cable and wire • Brake shoe • Emery paper • Rubber pad • Brake oil • Disc pad • Master cylinder repair kit • Wheel bearing (front / rear)	Class room Work shop / lab

		• Replacement of wheel bearing (rear / front) • Checking tyre air pressure.	05 hours 01 hour		

Module 6 title: - Electrical system of motorcycle
Objective of module: - Understand electrical system of motorcycle system / to diagnose and repair all electrical system.
Duration: 42 hours Theory: 07 hours Practical: 35 hours

Learning units	Learning out comes	Learning elements	Duration	Material required	Learning place
6.1 Introduction / repair and maintain motorcycle charging system.	• Perform the required service of charging system.	• Explain purpose and function of charging system. • Describe function of components of charging system (Alternate, voltage regulator, rectifier of battery) • Checking voltage regulator and rectifier. • Checking electrolyte level and gravity. • Recharging of week battery. • Preparation of electrolyte.	03 hours 04 hours 05 hours 05 hours 05 hours 10 hours	• Battery • Voltage regulator • Rectifier • Auto wire 5mm • Distal water • Sulfuric acid • Insulation tap • Fuse	Class room Work shop / lab
6.2 Repair and maintain lighting system and accessories.	• Perform the required service of lighting system and accessories.	• Replace wire harness of motorcycle. • Replace head light, tail light, indicators. • Checking indicator flasher / relay. • Checking horn circuit. • Checking and adjusting horn.	06 hour 02 hours 01 hours 01 hours	• Wire harness • Bulb (head light / tail light / indicator) • Flasher • Relay • Horn	Class room Work shop / lab

Module 7 title: - Service of motorcycle and engine overhauling
Objective of module: - Understand / service of the motorcycle / complete overhauling of engine / diagnosing engine fault.
Duration: - 135 hours Theory: 15 hours Practical: 120 hours

Learning units	Learning outcomes	Learning elements	Duration	Material required	Learning place
7.1 Service work of motorcycle.	• To perform service work properly.	• Explain the service work of motorcycle. • Cleaning (i) washing motorcycle (ii) cleaning air filter, fuel filter & spark plug • Oiling (i) Cables (Brake, clutch, accelerator, speedometer) (ii) Joints (brake linkages, Brake lever, clutch lever, Rear chain) • Greasing (i) Front / rear wheel bearings, steering ball, rear arm pivot shaft. • Refilling (i) Distilled water in battery, engine / gear box oil, brake fluid. • Changing (i) Oil in engine / gear box, air filler, fuel filler, oil filler. • Adjustment (i) Cables (clutch play, brake lever and paddle play, accelerator) (ii) Lights, brake, chain tension.	02 hours 05 hours 05 hours 02 hours 02 hours 04 hours 02 hours	• Air filter • Fuel filter • Spark plug • Cleaning spark plug brush • Grease • Distilled water • Gear oil • Brake fluid • Engine oil	Class room Work shop / lab
7.2 Engine tuning	• Perform engine tune up procedure properly.	• Explain engine tune-up procedure. • Checking / adjusting tappet clearance. • Checking / setting ignition timing. • Checking / adjusting shark plug gap. • Checking / adjusting engine RPM. • Service of carburetor.	05 hors 05 hors 04 hors 03 hors 03 hors 15 hors	• Petrol • Carburetor repair kit • Spark plug	Class room Work shop / lab
7.3 Engine top overhauling.	• Perform engine top overhauling procedure • To measure	• Explain top overhauling procedure • Remove cylinder head, cylinder block, piston pin, piston, piston rings. • Disassembling cylinder head and inspection	03 hours 05 hours 05 hours	• Half overhauling kit • Piston / piston ring set	Class room Work shop / lab

	correctly and to compare with standard size	all parts. • Measure cylinder bore, piston skirt, piston pin, piston pin hole, piston ring side clearance, piston rings gap valve spring free length, valve stem to guide clearance and valve and valve seat checking / grinding / lapping. • Reassembling cylinder head. • Refitting the piston rings, piston pin, piston. Cylinder block and cylinder head. • Setting / checking valve timing and ignition timing. • Checking engine compression. **Note: -** After all parts measurement compare service manual.	05 hours 03 hours 05 hours 04 hours 03 hour	• Petrol • Kerosene oil	
7.4 Procedure of complete engine overhauling.	• Perform complete engine overhauling procedure • To measure correctly and to compare with standard size	• Describe complete engine overhauling procedure. • Disassembling complete engine. • Physical inspection oil pump, clutch unit, gear box, kick starter assembly, shift fork assembly. • Measure clutch disc thickness, clutch spring, oil pump clearance, crank shaft run out, connecting rod big end bearing clearance, connecting rod big end side clearance, kick starter pinion. • Reassembling transmission and check function. • Reassembling kick starter and shaft fork assembly. • Refitting crank shaft and crank case. • Reassembly / refitting clutch mechanism. • Refitting cylinder block and cylinder head. • Start engine and check engine performance.	05 hours 03 hours 02 hours 05 hours 05 hours 03 hours 03 hours 03 hours 02 hour 01 hour	• Complete engine overhauling kit • Kerosene oil • Petrol • Engine oil • Grease • Cotton waste • Required spare parts if replacement	Class room Work shop / lab
7.5 Fault finding and their remedies	• To check engine performance and carry out / repair engine fault	• Trouble diagnosis for four stroke engine / two stroke engine. • Engine does not start. • Engine hard starting.	01 hour 01 hour 01 hour	• Petrol	Class room Work shop / lab

		• Engine stop suddenly. • Engine power weak. • Engine parts erratically. • Engine knock or pinks. • Engine misfiring. • Engine back fire. • Poor performance of engine at high speed. • Engine overheating. • Idles poorly. • Excessive fuel consumption.	01 hour 01 hour 01 hour 01 hour 01 hour 01 hour 01 hour 01 hour 01 hour 01 hour		

Assessment Template

Module 1: Auto motive workshop basic

Learning Units	Theory hours	Workplace hours	Recommended formative assessment	Recommended methodology	Scheduled dates
1.1 Describe and apply safety precaution and safe riding	10 hours	10 hours	• Describe personal safety. • Describe tools for safety. • Explain motorcycle safety. • Demonstrate safety riding for motorcycle. • Explain safety during service work of motorcycle.	Written test Written test Oral questioning Direct observation Direct observation	
1.2 Use of tools and tools introduction.		75 hours	• Uses of general tools screw drivers, spanners, wrenches, Allen key, pliers, pullers, hammer. • Uses of special tools. tappet adjuster, fly wheel puller, clutch holder, valve guide remover, valve guide driver, valve spring compressor, pin spanner, ball race driver, bearing driver (rear / front) fork seal driver, rear / front shock absorber, disassembling tool, timing gear removing puller and refitting tools. • Use of measuring tools. Steel foot rules, venire calipers micrometer, dial gauges, cylinder gauges, thickness gauges, tire pressure gauge, torque wrenches, compression gauge, vacuum gauge, wire gauge	Direct observation Direct observation Direct observation	
1.3 Basic mettle work exercise		55 hours	• Cutting exercise (with hand hacksaw) • Filing exercise • Drilling exercise • Threading exercise (with dies / taps) • Extraction exercise	Demonstration of practical skill	
1.4 Explain history of motorcycle	05 hours	10 hours	• Explain the history of two stroke motorcycle. • Explain the history of four stroke motorcycle. • Identify the motorcycle parts.	Oral questioning	

Module 2: - Application of related study

Learning Units	Theory hours	Workplace hours	Recommended formative assessment	Recommended methodology	Scheduled dates
2.1 Technical mathematic exercise	25 hours		• Calculating addition, subtraction, multiplication, division and calculating with brackets. • Calculation of percentage / percentage value and basic value. • Units of technical engineering. S I units, length, circumference areas, volumes, units of time. • Calculate the circumference, circular areas, circular volumes. • Calculate fuel consumption. • Explain / calculate electrical units, ohm's law, capacity of battery	Written test	
2.2 Technical drawing	15 hours	10 hours	• Describe and meaning, importance use of technical drawing. • Describe the type of basic line. • Describe angles, triangles and circle element. • Draw basic lines. • Draw different type of angles, triangle and elements of circle. • Draw the different symbols relating to motorcycle field.	Written test Practically draw	

Module 3: Power generation system engine

Learning Units	Theory hours	Workplace hours	Recommended formative assessment	Recommended methodology	Scheduled dates
3.1: Introduction repair and maintain motorcycle engine	14 hours	30 hour	• Describe working principle of two stroke cycle and four stroke cycle engines. • Describe engine components and their function. • Identify cylinder head and valves. • Explain engine valve timing and its importance. • Systematic method of removing an engine from a motorcycle. • Disassembling two and four stroke engine parts. • Physical examination wear, crack, bending, rust, corrosion, water and oil leaks, color carbon, overheating, balance, clearance. • Checking of engine parts with micrometer dial gauge and feeler gauge. • Assembling an engine. • Setting and checking of engine valve timing. ○ Setting and checking ignition timing	Written test Written test Oral questioning Oral questioning Demonstration of practical skills Demonstration of practical skills Direct observation Demonstration of practical skills Demonstration of practical	
3.2: Introduction / repair and maintain motor cycle fuel system.	10 hours	35 hours	• Explain working principle of fuel system. • Describe the main components of fuel system. • Explain working principle of carburetor.	Written test Oral questioning	

			• Explain the types of carbonator. • Explain the carburetor circuits. • Explain the trouble shooting of fuel system. • Service / checking / maintain components of fuel system of motor cycle. • Disassembling and assembling the carburetor. • Inspection / service all parts of carburetor. • Adjust the fuel level in carburetor. • Setting of air fuel ratio. • Adjustment of air fuel mixture. • Check engine RPM at idling speed.	&Interview Demonstration of practical skills	
3.3. Introduction repair and maintain lubrication system of motorcycle.	06 hours	30 hours	• Explain the purpose of lubrication system. • Describe the types of lubrication system. • Describe the working principle and importance of oil pump. • Remove and disassembling oil pump. • Inspection of oil pump. • Assembling / refitting of oil pump. • Checking / cleaning of oil strainer / oil passages. • Checking oil pressure. • Changing engine oil / checking oil level. • Inspection / replacement of oil seals	Written test Interview Demonstration of practical skills Practical Test	
3.4: Introduction repair and maintain motorcycle cooling system.	04 hours	15 hours	• Explain purpose / function and types of motorcycle cooling system. • Explain air cooling / water cooling system. • Describe the main components of water cooling system. • Service of air cooling system.	Interview Written test Oral questioning Demonstration	

			• Servicing / checking of water pump. • Servicing of radiator / radiator cap. • Flushing and refilling of radiator. ○ Checking of thermo state value of fan.	of practical skills	
3.5: Service of engine exhausts system.	01 hour	10 hours	• Service cylinders head, cylinder block, exhaust port / pipe. • Service / cleaning exhaust muffler.	Demonstration of practical skills	
3.6: Introduction repair and maintain motorcycle ignition system.	08 hours	30 hours	• Explain the purpose of ignition system. • Explain the type of ignition system. • Describe construction and function of ignition system components. • Adjustment C.B point gap. • Checking of magnet ignition system. • Test of coil ignition system parts. • Checking of C.D.I system. • Checking of pulsar coil resistance. • Checking of ignition coil. • Checking of condenser. • Checking physical condition of spark plug / testing of spark plug. • Checking/ adjusting spark plug gap	Written test Demonstration of practical skills	

Module 4: - Power transmission system

Learning Units	Theory hours	Workplace hours	Recommended formative assessment	Recommended methodology	Scheduled dates
4.1 Introduction and repair and maintain motorcycle clutch assembly.	06 hours	30 hours	• Describe working principle of clutch and its purpose and types. • Identify various components of clutch and their functions. • Disassembling clutch units. • Physical inspection and check of various parts of clutch. • Changing clutch plates and pressure plates. • Assembling clutch units. • Replacement clutch cable and wire.	Written test Practical test	
4.2 Introduction and repair and maintain motorcycle gear box	07 hours	40 hours	• Describe gear box and its purpose. • Explain working principle of different types of gear box. • Identify gear box components. • Explain chain sprocket and drive chain. • Removing and disassembling gear box. • Inspection of gears, shaft and washers. • Reassembling / refitting of gear box.	Written test Practical test	
4.3 Service transmission chain assembly.		15 hours	• Replacement of chain sprockets set. • Remove the chain link. • Remove and refitting chain lock.	Practical test	
4.4 Service mechanical starting system.	02 hours	20 hours	• Remove the kick and spindle. • Physical examination of kick and kick spindle. • Refitting kick and spring. • Introduction of self starter system. • Repair of self starter.	Practical test	

Module 5: - Chassis of motorcycle

Learning Units	Theory hours	Workplace hours	Recommended formative assessment	Recommended methodology	Scheduled dates
5.1 Introduction / repair and maintain steering and suspension system.	10 hours	40 hours	• Describe purpose and layout of steering mechanism. • Explain purpose of suspension system. • Explain purpose and types of shock absorbers. • Replacement of handle ball and cap. • Adjustment of free play in steering column. • Inspection of front / rear fork suspension (shock absorber) • Remove front / rear shock absorber. • Service of front / rear shock absorber. • Replace oil seal / refilling oil of front shock absorber. • Replace swing arm bush.	Written test Practical test	
5.2 Introduction / repair and maintain motorcycle braking system and wheels.	10 hours	40 hours	• Explain brake function and types of motorcycle brakes system. • Describe the function of disk brake. • Checking of brake mechanism. • Replacement brake shoe. • Replacement rubber pad. • Checking / service of disc brake. • Replace disk pad. • Service of master cylinder. • Adjusting of brake (rear / front) • Replacement of wheel bearing (rear / front) • Checking tyre air pressure.	Written test Practical test	

Module 6: - Electrical system of motorcycle

Learning Units	Theory hours	Workplace hours	Recommended formative assessment	Recommended methodology	Scheduled dates
6.1 Introduction / repair and maintain motorcycle charging system.	07 hours	25 hours	• Explain purpose and function of charging system. • Describe function of components of charging system (Alternate, voltage regulator, rectifier of battery) • Checking voltage regulator and rectifier. • Checking electrolyte level and gravity. • Recharging of week battery. • Preparation of electrolyte.	Written test Practical test	
6.2 Repair and maintain lighting system and accessories.		10 hours	• Replace wire harness of motorcycle. • Replace head light, tail light, indicators. • Checking indicator flasher / relay. • Checking horn circuit. • Checking and adjusting horn.	Practical test	

Module 7: - Service of motorcycle and engine overhauling

Learning Units	Theory hours	Workplace hours	Recommended formative assessment	Recommended methodology	Scheduled dates
7.1 Service work of motorcycle.	02 hours	20 hours	• Explain the service work of motorcycle. • Cleaning (i) washing motorcycle (ii) cleaning air filter and fuel filter /spark plug • Oiling (i) Cables (Brake, clutch, accelerator, speedometer) (ii) Joints (brake linkages, Brake lever, clutch lever, Rear chain) • Greasing (i) Front / rear wheel bearings, steering ball, rear arm pivot shaft. • Refilling (i) Distilled water in battery, engine / gear box oil, brake fluid. • Changing (i) Oil in engine / gear box, air filler, fuel filler, oil filler. • Adjustment (i) Cables (clutch play, brake lever and paddle play, accelerator) (ii) Lights, brake, chain tension.	Practical test Direct observation	
7.2 Engine tuning	05 hours	30 hours	• Explain engine tune-up procedure. • Checking / adjusting tappet clearance. • Checking / setting ignition timing. • Checking / adjusting shark plug gap.	Written test Practical test	

			• Checking / adjusting engine RPM. • Service of carburetor.		
7.3 Engine top overhauling.	03 hours	30 hours	• Explain top overhauling procedure • Remove cylinder head, cylinder block, piston pin, piston, piston rings. • Disassembling cylinder head and inspection all parts. • Measure cylinder bore, piston skirt, piston pin, piston pin hole, piston ring side clearance, piston rings gap, , valve spring free length, valves stem-to-guide clearance, valve/valve seat checking/ grinding/lapping. • Reassembling cylinder head. • Refitting the piston rings, piston pin, piston. Cylinder block and cylinder head. • Setting / checking valve timing and ignition timing. • Checking engine compression. **Note: -** After all parts measurement compare service manual.	Written test Practical test	
7.4 Procedure of complete engine overhauling.	05 hours	27 hours	• Describe complete engine overhauling procedure. • Disassembling complete engine. • Physical inspection oil pump, clutch unit, gear box, kick starter assembly, shift fork assembly. • Measure clutch disc thickness, clutch spring, oil pump clearance, crank shaft run out, connecting rod big end bearing clearance, connecting rod big end side clearance, kick starter pinion. • Reassembling transmission and check function. • Reassembling kick starter and shaft fork assembly. • Refitting crank shaft and crank case. • Reassembly / refitting clutch mechanism. • Refitting cylinder block and cylinder head. • Start engine and check engine performance.	Written test Practical test	
7.5 Fault finding and		13 hours	• Trouble diagnosis for four stroke engine / two stroke	Practical test	

their remedies			engine. ▪ Engine does not start. ▪ Engine hard starting. ▪ Engine stop suddenly. ▪ Engine power weak. ▪ Engine parts erratically. ▪ Engine knocks or pinks. ▪ Engine misfiring. ▪ Engine back fire. ▪ Poor performance of engine at high speed. ▪ Engine overheating. ▪ Idles poorly. ▪ Excessive fuel consumption.	Direct observation	

Supportive Notes

Assessment Context:

- These units of the course may be assessed on the job, off the job or a combination of on and off the job demonstrated by an individual working alone. In some areas continues assessment may be required to gauge the competences.
- Assessment of the practical skills must take place only after a period of supervised practice and repetitive experience. If work place conditions are not available assessment is simulated work place condition is acceptable.
- The prescribed outcome must be able to be achieved without direct supervision.
- Competency should be assessed within the context of the qualification being sought.

Critical Aspects:

Assessment must confirm the candidate is able to:

1. Apply the health and safety legislation while working.
2. Read measurements with measuring tools.
3. Select, handle and use hand tools, workshop tools safely and properly.
4. Check the compression pressure of engine and diagnose the faults.
5. Diagnose the troubles in different fuel systems and make necessary adjustment.
6. Set the valve and ignition timing.
7. Diagnose and service the lubricating, cooling, ignition systems.
8. Service the clutch and adjust the free play.
9. Remove, dismantle, check, assemble and refit the transmission.
10. Accuracy of adjustments.
11. Replace the suspension systems components.
12. Service of steering system.
13. Adjust the brake system.
14. Bleed the brake system.
15. Identify and connect the charging system connections.
16. Identify and demonstrate the drawings.
17. Apply the mathematical rules in routine work.

Assessment Condition:

The candidate will have access to:

- All tools, equipment, materials and documentation required.

The candidates will be permitted to refer the following documents.

- Relevant workplace procedures.
- Relevant product and manufacturing specifications.
- Relevant drawings, manuals, codes, standards and reference material.

The candidate will be required to:

- Orally or by other methods of communication, answer, questions put forward by the assessor.
- Identify superiors who can be approached for the collection of competency evidence where appropriate.

Special Notes:

During assessment the individual will:

- Demonstrate safe working practice all the times.
- Communicate information about processes, events or tasks being under taken to ensure a safe and efficient working environment.
- Take the responsibility for the quality of his own work.
- Plan takes in all situations and review tasks requirements as appropriate.
- Perform all tasks in accordance with standard operating procedures.
- Perform all tasks to specifications.
- Use accepted engineering techniques, practices, processes and work place procedures.
- Items requiring specializes repair will be sent to appropriate specialists.

Tasks involved will be completed within reasonable time frames relating to typical work place activities. Resources required for assessment include tools, equipment and machines listed within these units of course. The completed product should comply with the respective industrial standards.

Resources required for assessment include:

Materials, tools, equipment and machines listed within these units of course.

List of Consumable material for one batch

Sr.#	Item	Qty
1	Petrol	50 Ltr.
2	Mobile oil	15 Ltr.
3	Kerosene oil	30 Ltr.
4	Grease	2 kg
5	Emery cloth	24 Sheets
6	M.S 25x 40x100mm”	50kg
7	Hack saw blade	04 Dozen
8	Cotton waste	40 kg

List of Equipment:

Sr.#	Equipment	Qty
1	Battery charger 0-20 amps .(for 06 batteries)	01
2	Hand drill machine electrical	01
3	Bench fitted wheel grinder	01
4	Air compressor having air capacity 400 lbs, air pressure gauge, air pipe 15 meters, auto stop switch, non-return valve.	01
5	Column dill machine (medium size) having dill chuck & chuck key.	01
6	Motorcycle 70 CC four stroke	01
7	Motorcycle 125 CC	01
8	Motorcycle 100 CC	01
9	Motorcycle with self-starter	01
10	Motor cycle 100 two stroke	01
11	Spark plug cleaner and tester	

List of tools

Sr.#	Tool	Qty
1	Box spanner set of 27 pieces.(10-32mm)	two set
2	Combination spanner set of 12 pieces(6-24mm)	Five sets
3	T. spanner set of 8 pieces(8-17mm)	Two sets
4	Ring spanner set of 8 pieces(6-22mm)	Five sets
5	Adjustable spanner size 12”	Five sets
6	Screw driver (flat) 4”.6”,10”,12” set of 04 pieces	Six sets
7	Screw driver (Phillips) 4”.6”,10”,12” set of 04 pieces	Six sets
8	Combination pliers size 8”	Six Nos.
9	Long nose pliers size 6”	Six Nos.
10	Side cutter pliers size 6”	Six Nos.
11	Lock pliers (inside and outside) size 6”	Two No. each
12	Water pump pliers size 10”	Two Nos.
13	Grip pliers size 10”	Two Nos.
14	Steel hammer 500grms (cross peen)	Six Nos.
15	Rubber hammer	Two Nos.
17	Cross peen hammer 2 kg.	two No.
18	Scraper (Flat) size 4”	Five Nos.
19	Tap and die set (metric size) set of 40 pieces	two set
20	Chisel & punch set of 12 pieces	Two sets
21	Piston pin remover	One No.
22	Impact screw driver set	5 Nos.
23	Allen key set of 10 pieces	Five Nos.
24	Hand hacksaw frame	Ten Nos.
25	Bench vice size 4”	Ten Nos.
26	Tools box empty	Five Nos.
27	Steel rule 12”	Ten Nos.
28	Oil can	Two Nos.
29	Center punch	Six Nos.
30	Scriber	Six Nos.
31	Valve guide remover	One No.

32	Valve guide driver	One No.
33	Cam sprocket holder	One No.
34	Piston fork	One No.
35	No punching set	One No.
36	Steering spanner	One No.
37	Magnet holder (universal)	Two Nos.
38	Magnet puller	Two Nos.
39	Valve spring compressor	One No.
40	Tappet adjusting key (1+1 CC 70 CC 125)	Two Nos.
41	Clutch assembly holder	One No.
42	Clutch assembly nut driver	One No.
43	Plug spanner with rod	Two Nos.
44	Stator assembly puller	One No.
45	Front shock absorber installer and remover	One No.
46	Rear shock disassembling and assembling tool	One No.
47	Shock absorber seal installing tool	Four Nos.
48	Chain link remover	Three Nos.
49	Stubby(small screw driver + -)	Two Nos.
50	Feeler gauge	Six Nos.
51	Hydrometer	Three Nos.
52	Multi meter	Five Nos.
53	Cylinder compression gauge	One No.
54	Ignition timing gun	Two Nos.
55	Vernier caliper 0-160mm size	Ten Nos.
56	Micro meter size 0-25, 25-50 50-75	Four Nos. each
57	Toque wrench	Two Nos.
58	Ignition timing tester	One No.
59	Twist drill size 3.5mm, 5mm 7 7mm	Ten each
60	Twist drill size 9mm & 10-5mm	Five each
61	Engine compression gauge	Two nos
62	Mechanical lift / Ramp	One No
65	Dial gauge with magnet stand	One No.
66	Air pressure gun	Five Nos.

67	Machine vice size 4”	One No.
68	Flat file size 12” rough cut	Ten Nos.
69	Flat file size 10” fine cut	Ten Nos.
70	Square file size 8” fine cut	Ten Nos.
71	Round file size 8” fine cut	Ten Nos.
72	Tool tray size 18”x12”x2”	Six Nos.
73	Engine stand size 14”x10”x5”	Three Nos.
74	Measuring tap (5meter)	Two Nos.
75	Tachometer electronic	One No.
76	Tubular socket 10,12,14mm	Ten each