

**SYLLABUS FOR THE TRADE**

**OF**

**MECHANIC REPAIR AND MAINTENANCE TWO WHEELERS**

**(Semester Pattern)**

**UNDER**  
**CRAFTSMAN TRAINING SCHEME (CTS)**

*Designed in– 2013*

*By*  
Government of India  
**CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE**  
Directorate General of Employment & Training  
Ministry of Labour & Employment  
EN-81, Sector-V, Salt Lake City  
Kolkata-700 091

**LIST OF MEMBERS ATTENDED TRADE COMMITTEE MEETING**

<b>Sl. No.</b>	<b>Name &amp; Designation</b>	<b>Organisation</b>	<b>Remarks</b>
1	Sri M.S. Lingaiiah, Director	CSTARI, Salt Lake, Kol.	<b>Chairman</b>
2	Sri P. K. Roy, Sr. Envr. Engineer	W.B.Pollution Control Board	Member
3	Sri T.S. Ramanathan, Dy. Manager (HRD)	CSC Ltd. Kolkata	Member
4	Kashi Nath Karmakar, Sr. Faculty Automobile Engineering	G.T.T.I. Sealdah Branch	Member
5	Maj.(Retd) D.K.Ghosh, G.M.	Dewar's Garage Kolkata	Member
6	Mr. Debabrata Halder, Works Manager	Rolta Motor (Bajaj Auto) Kolkata	Member
7	Sri R. Senthil Kumar, JDT	CSTARI, Salt Lake, Kol.	Member
8	Sri T. Mukhopadhyay, DDT	CSTARI, Salt Lake, Kol.	Member
9	Sri A. Chakraborty, ADT	CSTARI, Salt Lake, Kol.	Member
10	Sri P.K. Koley, T.O.	CSTARI, Salt Lake, Kol.	Member
11	Sri A.B. Dhara. T.O.	CSTARI, Salt Lake, Kol.	Member
12	Sri S.B. Sarder, T.O.	CSTARI, Salt Lake, Kol.	Member

List of members attended the Workshop to finalize the syllabi of existing CTS into Semester Pattern held from 6<sup>th</sup> to 10<sup>th</sup> May'2013 at CSTARI, Kolkata.

Sl. No.	Name & Designation	Organisation	Remarks
1.	R.N. Bandyopadhyaya, Director	CSTARI, Kolkata-91	Chairman
2.	K. L. Kuli, Joint Director of Training	CSTARI, Kolkata-91	Member
3.	K. Srinivasa Rao, Joint Director of Training	CSTARI, Kolkata-91	Member
4.	L.K. Mukherjee, Deputy Director of Training	CSTARI, Kolkata-91	Member
5.	Ashoke Rarhi, Deputy Director of Training	ATI-EPI, Dehradun	Member
6.	N. Nath, Assistant Director of Training	CSTARI, Kolkata-91	Member
7.	S. Srinivasu, Assistant Director of Training	ATI-EPI, Hyderabad-13	Member
8.	Sharanappa, Assistant Director of Training	ATI-EPI, Hyderabad-13	Member
9.	Ramakrishne Gowda, Assistant Director of Training	FTI, Bangalore	Member
10.	Goutam Das Modak, Assistant Director of Trg./Principal	RVTI, Kolkata-91	Member
11.	Venketesh. Ch. , Principal	Govt. ITI, Dollygunj, Andaman & Nicobar Island	Member
12.	A.K. Ghate, Training Officer	ATI, Mumbai	Member
13.	V.B. Zumbre, Training Officer	ATI, Mumbai	Member
14.	P.M. Radhakrishna pillai, Training Officer	CTI, Chennai-32	Member
15.	A.Jayaraman, Training officer	CTI Chennai-32,	Member
16.	S. Bandyopadhyay, Training Officer	ATI, Kanpur	Member
17.	Suriya Kumari .K , Training Officer	RVTI, Kolkata-91	Member
18.	R.K. Bhattacharyya, Training Officer	RVTI, Trivandrum	Member
19.	Vijay Kumar, Training Officer	ATI, Ludhiana	Member
20.	Anil Kumar, Training Officer	ATI, Ludhiana	Member
21.	Sunil M.K. Training Officer	ATI, Kolkata	Member
22.	Devender, Training Officer	ATI, Kolkata	Member
23.	R. N. Manna, Training Officer	CSTARI, Kolkata-91	Member
24.	Mrs. S. Das, Training Officer	CSTARI, Kolkata-91	Member
25.	Jyoti Balwani, Training Officer	RVTI, Kolkata-91	Member
26.	Pragna H. Ravat, Training Officer	RVTI, Kolkata-91	Member
27.	Sarbojit Neogi, Vocational Instructor	RVTI, Kolkata-91	Member
28.	Nilotpal Saha, Vocational Instructor	I.T.I., Berhampore, Murshidabad, (W.B.)	Member
29.	Vijay Kumar, Data Entry Operator	RVTI, Kolkata-91	Member

## GENERAL INFORMATION

1. Name of the Trade : **Mechanic Repair and Maintenance of Two Wheelers**
2. N.C.O. Code No. :
3. Duration of Craftsmen Training : 06 Months (Single Semester)
4. Power Norms : 1.2 KW
5. Space Norms : 82.08 Sq. meter
6. Entry Qualification : Passed 10th class examination under 10+2 system of education with Science and Mathematics or its equivalent.
7. Unit strength : 16 (No. of Trainees)
8. Instructors Qualification : a) Degree in Mechanical/Automobile Engineering from recognized engg. college/university with one year experience in the relevant field  
OR  
Diploma in Mechanical/Automobile Engg From recognized board of technical education with two years experience in the relevant field  
OR  
10<sup>th</sup> Passed + NTC/NAC in the Trade of “**Mechanic Repair and Maintenance of Two Wheeler**” with 3 years post qualification experience in the relevant field  
b) Preference will be given to a candidate with Crafts Instructor Certificate (CIC)

\* **Note:** At least one Instructor must have Degree/Diploma in Mechanical/Automobile Engg. when applied for 02 units.

## TRADE: Mechanic Repair and Maintenance of Two Wheelers

### FIRST SEMESTER

Semester Code: MTW;SEM-I

Week No.	Trade Practical	Trade Theory	Engineering Drawing	Workshop Cal. & Science
1.	General introduction to the course, duration of the course & course content .Importance of safety and general precaution observed in the section. Fire extinguishers used for different type of fire .Storing &handling of inflammables materials .Elementary First Aid	Introduction to Central Motor Vehicles Acts & Rules. Familiarization with the Institute. Importance of trade training. Introduction to machinery used in the trade-type of jobs done by the trainees in the trade. Introduction to safety equipments and their uses etc.		
2.	<b>INTRODUCTION</b> Identify the parts & General servicing of Two Wheeler, washing, cleaning, oiling, greasing and lubricating.	General description of Two-wheeler. Location, function and purpose of two-stroke engine. Type of frame of Two-wheeler.	Introduction to Engineering Drawing and Blue Print reading. Free hand sketching of straight lines, rectangles, square and circles.	Common fractions. Additions, subtraction, multiplication and Divisions. Applied workshop problems involving fractions and vulgar fractions.
3. & 4.	<b>SUSPENSION WORK</b> Servicing of suspension changing bush, checking shock absorbers. Cleaning & Checking shock absorbers. Cleaning & checking the wheel bearings and greasing.	Description, location, suspension-mounted part of Two wheeler type of suspension fork acting provided in shock absorber.	Free hand sketching of nuts & bolts-studs with dimension from samples.	Properties of ferrous & non-ferrous metals and their uses.
			Free hand sketching of solids and hollow bodies such as square, cylinder, rings and cones.	Brief description of Manufacturing process of steel, copper & aluminum.

5. & 6.	<b>BREAK WORK</b> Adjusting brake pedal play, servicing the brake system, cleaning, checking, greasing and assembling. Inspecting the shoes and wheel drums, changing of brake lining. Repairing and maintenance of hydraulic disc brake used in Motorcycles.	Arrangement of brakes in Two-wheeler mechanical breaks provided in Two-wheeler.	Explanation of simple orthographic projection First angle	Metric system, metric weight and measurement units used conversion from FPS to Metric system & vice versa.
7. & 8.	<b>TRANSMISSION</b> Adjusting clutch lever free play, removing clutch assembly from Two-wheeler, cleaning and inspecting parts. Replacing defective parts. Fitting clutch assembly. Repair work of Automatic clutch and automatic transmission used in motor rakes.	Description of clutch and its type, function construction and arrangement of the clutch disc. Type of gearbox construction common troubles.	Explanation of simple orthographic projection in 3rd angle Views of simple hollow & solid bodies with dimensions	Exercises involving Metric & FPS Shop problems in metric systems Meaning of tenacity, elasticity, brittleness, compressibility & ductility-examples of each.
9. & 10.	Checking, adjusting and replacing defective parts (chain, sprocket, shafts) in power transmission from engine to driving wheel.	Different types of power transmission systems used in two-wheeler.	Isometric drawings of simple objects such as square, and rectangular blocks with grooves-key ways. Isometric drawings of simple objects such as square, and rectangular blocks with grooves-key ways.	Effect of alloying elements and properties of cast iron and steel alloys. Shop problems on force, work done, energy & power.
11. & 12.	<b>ENGINE WORK</b> Dismantling the unserviceable engine, cleaning and inspecting the parts, checking engine bore piston rings, connecting rod, bearings, crankshaft, assembling all the parts and measures the gaps. Engine Timing setting and Valve Timing setting of 4 -S Engine.	Description of two-stroke engine. Important working parts in the engine. Description of valve less engine and its merits and demerits.  Study about LPG kit used in Motorcycle and Three Wheelers.	Free hand sketch of clutch Assembly used in two wheeler	Applied problems on work, energy and power.

13. & 14.	Dismantling a four-stroke engine of two-wheeler cleaning, inspecting and assembling parts.	Four stroke engines, advantages of four-stroke engine. - Reed valve	Free hand sketch of different types of valves & pistons used in two wheelers.	Calculation of areas of square, rectangle, triangle, circles and regular polygon
15. & 16.	Dismantling the air cleaner, cleaning, inspecting, cleaning fuel tank, servicing carburetor, rectifying causes for engine not starting, high fuel consumption	Description of carburetor, fuel system type and location, Fuel tank - LPG & C.N.G.	Freehand sketching of different types of valves & pistons	Calculation of volume of square, rectangular & conical blocks, volume of cylinders (solid & hollow)
17. & 18.	Starting engine, tuning for slow speed, checking smoke and setting for exhaust gas emission measurement as per norms. Used by Tachometer.	Types of fuels exhaust gas pollution control-emission standard.	Free hand sketch of 2_ & 4 stroke cycles	- Do -
19. & 20.	<b>IGNITION SYSTEM</b> Dismantling the C.B. point cleaning electronic Ignition system & inspecting and replacing the pitted points. Making wiring harness and check different Electrical circuits used in Two-wheelers.	Principal of electronic ignition, advantage of electronic ignition.	Free hand sketch of electrical symbols and different electrical circuits of 2 wheeler	Heat and Temperature, Thermometers-centigrade & Fahrenheit scale, their conversion. Use of temperature measuring instruments-their description & uses.
21. & 22.	<b>STEERING WORK</b> Inspect and adjust rake of front fork, dismantle trailing link , adjust heavy duty thrust races.	Description of different types of steering handle, fork mounted over races.	Free hand sketch of assembly of 2 wheelers.	Electricity and its effects, static and dynamic electricity- AC & DC differences. Magnets-natural & artificial types- poles of magnets-magnetic fields. Definition of ampere, volt & ohm-units of ampere, volt, ohm. Ohm's Law.
23. & 24.	<b>ELECTRICAL ACCESSORIES REPAIR</b> Tracing the A.C /D.C electrical circuit in a two wheeler, checking horn, head light, indicator and replacing if necessary.	Description of light circuits and function of each circuit. Description electronic apparatus/ Battery charging system.	Free hand sketch of combustion chambers of different types	Calculations based on Ohm's Law. Lubricants types Viscosity and effects of temperature on viscosity, High

				detergent oil and its applications Gears and belt drives, problems on gear and belt drive.
25	Revision			
26	Examination			



## TRADE: MECHANIC REPAIR AND MAINTENANCE OF TWO WHEELERS

### A. LIST OF TOOLS & EQUIPMENT FOR ONE BATCH OF 16 TRAINEES

SL. NO.	DESCRIPTION	QUANTITY
1.	D.E. Spanner (6 to 32 mm)	2 sets
2.	Ring Spanner (6 to 32 mm)	2 sets
3.	Plier combination 200 mm, 250 mm	4 each
4.	Circlip pliers (internal and external) 150 mm	4 nos.
5.	Round nose pliers 150 mm	2 nos.
6.	Long nose pliers 150 mm, 200 mm	4 each
7.	Screw driver (II/d) 300 mm	2 each
8.	Screw driver light duty 150 mm, 200 mm, 250 mm.	2 each
9.	Star screw driver set	2 sets
10.	F/tank puller	2 nos.
11.	Monkey wrench 300 mm	2 nos.
12.	Bench vice 300 mm	2 nos.
13.	Socket wrench (long)	2 sets
14.	Socket wrench (box)	2 nos.
15.	Plug wrench	2 sets
16.	Grease gun	2 sets
17.	Allen key set	2 sets
18.	Magneto puller cot	2 sets
19.	Hacksaw frame	2 nos.
20.	Hammer (big & small)	2 each
21.	Plastic hammer	2 nos.
22.	Oil can	2 nos.
23.	File flat, round (Rough & smooth) 250mm, 300 mm	2 each
24.	Engine mounting puller	2 nos.
25.	Clutch puller	2 nos.
26.	Shock absorber puller	2 nos.
27.	Chisel	2 nos.
28.	Punch	2 nos.
29.	Snip	2 nos.
30.	Piston ring compressor and expander	1 each
31.	Piston ring puller	2 nos.
32.	Adjustable wrench 300 mm	2 nos.
33.	Pipe wrench 200 mm	2 nos.
34.	Tyre lever	2 sets.
35.	Feeler gauge (25 blades)	2 nos.
36.	Caliper (150 mm inside / outside)	2 nos.
37.	Steel rule 300 mm	6 nos.
38.	Vernier caliper 200 mm	2 nos.
39.	Hydrometer	2 nos.
40.	Ridge cutter	1 no.
41.	Bearing puller general	4 nos.
42.	Fire extinguisher	2 nos.
43.	Fire buckets with stand	2 no.

## B. GENERAL MACHINERIES & EQUIPMENTS

1.	Scooter / Motor cycle repairing stand	1 no.
2.	Spark plug testing & cleaning machine	1 no.
3.	Gas Analyzer with temperature & speed sensor	1 no.
4.	Scooter (two stroke engine)	1 no.
5.	Scooter (four stroke engine)	1 no.
6.	Motor cycle (two stroke engine)	1 no.
7.	Motor cycle (four stroke engine)	1 no.
8.	Two wheeler lifting stand	1 set
9.	Stroscoping Timing light	1 no.
10.	Tachometer	1no.
11.	Battery charger (Multiampere)	1 no.

## C. WORKSHOP FURNITURE

Sl. No.	Description	Quantity
1.	Discussion Table	1 No.
2.	Tool Cabinet	2 Nos.
3.	Trainees locker	Required to accommodate 16 lockers
4.	Book shelf (glass panel)	1 No.
5.	Storage Rack	2 Nos.
6.	Storage shelf	2 Nos.

### **SOCIAL STUDIES:**

The syllabus has already been approved and is common for all trades.