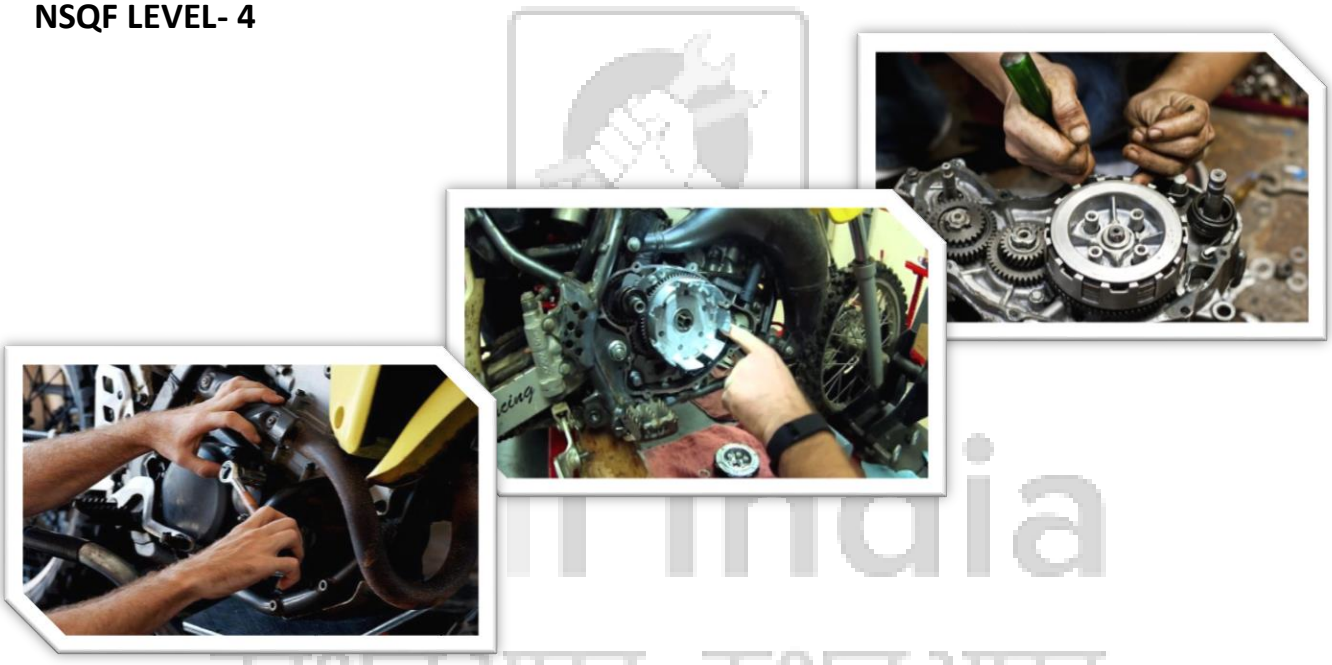
MECHANIC MOTOR CYCLE

COMPETENCY BASED CURRICULUM

(Duration: 1 Yr. 3 Months)

APPRENTICESHIP TRAINING SCHEME (ATS)

NSQF LEVEL- 4



SECTOR – AUTOMOBILE

सत्यमेव जयते

GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
DIRECTORATE GENERAL OF TRAINING

Directorate General of Training

Skill India
कौशल भारत-कुशल भारत

MECHANIC MOTOR CYCLE

(Revised in 2018)

APPRENTICESHIP TRAINING SCHEME (ATS)

NSQF LEVEL - 4

Developed By

Ministry of Skill Development and Entrepreneurship
Directorate General of Training
CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE
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Special acknowledgement is expended by DGT to the following expert members who had contributed immensely in this curriculum.

Sl. No.	Name & Designation Sh./Mr./Ms.	Organization	Expert Group Designation
1.	VKR Vadivelan	M/S Brilliant TVS, Chennai	Proprietor
2.	Jayapal	Two wheeler Owner association, Chennai	Secretary
3.	N. Ramesh Kumar	CTI, Chennai	TO
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1. BACKGROUND

1.1 Apprenticeship Training Scheme under Apprentice Act 1961

The Apprentices Act, 1961 was enacted with the objective of regulating the programme of training of apprentices in the industry by utilizing the facilities available therein for imparting on-the-job training. The Act makes it obligatory for employers in specified industries to engage apprentices in designated trades to impart Apprenticeship Training on the job in industry to school leavers and person having National Trade Certificate(ITI pass-outs) issued by National Council for Vocational Training (NCVT) to develop skilled manpower for the industry**.** There are four categories of apprentices namely**; trade apprentice, graduate, technician and technician (vocational) apprentices.**

Qualifications and period of apprenticeship training of **trade apprentices** vary from trade to trade. The apprenticeship training for trade apprentices consists of basic training followed by practical training. At the end of the training, the apprentices are required to appear in a trade test conducted by NCVT and those successful in the trade tests are awarded the National Apprenticeship Certificate.

The period of apprenticeship training for graduate (engineers), technician (diploma holders and technician (vocational) apprentices is one year. Certificates are awarded on completion of training by the Department of Education, Ministry of Human Resource Development.

1.2 Changes in Industrial Scenario

Recently we have seen huge changes in the Indian industry. The Indian Industry registered an impressive growth during the last decade and half. The number of industries in India have increased manifold in the last fifteen years especially in services and manufacturing sectors. It has been realized that India would become a prosperous and a modern state by raising skill levels, including by engaging a larger proportion of apprentices, will be critical to success; as will stronger collaboration between industry and the trainees to ensure the supply of skilled workforce and drive development through employment. Various initiatives to build up an adequate infrastructure for rapid industrialization and improve the industrial scenario in India have been taken.

1.3 Reformation

The Apprentices Act, 1961 has been amended and brought into effect from 22nd December, 2014 to make it more responsive to industry and youth. Key amendments are as given below:

- Prescription of number of apprentices to be engaged at establishment level instead of trade-wise.
- Establishment can also engage apprentices in optional trades which are not designated, with the discretion of entry level qualification and syllabus.
- Scope has been extended also to non-engineering occupations.
- Establishments have been permitted to outsource basic training in an institute of their choice.
- The burden of compliance on industry has been reduced significantly.

2. TRAINING SYSTEM

2.1 GENERAL

Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers range of vocational training courses catering to the need of different sectors of economy/ Labour market. The vocational training programmes are delivered under aegis of National Council of Vocational Training (NCVT). Craftsman Training Scheme (CTS) and Apprenticeship Training Scheme (ATS) are two pioneer programmes of NCVT for propagating vocational training.

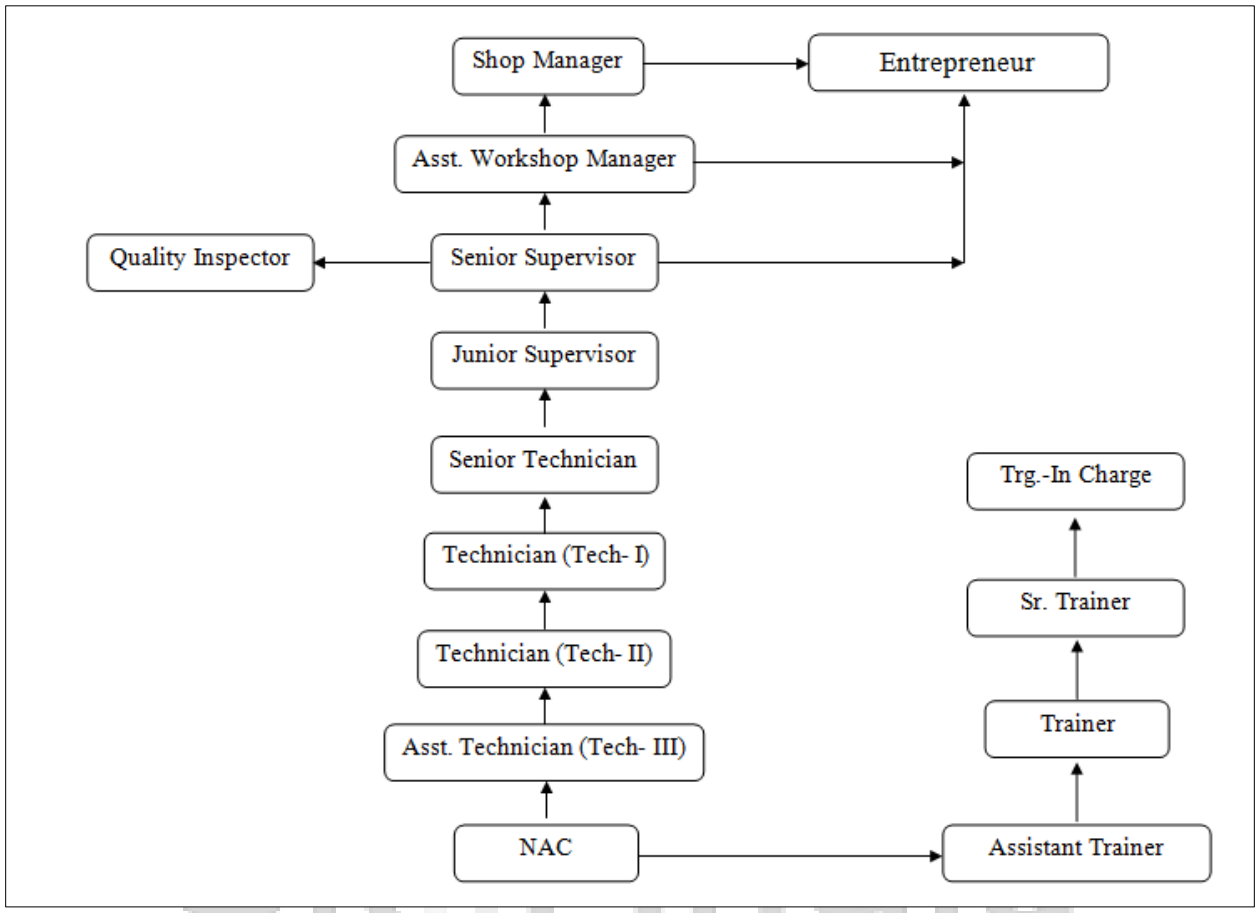
Mechanic Motor Cycle trade under ATS is one of the most popular courses delivered nationwide through different industries. The course is of one year (01 Block) duration. It mainly consists of Domain area and Core area. In the Domain area Trade Theory & Practical impart professional - skills and knowledge, while Core area - Workshop Calculation and science, Engineering Drawing and Employability Skills imparts requisite core skills & knowledge and life skills. After passing out the training programme, the trainee is being awarded National Apprenticeship Certificate (NAC) by NCVT having worldwide recognition.

Broadly candidates need to demonstrate that they are able to:

- Read & interpret technical parameters/document, plan and organize work processes, identify necessary materials and tools;
- Perform task with due consideration to safety rules, accident prevention regulations and environmental protection stipulations;
- Apply professional skill, knowledge, core skills & employability skills while performing jobs and solve problem during execution.
- Check the job/assembly as per drawing for functioning, identify and rectify errors in job/assembly.
- Document the technical parameters related to the task undertaken.

2.2 CAREER PROGRESSION PATHWAYS:

- Indicative pathways for vertical mobility.



2.3 COURSE STRUCTURE:

Table below depicts the distribution of training hours across various course elements during a period of one year (*Basic Training and On-Job Training*): -

Total training duration details: -

Time (in months)	**1-3**	**4 – 15**
Basic Training	**Block– I**	**-----**
Practical Training (On - job training)	**----**	**Block – I**

A. Basic Training

For 02 yrs. course (Engg.) :-(**Total 06 months:** 03 months in 1st yr. + 03 months in 2nd yr.)

For 01 yr. course (Engg.) :-(**Total 03 months:** 03 months in 1st yr.)

S No.	Course Element	Total Notional Training Hours	
		For 02 Yrs. course	**For 01 Yr. course**
1.	Professional Skill (Trade Practical)	550	275
2.	Professional Knowledge (Trade Theory)	240	120
3.	Workshop Calculation & Science	40	20
4.	Engineering Drawing	60	30
5.	Employability Skills	110	55
	Total (Including internal assessment)	**1000**	**500**

B. On-Job Training:-

For 02 yrs. Course (Engg.) :-(**Total 18 months:** 09 months in 1st yr. + 09 months in 2nd yr.)

Notional Training Hours for On-Job Training: 3120 Hrs.

For 01 yr. course (Engg.) :-(**Total 12 months**)

Notional Training Hours for On-Job Training: 2080 Hrs.

C. Total training hours:-

Duration	Basic Training	On-Job Training	Total
For 02 yrs. course (Engg.)	1000 hrs.	3120 hrs.	4120 hrs.
For 01 yr. course (Engg.)	500 hrs.	2080 hrs.	2580 hrs.

2.4 ASSESSMENT & CERTIFICATION:

The trainee will be tested for his skill, knowledge and attitude during the period of course and at the end of the training programme as notified by Govt of India from time to time. The Employability skills will be tested in first two semesters only.

a) The **Internal assessment** during the period of training will be done by **Formative assessment method** by testing for assessment criteria listed against learning outcomes. The training institute have to maintain individual *trainee portfolio* as detailed in assessment guideline. The marks of internal assessment will be as per the template (Annexure – II).

b) The final assessment will be in the form of summative assessment method. The All India Trade Test for awarding NAC will be conducted by NCVT on completion of course as per guideline of Govt of India. The pattern and marking structure is being notified by govt of India from time to time. **The learning outcome and assessment criteria will be basis for setting question papers for final assessment. The examiner during final examination will also check** individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.

2.4.1 PASS REGULATION

The minimum pass percent for Practical is 60% & minimum pass percent for Theory subjects 40%. The candidate pass in each subject conducted under all India trade test.

2.4.2 ASSESSMENT GUIDELINE

Appropriate arrangements should be made to ensure that there will be no artificial barriers to assessment. The nature of special needs should be taken into account while undertaking assessment. Due consideration should be given while assessing for team work, avoidance/reduction of scrap/wastage and disposal of scarp/wastage as per procedure, behavioral attitude, sensitivity to environment and regularity in training. The sensitivity towards OSHE and self-learning attitude are to be considered while assessing competency.

Assessment will be evidence based comprising the following:

- Job carried out in labs/workshop
- Record book/ daily diary
- Answer sheet of assessment
- Viva-voce
- Progress chart
- Attendance and punctuality
- Assignment
- Project work

Evidences of internal assessments are to be preserved until forthcoming semester examination for audit and verification by examination body. The following marking pattern to be adopted while assessing:

Performance Level	Evidence
(a) Weightage in the range of 60 -75% to be allotted during assessment	
For performance in this grade, the candidate with occasional guidance and showing due regard for safety procedures	• Demonstration of good skill in the use of hand tools, machine tools and workshop equipment

and practices, has produced work which demonstrates attainment of an acceptable standard of craftsmanship.	• Below 70% tolerance dimension/accuracy achieved while undertaking different work with those demanded by the component/job/set standards. • A fairly good level of neatness and consistency in the finish • Occasional support in completing the project/job.
(b)Weightage in the range of above75% - 90% to be allotted during assessment	
For this grade, the candidate, with little guidance and showing due regard for safety procedures and practices, has produced work which demonstrates attainment of a reasonable standard of craftsmanship.	• Good skill levels in the use of hand tools, machine tools and workshop equipment • 70-80% tolerance dimension/accuracy achieved while undertaking different work with those demanded by the component/job/set standards. • A good level of neatness and consistency in the finish • Little support in completing the project/job
(c) Weightage in the range of above 90% to be allotted during assessment	
For performance in this grade, the candidate, with minimal or no support in organization and execution and with due regard for safety procedures and practices, has produced work which demonstrates attainment of a high standard of craftsmanship.	• High skill levels in the use of hand tools, machine tools and workshop equipment • Above 80% tolerance dimension/accuracy achieved while undertaking different work with those demanded by the component/job/set standards. • A high level of neatness and consistency in the finish. • Minimal or no support in completing the project.

3. JOB ROLE

Brief description of Job roles:

Mechanic, Motor Cycle repairs, services and overhauls motor cycles, auto rickshaws scooters; etc., to make and keep them roadworthy. Examines motor cycle or scooter to locate faults by running engine in stationary position or by driving it on road. Dismantles parts such as engine, ignition system, dynamo forks, shock absorbers, gear box etc., as necessary. Grinds valves, sets timings, relines brakes, re-bushes steering mechanism, replaces worn out parts, assembles gear box clutch etc. and performs other tasks to effect repair, cleans and sets carburettor, fits driving chain, wheels silencer, kick, gear, clutch and brake levers and other accessories. Adjusts control cables for brake, clutch and accelerator, sets tappets and wheel alignment, tightens loose parts and makes necessary fittings and connections. Changes engine and gear box oil, starts engine and tunes it up. Tests performance of vehicle by driving on road and makes further adjustments to remove defects noticed if any. May assemble motor cycle or auto-rickshaws from assembled parts.

Auto Service Technician (two and three wheelers) is responsible for the repairing and routine servicing and maintenance (including electrical and mechanical aggregates) of two/three wheeler vehicles.

Plan and organize assigned work and detect & resolve issues during execution. Demonstrate possible solutions and agree tasks within the team. Communicate with required clarity and understand technical English. Sensitive to environment, self-learning and productivity.

Reference NCO: 7231.0500, 7231.0501

4. NSQF LEVEL COMPLIANCE

NSQF level for MECHANIC MOTOR CYCLE trade under ATS: **Level 4**

As per notification issued by Govt. of India dated- 27.12.2013 on National Skill Qualification Framework total 10 (Ten) Levels are defined.

Each level of the NSQF is associated with a set of descriptors made up of five outcome statements, which describe in general terms, the minimum knowledge, skills and attributes that a learner needs to acquire in order to be certified for that level.

Each level of the NSQF is described by a statement of learning outcomes in five domains, known as level descriptors. These five domains are:

a. Process
b. professional knowledge,
c. professional skill,
d. core skill and
e. Responsibility.

The Broad Learning outcome of Mechanic Motor Cycle trade under ATS mostly matches with the Level descriptor at Level- 4.

The NSQF level-4 descriptor is given below:

Level	Process Required	Professional Knowledge	Professional Skill	Core Skill	Responsibility
Level 4	Work in familiar, predictable, routine, situation of clear choice.	Factual knowledge of field of knowledge or study	Recall and demonstrate practical skill, routine and repetitive in narrow range of application, using appropriate rule and tool, using quality concepts	language to communicate written or oral, with required clarity, skill to basic Arithmetic and algebraic principles, basic understanding of social political and natural environment.	Responsibility for own work and learning.

5. GENERAL INFORMATION

Name of the Trade	**Mechanic Motor Cycle**
NCO - 2015	7231.0500, 7231.0501
NSQF Level	Level – 4
Duration of Apprenticeship Training (Basic Training + On-Job Training)	3 months+ One year (01 Block of 15 months duration including basic training).
Duration of Basic Training	a) Block –I : 3 months **Total duration of Basic Training: 3 months**
Duration of On-Job Training	a) Block–I: 12 months **Total duration of Practical Training: 12 months**
Entry Qualification	Passed 10th Class Examination
Selection of Apprenticeship	The apprentices will be selected as per Apprenticeship Act amended time to time.
Instructors Qualification for Basic Training	As per ITI instructors qualifications as amended time to time for the specific trade.
Infrastructure for basic Training	As per related trade of ITI
Examination	The internal examination/ assessment will be held on completion of each block. Final examination for all subjects will be held at the end of course and same will be conducted by NCVT.
Rebate to Ex-ITI Trainees	3 Months for those who have passed Mechanic Motor Cycle trade under CTS.
CTS trades eligible for Mechanic Motor Cycle Apprenticeship	Mechanic (Motor Cycle)

Note:

- *Industry may impart training as per above time schedule for different block, however this is not fixed. The industry may adjust the duration of training considering the fact that all the components under the syllabus must be covered. However the flexibility should be given keeping in view that no safety aspects is compromised.*
- *For imparting Basic Training the industry to tie-up with ITIs having such specific trade and affiliated to NCVT.*
- *-up with ITIs having such specific trade and affiliated to NCVT.*

6. LEARNING OUTCOME

6.1 GENERIC LEARNING OUTCOME

The following are minimum broad Common Occupational Skills/ Generic Learning Outcome after completion of the MECHANIC MOTOR CYCLE course of 01 years duration under ATS.

Block I:

1. Recognize & comply safe working practices, environment regulation and housekeeping.
2. Understand and explain different mathematical calculation & science in the field of study including basic electrical. *[Different mathematical calculation & science - Unit, Basic Mathematics, Percentage, Material Science ,Mass, Weight and Density ,Mensuration, Elasticity ,Heat & Temperature ,Basic Electricity]*
3. Interpret specifications, different engineering drawing and apply for different application in the field of work. *[Different engineering drawing-Lines, Free hand drawing , Drawing of Geometrical Figures , Sizes and Layout of Drawing Sheets, Method of presentation of Engineering Drawing, Drawing of Solid figures, Free hand Drawing of Solid figures, Free Hand sketch, Projections, Drawing of Orthographic projection in 3rd angle]*
4. Select and ascertain measuring instrument and measure dimension of components and record data.
5. Explain the concept in productivity, quality tools, and labour welfare legislation and apply such in day to day work to improve productivity & quality.
6. Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.
7. Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & social growth.
8. Plan and organize the work related to the occupation.

6.2 SPECIFIC LEARNINGOUTCOME

Block – I

1. Perform basic maintenance
2. Service cooling system
3. Service lubricating system
4. Service fuel feed system (petrol)
5. Service fuel feed system (diesel)

6. Test basic electrical and electronics
7. Diagnose engine problems
8. Overhaul cylinder head assembly
9. Overhaul cylinder block assembly
10. Maintain transmission in two wheelers
11. Maintain transmission in three wheelers
12. Maintain steering and suspension
13. Maintain brake system
14. Repair wheels and tyres
15. Maintain electrical and electronics
16. Service intake, exhaust and emission system

Note: *Learning outcomes are reflection of total competencies of a trainee and assessment will be carried out as per assessment criteria.*

7. LEARNING OUTCOME WITH ASSESSMENT CRITERIA

GENERIC LEARNING OUTCOME	
LEARNING OUTCOMES	**ASSESSMENT CRITERIA**
1. Recognize & comply safe working practices, environment regulation and housekeeping.	1. 1. Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements.
	1. 2. Recognize and report all unsafe situations according to site policy.
	1. 3. Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures.
	1. 4. Identify, handle and store / dispose off dangerous/ unsalvageable goods and substances according to site policy and procedures following safety regulations and requirements.
	1. 5. Identify and observe site policies and procedures in regard to illness or accident.
	1. 6. Identify safety alarms accurately.
	1. 7. Report supervisor/ Competent of authority in the event of accident or sickness of any staff and record accident details correctly according to site accident/injury procedures.
	1. 8. Identify and observe site evacuation procedures according to site policy.
	1. 9. Identify Personal Productive Equipment (PPE) and use the same as per related working environment.
	1. 10. Identify basic first aid and use them under different circumstances.
	1. 11. Identify different fire extinguisher and use the same as per requirement.
	1. 12. Identify environmental pollution & contribute to avoidance of same.
	1. 13. Take opportunities to use energy and materials in an environmentally friendly manner
	1. 14. Avoid waste and dispose waste as per procedure
	1. 15. Recognize different components of 5S and apply the same in the working environment.
2. Understand, explain different mathematical calculation & science-Unit,, Basic Mathematics,	2.1 Explain concept -Unit,, Basic Mathematics, Percentage , Material Science , Mass, Weight and Density , Mensuration , Elasticity , Heat & Temperature , Basic Electricity ,

Percentage , Material Science, Mass, Weight and Density, Mensuration, Elasticity, Heat & Temperature , Basic Electricity,	2.2 Measure dimensions as per drawing
	2.3 Use scale/ tapes to measure for fitting to specification.
	2.4 Comply given tolerance.
	2.5 Prepare list of appropriate materials by interpreting detail drawings and determine quantities of such materials.
	2.6 Ensure dimensional accuracy of assembly by using different instruments/gauges.
	2.7 Explain basic electricity, insulation & earthing
3. Interpret specifications, different engineering drawing and apply for different application in the field of work. *[Different Lines, Free hand drawing, Drawing of Geometrical Figures , Sizes and Layout of Drawing Sheets, Method of presentation of Engineering Drawing, Drawing of Solid figures, Free hand Drawing of Solid figures, Free Hand sketch, Projections, Drawing of Orthographic projection in 3rd angle. engineering drawing-*	3. 1. Read & interpret the information on drawings and apply in executing practical work.
	3. 2. Read & analyse the specification to ascertain the material requirement, tools, and machining /assembly /maintenance parameters.
	3. 3. Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work.
4. Select and ascertain measuring instrument and measure dimension of components and record data.	4.1 Select appropriate measuring instruments such as micrometers, vernier calipers, dial gauge, bevel protector and height gauge (as per tool list).
	4.2 Ascertain the functionality & correctness of the instrument.
	4.3 Measure dimension of the components & record data to analyse the with given drawing/measurement.
5. Explain the concept in productivity, quality tools, and labour welfare legislation and apply such in day to day work to improve productivity & quality.	5.1 Explain the concept of productivity and quality tools and apply during execution of job.
	5.2 Understand the basic concept of labour welfare legislation and adhere to responsibilities and remain sensitive towards such laws.
	5.3 Knows benefits guaranteed under various acts

6. Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.	6.1 Explain the concept of energy conservation, global warming, pollution and utilize the available recourses optimally & remain sensitive to avoid environment pollution.
	6.2 Dispose waste following standard procedure.
7. Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.	7. 1. Explain personnel finance and entrepreneurship.
	7. 2. Explain role of Various Schemes and Institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non financing support agencies to familiarizes with the Policies /Programmes & procedure & the available scheme.
	7. 3. Prepare Project report to become an entrepreneur for submission to financial institutions.
8. Plan and organize the work related to the occupation.	8. 1. Use documents, drawings and recognize hazards in the work site.
	8. 2. Plan workplace/ assembly location with due consideration to operational stipulation
	8. 3. Communicate effectively with others and plan project tasks
	8. 4. Assign roles and responsibilities of the co-trainees for execution of the task effectively and monitor the same.
SPECIFIC OUTCOME	
Block-I	
*Assessment Criteria i.e. the standard of performance, for each specific learning outcome mentioned under **Block – I**(section: 10) must ensure that the trainee works in familiar, predictable, routine, situation of clear choice. Assessment criteria should broadly cover the aspect of **Planning** (Identify, ascertain, etc.); **Execution** apply factual knowledge of field of knowledge, recall and demonstrate practical skill during performing the work in routine and repetitive in narrow range of application, using appropriate rule and tool, complying with basic arithmetic and algebraic principles and language to communicate in written or oral with required clarity; **Checking/ Testing** to ensure functionality during the assessment of each outcome. The assessments parameters must also ascertain that the candidate is responsible for his/her own work and learning*	

8. SYLLABUS

BASIC TRAINING (Block – I)
Duration: (03) Three Months

Week No.	Professional Skills (Trade Practical)	Professional Knowledge (Trade Theory)
1.	GENERAL SHOP SAFETY First aid and Fire safety, Use of fire extinguishers. Identify fuels, oils and chemicals used in the engines and accessories-handling of shop safety equipment-handling of safety devices-first aid- practice on hazard waste disposal.	**Occupational Safety & Health** Importance of Safety and general Precautions to be observed in the shop. Basic first aid, safety signs - for Danger, Warning, caution & personal safety message. Safe handling of Fuel Spillage, Fire extinguishers used for different types of fire. Safe disposal of toxic dust, safe handling and Electrical safety tips.
2.	MEASURING SYSTEMS AND MEASUREMENTS Practice on measuring on the given jobs- measuring space with a feeler gauge- measuring the given jobs with precision measuring instruments- checking external and internal diameter and run outs-measure straightness on the given job.	Measuring systems and types- description of steel rule- description of feeler gauge- constructional details and working principle of precision measuring instruments like Vernier caliper, micrometer, bore gauge and dial gauge- description of surface plate and V blocks- importance of correct roundness-surface finish and its importance.
3	BASIC HAND TOOLS Practice on marking and cutting of a given job- file the job to bring required size- practice on drilling, tapping and dying- reaming practice- repair damaged threads. Exercise on using impact wrenches	Details of various types of marking and cutting tools- punch, scriber, hammer and mallets, hack saw frame and blade, chisels etc. – marking media-description of work holding devices like vices- details of various drill bits- description and types of drilling machines- details of taps, dies and reamers- details of screw extractors- details of bench grinders- safety precautions to be observed while working with hand tools and lifting & carrying components and equipment.

		Description of Power tools and equipment.
4.	FASTENERS AND BEARINGS Practice on general cleaning, checking and on loosening and tightening of various types of screwing joints using screwing tools. Removal of broken stud /bolt from blind hole. Remove and replace bearings from the given jobs.	Threads- thread categorization- types of threads- types of screwed joints- types of nuts- property classes of bolts- screw locking arrangements- types and description of screwing tools- description and types different types of bearings. Fundamentals of Hydraulics & Pneumatics
5	BASIC ELECTRICAL AND ELECTRONICS AND BATTERY Identify and interpret electrical/electronic system concern. Practice on measuring circuit voltage, ampere and resistance. Practice on measuring voltage drop. Practice on installing crimp connector and terminal end. Practice on testing fuses and relays- test diodes Remove and connect battery terminal from a battery- clean terminals- check voltage of a battery- check cranking voltage- check charging voltage- top up distilled water up to the level- charging a battery – test battery- specific gravity test.	General principles of electrical engineering- structure of atoms- voltage- current- fuses- electrical conduction- current direction- types of current- voltage drop- resistance- PTC and NTC resistors- types of resistors- ohm's law- resistor circuits- electro magnetism- electromagnetic induction- description of multimeter- function and types of relays- semiconductors- N type and P type semiconductors- description of diodes and transistors. Purpose of battery- types- construction and working principle of a lead acid battery- maintenance free batteries- battery ratings- battery charging methods- trouble shooting a battery
6.	IDENTIFICATION OF TWO AND THREE WHEELERS AND BASIC MAINTENANCE Identification of major components of a motor cycle, scooter and 3wheeler. Remove and refit the engine assembly from the given vehicle- decarbonize engine by using chemicals. Water wash a vehicle- Check and top up coolant, engine oil level and brake oil level- clean and refit air filter- check oil leaks in an engine- check vacuum and	Introduction to Engine: Description of internal & external combustion engines, Classification of IC engines, Principle & working of 2&4-stroke diesel engine (Compression ignition Engine (C.I)**)** **&** spark ignitionengine **(S.I) ,** differentiate between 2-stroke and 4 stroke, C.I engine and S.I Engine, Direct injection and Indirect injection, Technical terms used in engine, Engine specification.

	fuel hoses for any damages and leaks- adjust free play in the accelerator, brake and clutch levers and greasing- check all lights, switches and horn- inflate tyres.	Motor cycle water washer- description and types- precautions to be observed while water washing a vehicle.
7	COOLING AND LUBRICATION SYSTEM Drain, Reverse flush and refill cooling system- remove and refit drive belt and hoses- remove and refit coolant pump- remove and refit radiator and fan assembly- test thermostat. Drain engine oil- change oil filter- refit new engine oil- blotting paper test- remove and refit oil pump- remove, clean and refit oil cooler. CYLINDER HEAD Remove accessories fitted with the petrol engine- remove and dismantle cylinder head- clean and lubricate cylinder head components viz. valve, valve guide, valve seats, valve spring, timing belt, rocker arm and cam shaft - reassemble and refit cylinder head components- set valve timing- adjust valve clearance.	Engine operating temperature- requirements of cooling system- types of cooling system and its description- description of pump circulating system components- radiator and its types- description- expansion tank- details of radiator pressure cap- coolant pump- construction and working of fan- types of thermostat and its description. Functions of a lubricating system- description of lubricating system- forced feed and petrol system - list out engine lubricating components- description of different types of oil pumps- types of oil filtering systems and its description- description of oil cooler- crank case ventilation. Description of cylinder head design- details of arrangement of valves in engines- valve timing diagram of a petrol and diesel engines- details of arrangement of camshaft in engines- multiple valve technology- detailed description of valve components- details of camshaft drives- valve clearance and its importance.
8	CYLINDER BLOCK & TRANSMISSION IN TWO WHEELERS Remove and refit clutch cable assembly- Remove, clean and reassemble clutch assembly from the vehicle- remove and refit gear linkage mechanism- remove and refit magneto assembly from a	Functions of a cylinder- cylinder types and description- types of cylinder liners- description of cylinder head gasket- functions of a piston- types and material used for piston- connecting rod- functions- material and design of connecting rod- crank shaft- functions-

	vehicle- remove, clean and reassemble drive chain assembly- remove and refit drive belt assembly. Dismantle engine block and gear components- clean and lubricate components viz. Crank shaft, main and connecting rod bearings, piston, piston rings, connecting rod and fly wheel – clean gear components- s-reassemble engine block assembly- tighten cylinder head bolts.	material and design of crank shaft- fly wheel- description of gear box in the two wheeler. Description and types of clutches- description of gear linkage mechanism- types of drive belts and chain and their description- trouble tracing in transmission system in a 2 wheeler.
9	TRANSMISSION IN THREE WHEELER Remove, clean and refit clutch assembly in three wheelers- disconnect and connect clutch linkages- remove, dismantle, clean and reassemble gear box assembly in three wheeler- service universal joint and propeller shaft- remove and refit differential assembly.	Description and types of clutch in three wheelers- description of clutch linkages- description and types of gear box- types of universal joints- description and types of propeller shaft- description of differential- precautions to be observed while servicing transmission system in three wheelers- trouble tracing in transmission system in three wheelers
10	PETROL AND DIESEL FUEL SYSTEM Remove, clean and refit fuel tank from the given vehicle- check leakages in the fuel tank- remove and refit fuel filter- remove and refit carburetor- dismantle and clean carburetor components and reassemble- remove and refit throttle body assembly in the MPI system- clean carbon deposits in the throttle body. Clean diesel fuel tank- remove and refit diesel fuel filters- check leaks in fuel system-remove and refit fuel hoses- removing and refitting fuel injection pump and injectors- setting injection timing- bleed fuel system Remove, clean and refit intake system- remove and refit exhaust manifold, silencer and exhaust pipe- Test and	Description of air induction system- Description of fuel tank- carburetor types and its description- lay out of MPI system- precautions to be observed while servicing carburetor and MPI system- types and description of fuel filters. Lay out of diesel fuel systems- description of fuel tank- details of low pressure pump- importance of clean fuel- types of fuel filters and its description- construction and working of different types of fuel injection pumps- types and working of governor- description of injectors- different types of nozzles. Description of air induction system- description of intake and exhaust manifold- details of various types of

	service a secondary air induction system- check hoses in the crank case ventilation.	mufflers Details of air pollution and emissions- emission standards- description of smoke meter- types and description- secondary air induction system design and operation.
11	STEERING, SUSPENSION, WHEEL AND BRAKE. Remove, clean and refit steering assembly from a two wheeler and three wheeler- remove front fork assembly- drain fork oil- dismantle and clean the fork components- reassemble and refit front fork assembly- check fork bend- remove and refit rear shock absorber. Remove, dismantle, clean and reassemble tyres from the wheel assembly- practice on repairing puncture in a tube tyre- practice on repairing puncture in a tubeless tyre- wheel balancing. Remove and refit. Brake cable- Remove, clean and refit front and rear drum brake assembly- remove, clean and refit front disc brake assembly- bleed hydraulic brake- adjust brake shoes.	Description and types of steering system used in two and three wheelers- description of a front fork assembly- types and description of telescopic shock absorbers- trouble tracing in steering and suspension in two and three wheelers. Description and types of wheels- different types of tyres and its constructional details- tyre wear pattern- effects of correct inflation of tyres- tyre storage- tyre rotation Description and types of drum and disc brakes- description of hydraulic braking system- precautions to be observed while servicing brake assembly- trouble tracing in brake system.
12	DASH BOARD AND ELECTRICAL EQUIPMENTS Remove and refit gauges in the dash board- start the engine and observe the readings shown in the gauges- remove and refit head lights and tail lights- remove and refit horn- remove, clean and refit electrical switches. Practice on tracing input sensor wiring and connectors-remove and refit sensors. STARTING AND CHARGING SYSTEM	Description about fuel gauges- purpose and types of warning lights- their description- description of head and tail light- construction and working principle of horn. Description of electronic control system- classification of sensors- description of various types of sensors-Function and working principle of sensors. Study about wiring diagram of a stating system- Principle of starter- components of a starter- construction and working of

	Remove and refit starter- check starting system wiring harness- test ignition switch- remove and refit starter relay- dismantle and assemble starter- Check the operation of the charging system- perform voltage drop tests- remove and refit alternator- dismantle and reassemble alternator- remove and refit magneto assembly in a vehicle.	starter- starter field coil design- solenoids- types and function- Study about wiring diagram of a charging system- construction and working principle of magneto assembly - description of voltage regulator and rectifier operation.
13	**Assessment/Examination 03days**	

Note: - *More emphasis to be given on video/real-life pictures during theoretical classes. Some real-life pictures/videos of related industry operations may be shown to the trainees to give a feel of Industry and their future assignment.*

9. SYLLABUS - CORE SKILLS

9.1 WORKSHOP CALCULATION SCIENCE & ENGINEERING DRAWING

Block – I		
Sl. No.	**Workshop Calculation and Science (Duration: - 20 hrs.)**	**Engineering Drawing (Duration : - 30 hrs.)**
1.	**Unit**: Systems of unit- FPS, CGS, MKS/SI unit, unit of length, Mass and time, Conversion of units	**Introduction to Engineering Drawing and Drawing Instruments :** - Conventions - Viewing of engineering drawing sheets. - Method of Folding of printed Drawing Sheet as per BIS SP:46-2003
2.	**Fractions**: Fractions, Decimal fraction, Addition, Subtraction, Multiplication and Division of Fractions and Decimals, conversion of Fraction to Decimal and vice versa. Simple problems using Calculator.	**Drawing Instruments : their uses** Drawing board, T-Square, Drafter (Drafting M/c), Set Squares, Protractor, Drawing Instrument Box (Compass, Dividers, Scale, Diagonal Scales etc.), Pencils of different Grades, Drawing pins / Clips.
3.	**Properties of Material** : properties - Physical & Mechanical, Types –Ferrous & Non-Ferrous, difference between Ferrous and Non-Ferrous metals, introduction of Iron, Cast Iron, Wrought Iron, Steel, difference between Iron and Steel, Alloy steel, carbon steel, stainless steel, Non-Ferrous Alloys.	**Lines** : - Definition, types and applications in Drawing as per BIS SP:46-2003 - Classification of lines (Hidden, centre, construction, Extension, Dimension, Section) - Drawing lines of given length (Straight, curved) - Drawing of parallel lines, perpendicular line - Methods of Division of line segment
4.	**Average :** Problems of Average. **Ratio & Proportion** : Simple calculation on related problems.	**Drawing of Geometrical Figures:** Drawing practice on: - Angle: Measurement and its types, method of bisecting. - Triangle -different types - Rectangle, Square, Rhombus, Parallelogram. - Circle and its elements.
5.	**Mass, Weight and Density**: Mass, Unit of Mass, Weight, difference between mass and weight, Density,	**Dimensioning:** - Definition, types and methods of dimensioning (functional, non-functional

	unit of density.	and auxiliary) - Types of arrowhead Leader Line with text
6.		**Sizes and Layout of Drawing Sheets** - Selection of sizes - Title Block, its position and content - Item Reference on Drawing Sheet (Item List)
7.	**Percentage**: Introduction, Simple calculation. Changing percentage to decimal and fraction and vice-versa.	**Method of presentation of Engineering Drawing** - Pictorial View - Orthogonal View - Isometric view
8.	Forces definition. - Definition and example of compressive, tensile, shear forces, axial and tangential forces. Stress, strain, ultimate strength, factor of safety for MS. **Speed and Velocity**: Rest and motion, speed, velocity, difference between speed and velocity, acceleration, retardation.	**Symbolic Representation (as per BIS SP:46-2003) of :** - Fastener (Rivets, Bolts and Nuts) - Bars and profile sections - Weld, brazed and soldered joints. - Electrical and electronics element - Piping joints and fittings
9.	**Mensuration:** Area and perimeter of square, rectangle, parallelogram, triangle, circle, semi circle. Volume of solids – cube, cuboids, cylinder and Sphere. Surface area of solids – cube, cuboids, cylinder and Sphere. - Area of cut-out regular surfaces: circle and segment and sector of circle. - Volume of cut-out solids: hollow cylinders, frustum of cone, block section. - Volume of simple solid blocks.	**Dimensioning practice:** - Position of dimensioning (unidirectional, aligned, oblique as per BIS SP:46-2003) Symbols preceding the value of dimension and dimensional tolerance
10.	**Algebra** : Addition, Subtraction, Multiplication, Division, Algebraic formula, Linear equations (with two variables). - Circular Motion: Relation between circular motion and Linear motion, Centrifugal force, Centripetal force.	**Construction of Geometrical Drawing Figures:** - Polygons and their values of included angles. Conic Sections (Ellipse)
11.	**Work, Power and Energy**: work, unit of	**Projections:**

	work, power, unit of power, Horse power, mechanical efficiency, energy, use of energy, potential and kinetic energy, examples of potential energy and kinetic energy.	- Concept of axes plane and quadrant. - Orthographic projections - Method of first angle and third angle projections (definition and difference) - Symbol of 1st angle and 3rd angle projection as per IS specification.
12.	**Trigonometry:** Trigonometric ratios, Trigonometric tables. - Finding the value of unknown sides and angles of a triangle by Trigonometrical method. - Finding height and distance by trigonometry.	Machined components; concept of fillet & chamfer; surface finish symbols.
13.	**Heat & Temperature**: Heat and temperature, their units, difference between heat and temperature, boiling point, melting point, scale of temperature, relation between different scale of temperature, Thermometer, pyrometer, transmission of heat, conduction, convection, radiation.	Screw thread, their standard forms as per BIS, external and internal thread, conventions on the features for drawing as per BIS.
14.	**Basic Electricity**: Introduction, use of electricity, Types of current_ AC, DC, their comparison, voltage, resistance, their units. Conductor, insulator, Types of connections – series, parallel, electric power, Horse power, energy, unit of electrical energy. Concept of earthing.	Reading & interpretation of assembly drawing and detailing.
	Heat treatment – Necessity, different common types of Heat treatment.	
	Graph: - Read images, graphs, diagrams – Bar chart, pie chart. - Graphs: abscissa and ordinates, graphs of straight line, related to two sets of varying quantities.	
15	**Transmission of power:** By belt, pulleys & gear drive.	Reading of drawing. Simple exercises related to missing lines, dimensions and views. How to make queries.

16	**Concept of pressure** – units of pressure, atmospheric pressure, gauge pressure – gauges used for measuring pressure. **Introduction to pneumatics & hydraulics systems.** Solution of NCVT test papers	Simple exercises related to trade related symbols. - Solution of NCVT test papers.

9.2 EMPLOYABILITY SKILLS

(DURATION: - 55 HRS.)

Topic No.	Topic	Duration (in hours)
	English Literacy	**7**
1.	Reading **Reading and understanding simple sentences about self, work and environment**	
2.	Writing **Construction of simple sentences Writing simple English**	
3.	Speaking / Spoken English **Speaking with preparation on self, on family, on friends/ classmates, on know, picture reading gain confidence through role-playing and discussions on current happening job description, asking about someone's job habitual actions. Taking messages, passing messages on and filling in message forms Greeting and introductions office hospitality,Resumes or curriculum vita essential parts, letters of application reference to previous communication.**	
	I.T. Literacy	**10**
1.	Basics of Computer **Introduction, Computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down of computer.**	
2.	Word processing and Worksheet **Basic operating of Word Processing, Creating, opening and closing Documents, use of shortcuts, Creating and Editing of Text, Formatting the Text, Insertion & creation of Tables. Printing document.** **Basics of Excel worksheet, understanding basic commands, creating simple worksheets, understanding sample worksheets, use of simple formulas and functions, Printing of simple excel sheets.** **Use of External memory like pen drive, CD, DVD etc,**	
3.	Computer Networking and INTERNET **Accessing the Internet using Web Browser, Downloading and Printing Web Pages, Opening an email account and use of email. Social media sites and its implication.**	
	Communication Skill	**18**
1	Introduction to Communication Skills **Communication and its importance** **Principles of Effective communication** **Types of communication - verbal, nonverbal, written, email, talking on phone.** **Nonverbal communication - components-Para-language**	

	Body - language **Barriers to communication and dealing with barriers.**	
2	Listening Skills **Listening-hearing and listening, effective listening, barriers to effective listening guidelines for effective listening.**	
3	Motivational Training **Characteristics Essential to Achieving Success** **The Power of Positive Attitude** **Self awareness** **Importance of Commitment** **Ethics and Values** **Ways to Motivate Oneself** **Personal Goal setting and Employability Planning.**	
4	Facing Interviews **Manners, Etiquettes, Dress code for an interview** **Do's & Don'ts for an interview**	
	Entrepreneurship skill	**8**
1.	**Concept of Entrepreneurship** **Entrepreneurship- Entrepreneurship - Enterprises:-Conceptual issue. Source of business ideas, Entrepreneurial opportunities, The process of setting up a business.**	
2.	Institutions Support **Role of Various Schemes and Institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non financing support agencies to familiarizes with the Policies /Programmes& procedure & the available scheme.**	
	Productivity	
1.	**Productivity** Definition, Necessity.	
2.	**Affecting Factors** Skills, Working Aids, Automation, Environment, Motivation How improves or slows down.	
3.	**Personal Finance Management** Banking processes, Handling ATM, KYC registration, safe cash handling, Personal risk and Insurance.	
	Occupational Safety, Health & Environment Education	**6**
1	Safety & Health **Introduction to Occupational Safety and Health importance of safety and health at workplace.**	

2	Occupational Hazards **Basic Hazards, Chemical Hazards, Vibro-acoustic Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards. Occupational health, Occupational hygienic, Occupational Diseases/ Disorders & its prevention.**	
3	Accident & safety **Basic principles for protective equipment.** **Accident Prevention techniques - control of accidents andsafety measures.**	
4	First Aid **Care of injured & Sick at the workplaces, First-Aid & Transportation of sick person**	
	Labour Welfare Legislation	
1	Welfare Acts **Benefits guaranteed under various acts- Factories Act, Apprenticeship Act, Employees State Insurance Act (ESI), Employees Provident Fund Act.**	
	Quality Tools	**6**
1.	**Quality Consciousness :** Meaning of quality, Quality Characteristic	
2.	**Quality Circles :** **Definition, Advantage of small group activity, objectives of quality Circle, Roles and function of Quality Circles in Organization, Operation of Quality circle. Approaches to starting Quality Circles, Steps for continuation Quality Circles.**	
3.	**House Keeping :** **Purpose of Housekeeping, Practice of good Housekeeping.**	
4.	Quality Tools **Basic quality tools with a few examples**	

10. DETAILS OF COMPETENCIES (ON-JOBTRAINING)

The **competencies/ specific outcomes** on completion of On-Job Training are detailed below: -

Block – I

1. PERFORM BASIC MAINTENANCE

a. Washing a vehicle
b. Check electrical bulbs and components for proper working
c. Lubricating the vehicle moving components
d. Adjust pedal/lever free play
e. Inflate tyres

2. SERVICE COOLING SYSTEM

a. Perform cooling system pressure tests, inspect and test radiator, pressure cap, coolant recovery tank, and hoses; determine necessary action
b. Inspect, refit and adjust drive belts, and pulleys; check pulley and belt alignment
c. Inspect, test, and refit thermostat
d. Inspect and test fan

3. SERVICE LUBRICATING SYSTEM

a. Change engine oil and filter
b. Flush lubricating system
c. Service oil pump

4. SERVICE FUEL FEED SYSTEM (PETROL)

a. Clean fuel tank
b. Service carburetor
c. Tuning carburetor with the help of exhaust gas analyzer
d. Service throttle body in FI engines
e. Service FI system injector

5. SERVICE FUEL FEED SYSTEM (DIESEL)

a. Clean fuel tank
b. Service low pressure pump
c. Service fuel filter
d. Setting injection timing
e. Remove and refit high pressure fuel injection pump

f. Service and test injectors

6. TEST BASIC ELECTRICAL AND ELECTRONICS

a. Test ampere, voltage and resistance in a electrical circuit
b. Test diodes
c. Test voltage drop
d. Test continuity and discontinuity in a circuit

7. DIAGNOSE ENGINE PROBLEMS

a. Perform engine vacuum test, engine compression and engine oil pressure test, interpret and conclude the results

8. OVERHAUL CYLINDER HEAD ASSEMBLY

(*DISMANTLE, CLEAN, INSPECT, MEASURE, CONCLUDE THE RESULTS, DETERMINE FOR REFIT THE COMPONENTS AND REASSEMBLE CYLINDER HEAD ASSEMBLY)*

a. Dismantle engine head assembly
b. Visual inspection of components for cracks
c. Check gasket surface areas for warpage and surface finish
d. Inspect and measure valves, valve seats and valve spring
e. Refit valve seats and valves
f. Valve lapping
g. Refit valve guide, check valve stem- to- guide clearance
h. Reaming valve guide for correct clearance
i. Inspect and measure rocker assembly, determine necessary action
j. Inspect and measure cam shaft run out, journal and cam lobe wear
k. Inspect valve lifters
l. Inspect and refit drive belt/chain
m. Reassemble engine head assembly

9. OVERHAUL CYLINDER BLOCK ASSEMBLY

(DISMANTLE, CLEAN, INSPECT, MEASURE, CONCLUDE THE RESULTS, DETERMINE FOR REFIT THE COMPONENTS AND REASSEMBLE CYLINDER BLOCK ASSEMBLY.)

a. Dismantle engine block assembly
b. Inspect engine block for visible cracks and surface warpage
c. Inspect and measure cylinder walls/sleeves for damage, wear and ridges
d. Inspect and measure crank shaft for journal wear

e. Inspect and measure main and connecting rod bearings for wear
f. Determine piston to bore clearance
g. Inspect, measure and install piston rings
h. Service oil pump, measure oil pump components
i. Reassemble engine block components
j. Adjust valve clearance

10. MAINTAIN TRANSMISSION IN TWO WHEELERS

a. Remove, clean and inspect clutch assembly
b. Replace the clutch components if necessary
c. Remove the engine and take out the gear components.
d. Inspect the gear components and refit. Replace if necessary
e. Remove, clean and inspect the drive chain/belt. Lubricate chain assembly. Lubricate drive belt assembly components. Reassemble the components.

11. MAINTAIN TRANSMISSION IN THREE WHEELERS

a. Service clutch assembly. Clean and inspect the components.
b. Service gear box assembly. Clean and inspect the components.
c. Service universal joint and propeller shaft
d. Service differential

12. MAINTAIN STEERING AND SUSPENSION

a. Service steering system in a two wheeler and three wheeler.
   Remove, dismantle, clean and inspect the components. Conclude the inspection results. Replace the components if necessary. Reassemble and refit the steering system. Check for its proper functioning.
b. Service suspension system in a two wheeler and three wheeler.
   Remove and dismantle front fork assembly. Inspect the components and conclude the results. Replace the worn out components. Reassemble and refit the fork assembly.

13. MAINTAIN BRAKE SYSTEM

a. Remove, clean and refit the disc brake assembly
b. Remove, clean and refit the drum brake assembly
c. Inspect the components and replace if necessary
d. Bleed the hydraulic brake system

14. REPAIR WHEELS AND TYRES

a. Repairing a punchered tube
b. Repairing tubeless tyre puncture
c. Wheel balancing in three wheelers

15. MAINTAIN ELECTRICAL AND ELECTRONICS

a. Test battery
b. Check cranking voltage and charging voltage
c. Inspect, test and diagnose starting system
d. Inspect, test and diagnose charging
e. Tune horn
f. Replace head light and tail lights
g. Align head light
h. Test electrical components for its proper functioning
i. Remove and refit sensors
j. Inspect electrical gauges

16. SERVICE INTAKE, EXHAUST AND EMISSION SYSTEM

a. Remove, clean and refit intake and exhaust manifold
b. Service secondary air induction system

Note:

1. Industry must ensure that above mentioned competencies are achieved by the trainees during their on job training.
2. In addition to above competencies/ outcomes industry may impart additional training relevant to the specific industry.

ANNEXURE – I

INFRASTRUCTURE FOR PROFESSIONAL SKILL & PROFESSIONAL KNOWLEDGE

MECHANIC MOTOR CYCLE			
LIST OF TOOLS AND EQUIPMENT for Basic Training (For 16 Apprentices)			
A. TRAINEES TOOL KIT (For each additional unit trainees tool kit Sl. 1-18 is required additionally)			
Sl. no.	**Name of the Tool &Equipments**	**Specification**	**Quantity**
1	D.E. spanner set	4-32mm	16 nos.
2	Ring spanner set	4-32 mm	16 nos.
3	Socket spanner set	4-32 mm	16 nos.
4	Deep socket set	4-32 mm	16 nos.
5	Screw driver flat head	small and big size	16 nos.
6	Screw driver Philips type	small and big size	16 nos.
7	Impact screw driver set		16 nos.
8	Flat chisel		16 nos.
9	Allen key set		16 nos.
10	Feeler gauge		16 nos.
11	Ball peen hammer	0.5kg	16 nos.
12	Mallet	15cm	16 nos.
13	Hand file	20 cm	16 nos.
14	Scriber	15cm	16 nos.
15	Steel rule	30 cm	16 nos.
16	Centre punch	10 x 100 mm	16 nos.
17	Tools box with lock and key		16 nos.
18	Plier combination		16 nos.
19	Wire cutter		16 nos.
20	Multi meter		16 nos.
21	Continuity tester		16 nos.
22	T spanner	8mm	16 nos.
23	T spanner	10mm	16 nos.
24	T spanner	12 mm	16 nos.
B : INSTRUMENTS & GENERAL SHOP OUTFIT			

25	Vernier caliper	30 cm	01 no
26	Outside micrometer	0-25mm	01 no
27	Outside micrometer	25-50mm	01 no
28	Outside micrometer	50-75mm	01 no
29	Outside micrometer	75-100mm	01 no
30	Outside micrometer	100-125 mm	01 no
31	Outside micrometer	125-150mm	01 no
32	Inside micrometer	25-150 mm	01 no
33	Dial test indicator	0.01mm accuracy	01 no
34	Stand for dial gauge with magnetic base		01 no
35	Surface plate with stand		01 no
36	V block suitable to hold components		02 nos.
37	Vice fitted on table		04 nos.
38	Battery charger		01 no
39	Caliper inside spring type	15 cm	04 nos.
40	Caliper outside spring type	15 cm	04 nos.
41	Cleaning tray plastic made		10 nos.
42	Divider spring type		04 nos.
43	Electrical soldering iron		04 nos.
44	Try square	15 cm	14 nos.
45	Files assorted types and sizes		01 set each
46	Hack saw frame		04 nos.
47	Hand operated crimping tool		01 no
48	Oil can	0.5 litre capacity	10 nos.
49	Piston ring compressor		01 no
50	Piston ring expander		01 no
51	Piston ring groove cleaner		01 no
52	Valve spring compressor		01 no
53	Bearing puller		01 set
54	Bearing installer		01 set
55	Oil seal installer		01 set
56	Compression gauge petrol		01 no
57	Compression gauge diesel		01 no
58	Vacuum gauge		01 no
59	Magneto puller for different vehicles		01 no each
60	Clutch puller for different vehicles		01 no each
61	Circlip plier internal		01 no

62	Circlip plier external		01 no
63	Tachometer		01 no
64	Timing light		01 no
65	Spark plug spanner for different vehicles		01 set
66	CDI and ignition coil tester		01 no
67	Greasilator		01 no
68	Special tools for removing and refitting variable belt transmission		01 set for each vehicle
69	Special tools for removing and refitting steering components		01 set for each vehicle
70	Special tools for removing and refitting front fork components		01 set for each vehicle
71	Hydraulic brake bleeder unit		01 no
72	Taps and die set		01 set
73	Hand reamer of different sizes		01set
74	Hand drilling machine with various size drill bits		01 set
75	Stud remover		04 nos.
76	Stud extractor ezy out		04 nos.
77	Letter punch		01 set
78	Number punch		01 set
79	Scraper flat		01 no
80	Thread pitch gauge		01 set
81	Torque wrench able to tighten all nuts and studs		01 set each
82	Tyre pressure gauge		01 no
83	Grip plier		04 nos.
84	Spark plug cleaner		01 no
85	Special tools for carburetor service		01 set
86	Spring tension tester		01 no
C : GENERAL MACHINERY INSTALLATIONS			
87	Motor cycle	100 cc both drum brakes	01 no
88	Motor cycle with FI engine	above 150 cc with disc and drum brakes and water cooled	01 no
89	Scooter with variable belt drive		01 no

90	Moped	100 cc	01 no
91	Three wheeler with 2 stroke engine		01 no
92	Three wheeler with 4 stroke engine		01 no
93	Three wheeler with diesel engine		01 no
94	Vehicle lift for two and three wheeler		01 no each
95	Air compressor with pneumatic pipe lines		01 no
96	Car washer		01 no
97	bench grinding machine		01 no
98	Gas welding machine		01 no
99	Cut model motor cycle showing all components electric drive		01 no
100	2 stroke engine for dismantling and assembling		01 no
101	4 stroke engine for dismantling and assembling		01 no

INFRASTRUCTURE FOR WORKSHOP CALCULATION & SCIENCE AND ENGINEERING DRAWING

TRADE: MECHANIC MOTOR CYCLE

LIST OF TOOLS& EQUIPMENTS FOR -16APPRENTICES

1) **Space Norms** : 45 Sq.m.(For Engineering Drawing)

2) Infrastructure:

A : TRAINEES TOOL KIT:-			
Sl. No.	**Name of the items**	**Specification**	**Quantity**
1.	Draughtsman drawing instrument box	As per standard	16
2.	Set square celluloid 45^o	(250 X 1.5 mm)	16
3.	Set square celluloid 30^o-60^o	(250 X 1.5 mm)	16
4.	Mini drafter	As per standard	16
5.	Drawing board IS: 1444	(700mm x500 mm)	16
B : Furniture Required			
Sl. No.	**Name of the items**	**Specification**	**Quantity**
1	Drawing Board	As per standard	20
2	Models : Solid & cut section	As per standard	as required
3	Drawing Table for trainees	As per standard	as required
4	Stool for trainees	As per standard	as required
5	Cupboard (big)	As per standard	01
6	White Board	(size: 8ft. x 4ft.)	01
7	Trainer's Table	As per standard	01
8	Trainer's Chair	As per standard	01

TOOLS &EQUIPMENTS FOR EMPLOYABILITY SKILLS		
Sl. No.	**Name of the Equipment**	**Quantity**
1.	Computer (PC) with latest configurations and Internet connection with standard operating system and standard word processor and worksheet software	10 Nos.
2.	UPS - 500VA	10 Nos.
3.	Scanner cum Printer	1 No.
4.	Computer Tables	10 Nos.
5.	Computer Chairs	20 Nos.
6.	LCD Projector	1 No.
7.	White Board 1200mm x 900mm	1 No.
Note: - Above Tools &Equipments not required, if Computer LAB is available in the institute.		

ANNEXURE-II

FORMAT FOR INTERNAL ASSESSMENT

Name & Address of the Assessor :			**Year of Enrollment :**
Name & Address of ITI (Govt./Pvt.) :			**Date of Assessment :**
Name & Address of the Industry :			**Assessment location: Industry / ITI**
Trade Name :	**Semester:**		**Duration of the Trade/course:**
Learning Outcome:			

Sl. No	**Candidate Name**	**Father's/Mother's Name**	Safety consciousness	Workplace hygiene	Attendance/ Punctuality	Ability to follow Manuals/ Written instructions	Application of Knowledge	Skills to handle tools & equipment	Economical use of materials	Speed in doing work	Quality in workmanship	VIVA	**Total internal assessment Marks**	**Result (Y/N)**
Maximum Marks (Total 100 Marks)			**15**	**5**	**10**	**5**	**10**	**10**	**5**	**10**	**15**	**15**		
1														
2														