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

COMPETENCY BASED CURRICULUM

MECHANIC AGRICULTURAL MACHINERY

(Duration: Two Years)
Revised in July 2022

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 4

SECTOR - AUTOMOTIVE

Directorate General of Training

MECHANIC AGRICULTURAL MACHINERY

(Engineering Trade)

Revised in July 2022

Version: 2.0

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NSQF LEVEL - 4

Developed By

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

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1. COURSE INFORMATION

During the two-year duration of Mechanic Agricultural Machinery trade, a candidate is trained on subjects- Professional Skill, and Employability Skills related to job role. In addition to this, a candidate is entrusted to make/do project work and Extra Curricular Activities to build up confidence. The practical skills are imparted in simple to complex manner & simultaneously theory subject is taught in the same fashion to apply cognitive knowledge while executing task.

The content broadly covers fitting of different components by operating different hand tools conventional machines and maintenance of machineries used in agriculture field. The broad components covered under Professional Skill subject are as below:

First Year: – In this year, the contents covered are from safety aspect related to the trade, the learner learns to apply safe working practices complying environment regulations and housekeeping in an automotive workshop; plan and perform precision measurements on the components and compare parameters with specifications used in automotive workshop practices, carryout marking and perform basic fitting operations used in the work shop practices along with inspection of dimensions; produce sheet metal components using bending process & other various sheet metal operations; construct electrical circuits and perform testing of basic electrical parameters by using electrical measuring instruments, construct basic electronic circuits and testing, manufacture components with different types of welding processes in the given job, identify and select the hydraulic and pneumatic components in a vehicle and inspect the auto component using Non-destructive testing methods. The learner learns to overhaul diesel engine of Tractor; service, cooling and lubrication system of Tractor in a workshop; service Exhaust System and Fuel Feed System of Tractor in a workshop; overhaul Clutch, Gearbox, Steering system, differential and PTO unit of Tractor in a workshop; carryout Repair of Wheels and Tyres of Tractor in the Workshop; overhaul Brake system of Tractor in the workshop; overhaul Major Assemblies of Power Tiller and carryout Field Operation; overhaul and troubleshoot for correct functioning of Implements of Tractor; perform battery testing, charging operations and overhaul charging and Starting System of Tractor.

Second Year: – In this year, test and rectify faults in functionality of major components and assemblies of Mould Board Plough, Disc Plough and troubleshoot of tillage and its implements; check, test and troubleshoot faults in functionality of major components and assemblies of Chisel Plough and Rotavator; troubleshoot & test the functionality of major components and assemblies of disc harrows (Off set Type/Double action. and single action) and Power harrows; check and service proper functionality of major components and assemblies of cultivators and soil forming equipments; identify and check functionality of major components and assemblies of Lazar leveler, trencher & post hole digger; dismantle, assemble and troubleshoot seed drills; test and verify functions of major components and assemblies of planters and fertilizer applicators; identify and check functionality of major components and assemblies of volute type centrifugal pump and submersible pump; service irrigation valves and hydrants; service

and trouble shoot power tillers/power weeder; identify and check functionality of grain handling seed treating and drying and troubleshoot major components and assemblies of AC motors; identify and trouble shoot faults in major components and assemblies of sprayers & dusters; detect and troubleshoot major components and assemblies of reaper, reaper winder, straw- reapers; troubleshoot the faults in functionality of major components and assemblies of Thresher, Maize seller, Groundnut decorticator; identify and check functionality of major components and assemblies of combine harvester- cutter bar assembly, feeder unit, threshing unit, separating unit; test and troubleshoot functionality of major components and assemblies of mower, folder harvester, power chaff/silage cutter; detect and rectify functionality of major components and assemblies of rotary harvester, hay bailer; find and troubleshoot major components and assemblies of groundnut digger, potato / onion digger; service and troubleshoot winnower, cleaner & grader; maintain and service rice huller, polisher, feed grinder-cum-mixer, hammer mill; detect and rectify functionality of grain handling seed treating and drying equipment.

2. TRAINING SYSTEM

2.1 GENERAL

The Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers a range of vocational training courses catering to the need of different sectors of economy/ Labour market. The vocational training programmes are delivered under the aegis of Directorate General of Training (DGT). Craftsman Training Scheme (CTS) with **variants** and Apprenticeship Training Scheme (ATS) are two pioneer schemes of DGT for strengthening vocational training.

Mechanic Agricultural Machinery trade under CTS is delivered nationwide through a network of ITIs. The course is of two years duration. It mainly consists of Domain area and Core area. The Domain area (Trade Theory & Practical) imparts professional skills and knowledge, while Core area (Employability Skills) imparts requisite core skill, knowledge and life skills. After passing out the training program, the trainee is awarded National Trade Certificate (NTC) by DGT which is recognized worldwide.

Candidates broadly need to demonstrate that they are able to:

- Read & interpret technical parameters/documentation, 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 knowledge, core skills & employability skills while performing the job and machining work.
- Check the job/components as per drawing for functioning identify and rectify errors in job/components.
- Document the technical parameters related to the task undertaken.

2.2 PROGRESSION PATHWAYS:

- Can join industry as Technician and will progress further as Senior Technician, Supervisor and can rise up to the level of Manager.
- Can become Entrepreneur in the related field.
- Can take admission in diploma course in notified branches of Engineering by lateral entry.
- Can join Apprenticeship programme in different types of industries leading to National Apprenticeship certificate (NAC).
- Can join Crafts Instructor Training Scheme (CITS) in the trade for becoming an instructor in ITIs.

- Can join Advanced Diploma (Vocational) courses as applicable conducted by DGT.

2.3 COURSE STRUCTURE:

Table below depicts the distribution of training hours across various course elements during a period of two years:

S No.	Course Element	Notional Training Hours	
		1st Year	2nd Year
1	Professional Skill (Trade Practical)	840	840
2	Professional Knowledge (Trade Theory)	240	300
3	Employability Skills	120	60
	Total	**1200**	**1200**

Every year 150 hours of mandatory OJT (On the Job Training) at nearby industry, wherever not available then group project is mandatory.

4	On the Job Training (OJT)/ Group Project	150	150

Trainees of one-year or two-year trade can also opt for optional courses of up to 240 hours in each year for 10th class /12th class certificate along with ITI certificate or add on short term courses.

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 the DGT from time to time.

a) The Continuous Assessment (Internal)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 Formative assessment template provided on www.bharatskills.gov.in

b) The final assessment will be in the form of summative assessment. The All India Trade Test for awarding NTC will be conducted by controller of examinations, DGT as per the guideline. The pattern and marking structure is being notified by DGT 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

For the purposes of determining the overall result, weightage of 100% is applied for six months and one year duration courses and 50% weightage is applied to each examination for two years courses. The minimum pass percent for Trade Practical and Formative assessment is 60% & for all other subjects is 33%.

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 teamwork, avoidance/reduction of scrap/wastage and disposal of scrap/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 some of 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
- Computer based multiple choice question examination
- Practical Examination

Evidences of internal (Formative) assessments are to be preserved until forthcoming examination for audit and verification by examination body. The following marking pattern to be adopted for formative assessment:

Performance Level	Evidence
(a) Marks in the range of 60 -75% to be allotted during assessment	
For performance in this grade, the candidate	• Demonstration of good skill in the use of

should produce work which demonstrates attainment of an acceptable standard of craftsmanship with occasional guidance, and due regard for safety procedures and practices.	hand tools, machine tools and workshop equipment. • 60-70% accuracy achieved while undertaking different work with those demanded by the component/job. • A fairly good level of neatness and consistency in the finish. • Occasional support in completing the project/job.
(b) Marks in the range of 75%-90% to be allotted during assessment	
For this grade, a candidate should produce work which demonstrates attainment of a reasonable standard of craftsmanship, with little guidance, and regard for safety procedures and practices.	• Good skill levels in the use of hand tools, machine tools and workshop equipment. • 70-80% accuracy achieved while undertaking different work with those demanded by the component/job. • A good level of neatness and consistency in the finish. • Little support in completing the project/job.
© Marks 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% accuracy achieved while undertaking different work with those demanded by the component/job. • 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:

Tractor Mechanic; repairs and overhauls tractors by various mechanical processes for agriculture, constructional and other heavy duties. Examines and drives vehicle on road or runs engine in stationary position to diagnose troubles and defects. Dismantles part or complete engine or unit according to nature of defects. Repairs or replaces defective parts, reassembles them with prescribed settings, clearances, timings and adjustments by further tooling as necessary and ensures accuracy of fit. Installs assembled or repaired engine securely in position on vehicle chassis and connects oil and fuel lines, controls and other accessories. Starts engine and observes performance for any unusual noise and knocks. Adjusts carburetor, fuel pump (Carburetor for petrol engine and fuel pump for diesel engine), sets clearance between tappets and valves, tunes engine, adjusts brakes, makes electrical connections and performs other tasks to ensure stipulated performance. May repair and overhaul electric motors, fuel pump etc. of engine. May weld, braze or solder parts. May repair other agricultural machinery for ploughing, harvesting etc. and be designated as mechanic, agricultural machines.

Tractor Operator, Farm; Tractor Driver, Farm operates and services farm tractor having different attachments for ploughing, harrowing, harvesting and other agricultural operations. Checks different parts of tractor to ensure that it is in proper working order. Collects, attaches and adjusts special equipment, required for different operations of tractor. Feeds tractor with fuel and demarcates land for ploughing. Starts tractor and drives it through fields at regulated speed depending on nature of soil and work. Controls operation of different attachments including turning of wheels by operating levers and pedals as required. Tows trailers laden with crops and other materials when required. Cleans and oils machine. Maintains tractor and other implements in good working order and keeps record of fuel consumption. May supervise work of Helpers. May detect mechanical defects and undertake minor repairs.

Tractor Driver, Construction; operates petrol or diesel powered tractor to haul vehicles or implements such as trailors, graders, etc. for pushing, pulling or moving goods and material or dumping earth. Checks engine oil, radiator water, diesel or petrol supply and other important greasing points of vehicles. Checks that brakes and pedals of vehicle are in good condition. Fastens attachments, such as graders, trailors, ploughs, and rollers to tractor with hitch pins; releases brakes, shifts gears, and depresses, accelerator or moves throttle to control forward and backward movement of machine; steers tractor by turning steering wheel and depressing brake pedals. May couple and uncouple loads to and from tractor. May lubricate and repair tractor and attachments. May be designated according to type of power utilized as diesel tractor operator or gasoline-tractor operator.

Reference NCO-2015:

a) 7233.1500–Tractor Mechanic
b) 8341.0101 – Tractor Operator, Farm
c) 8341.0300 –Tractor Driver, Construction

Reference NOS: - AGR/N9421, AGR/N 9422, AGR/N 9424, AGR/N 9425, AGR/N 9426, AGR/N 9427, AGR/N 9428 AGR/N9429, AGR/N 9430. AGR/N 9431, AGR/N 9432, AGR/N 9433, AGR/N 9434, AGR/N 9435, AGR/N 9436, AGR/N 9437, AGR/N 9438, AGR/N 9439, AGR/N 9440, AGR/N 9441, AGR/N 9442, AGR/N 9443,AGR/N 9450,AGR/N 9451, AGR/N 1129, AGR/N 1126, AGR/N 1130, AGR/N 1128, AGR/N 1108, AGR/N 1119, AGR/N 1114, AGR/N 1111, AGR/N 1006

4. GENERAL INFORMATION

Name of the Trade	**Mechanic Agricultural Machinery**
Trade Code	DGT/1064
NCO – 2015	7233.1500, 8341.0101,8341.0300
NOS Covered	AGR/N9421, AGR/N 9422, AGR/N 9424, AGR/N 9425, AGR/N 9426, AGR/N 9427, AGR/N 9428 AGR/N9429, AGR/N 9430. AGR/N 9431, AGR/N 9432, AGR/N 9433, AGR/N 9434, AGR/N 9435, AGR/N 9436, AGR/N 9437, AGR/N 9438, AGR/N 9439, AGR/N 9440, AGR/N 9441, AGR/N 9442, AGR/N 9443,AGR/N 9450,AGR/N 9451, AGR/N 1129, AGR/N 1126, AGR/N 1130, AGR/N 1128, AGR/N 1108, AGR/N 1119, AGR/N 1114, AGR/N 1111, AGR/N 1006
NSQF Level	Level – 4
Duration of Craftsmen Training	Two Years (2400 hours + 300 hours OJT/Group Project)
Entry Qualification	Passed 10th class examination with Science and Mathematics or with vocational subject in same sector or its equivalent.
Minimum Age	14 years as on first day of academic session.
Eligibility for PwD	LD, LC, DW, AA, LV, DEAF
Unit Strength (No. Of Students)	24 (There is no separate provision of supernumerary seats)
Space Norms	225 Sq. m
Power Norms	10 KW
Instructors Qualification for	
1. Mechanic Agricultural Machinery Trade	B.Voc/Degree in Agriculture Engineering from AICTE/UGC recognized Engineering College/ university with one-year experience in the relevant field. **OR** 03 years Diploma in Agriculture Engineering from AICTE recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with two years' experience in the relevant field. **OR** NTC/NAC passed in the trade of "Mechanic Agricultural

	Machinery" with three years' experience in the relevant field. Essential Qualification: Relevant National Craft Instructor Certificate (NCIC) in any of the variants under DGT. ***NOTE: - Out of two Instructors required for the unit of 2(1+1), one must have Degree/Diploma and other must have NTC/NAC qualifications. However, both of them must possess NCIC in any of its variants.***
2. Employability Skill	MBA/ BBA / Any Graduate/ Diploma in any discipline with Two years' experience with short term ToT Course in Employability Skills. (Must have studied English/ Communication Skills and Basic Computer at 12th / Diploma level and above) **OR** Existing Social Studies Instructors in ITIs with short term ToT Course in Employability Skills.
3. Minimum Age for Instructor	21 Years
List of Tools and Equipment	As per Annexure – I

5. LEARNING OUTCOMES

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

5.1 LEARNING OUTCOMES

First Year

1. Make choices to carry out marking of the components for basic fitting operations in the workshop following safety precautions.(NOS:AGR/N9421)
2. Perform precision measurements on the components in automotive workshop practices (NOS:AGR/N9422)
3. Use different types of fastening and locking devices in a vehicle. (NOS:AGR/N9423)
4. Use cutting tools in the workshop, following safety precautions while grinding. (NOS:AGR/N9424)
5. Use different types of tools and workshop equipment in the workshop. (NOS:AGR/N1126)
6. Perform basic fitting operations used in the workshop practices and inspection of dimensions. (NOS:AGR/N9425)
7. Produce sheet metal components using various sheet metal operations. (NOS:AGR/N9426)
8. Construct electrical circuits and test its parameters by using electrical measuring instruments. (NOS:AGR/N9427)
9. Perform basic electrical testing in a vehicle. (NOS:AGR/N1129)
10. Perform battery testing and charging operations. (NOS:AGR/N1129)
11. Construct basic electronic circuits and testing. (NOS:AGR/N9428)
12. Manufacture components with different types of welding processes in the given job. (NOS:AGR/N9429)
13. Inspect the auto component using Non-destructive testing methods. (NOS:AGR/N1126)
14. Identify the hydraulic and pneumatic components in a vehicle. (NOS:AGR/N1129)
15. Demonstrate Major Assemblies of Tractor. (NOS:AGR/N1130)
16. Overhaul Diesel Engine of Tractor. (NOS:AGR/N1128)
17. Perform servicing of Cooling and Lubrication system of Tractor in a workshop. (NOS:AGR/N1128)
18. Service Intake and Exhaust System of Tractor in a workshop. (NOS:AGR/N1128)
19. Service Fuel Feed System of Tractor in a workshop. (NOS:AGR/N1128)
20. Overhaul Clutch and Gearbox of Tractor in a workshop. (NOS:AGR/N1129)
21. Overhaul Differential and PTO Unit of Tractor in the workshop. (NOS:AGR/N1129)

22. Overhaul Steering System of Tractor in the workshop. (NOS:AGR/N1129)
23. Carryout Repair of Wheels and Tyres of Tractor in the Workshop. (NOS:AGR/N1129)
24. Overhaul Brake system of Tractor in the workshop. (NOS:AGR/N1129)
25. Overhaul Major Assemblies of Power Tiller and carryout Field Operation. (NOS:AGR/N1108)
26. Overhaul Implements of Tractor. (NOS:AGR/N1119)
27. Overhaul Charging and Starting System of Tractor. (NOS:AGR/N1129)
28. Read and apply engineering drawing for different application in the field of work(NOS:AGR/N9450)
29. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS:AGR/N9451)

Second Year

30. Test and rectify faults in functionality of major components and assemblies of Mould Board Plough, Disc Plough and troubleshoot of tillage and its implements. (NOS:AGR/N1119)
31. Check, test and troubleshoot faults in functionality of major components and assemblies of Chisel Plough and Rotavator. (NOS:AGR/N9430)
32. Troubleshoot & Test the functionality of major components and assemblies of disc harrows (Off set Type/Double action and single action) and Power harrows. (NOS:AGR/N1119)
33. Check and service proper functionality of major components and assemblies of cultivators and soil forming equipments. (NOS:AGR/N1119)
34. Identify and check functionality of major components and assemblies of Lazar leveller, trencher & post hole digger. (NOS:AGR/N9431)
35. Dismantle, assemble and troubleshoot seed drills. (NOS:AGR/N9432)
36. Test and verify functions of major components and assemblies of planters and fertilizer applicators. (NOS:AGR/N9433)
37. Identify and check functionality of major components and assemblies of volute type centrifugal pump and submersible pump. (NOS:AGR/N1114)
38. Service irrigation valves and hydrants. (NOS:AGR/N1006)
39. Service and Trouble shoot power tillers/power weeder. (NOS:AGR/N1111)
40. Identify and check functionality of grain handling seed treating and drying and troubleshoot major components and assemblies of AC motors. (NOS:AGR/N9434)
41. Identify and trouble shoot faults in major components and assemblies of sprayers & dusters. (NOS:AGR/N9435)
42. Detect and troubleshoot major components and assemblies of reaper, reaper winder,

straw- reapers. (NOS:AGR/N9436)

43. Troubleshoot the faults in functionality of major components and assemblies of Thresher, Maize seller, Groundnut decorticator. (NOS:AGR/N9437)
44. Identify and check functionality of major components and assemblies of combine harvester- cutter bar assembly, feeder unit, threshing unit, separating unit. (NOS:AGR/N1105)
45. Test and troubleshoot functionality of major components and assemblies of mower, folder harvester, power chaff/silage cutter. (NOS:AGR/N9438)
46. Detect and rectify functionality of major components and assemblies of rotary harvester, hay bailer. (NOS:AGR/N9439)
47. Find and troubleshoot major components and assemblies of groundnut digger, potato / onion digger. (NOS:AGR/N9440)
48. Service and troubleshoot winnower, cleaner & grader. (NOS:AGR/N9441)
49. Maintain and service rice huller, polisher, feed grinder-cum-mixer, hammer mill. (NOS:AGR/N9442)
50. Detect and rectify functionality of grain handling seed treating and drying equipment. (NOS:AGR/N9443)
51. Read and apply engineering drawing for different application in the field of work(NOS:AGR/N9450)
52. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS:AGR/N9451)

6. ASSESSMENT CRITERIA

LEARNING OUTCOMES	ASSESSMENT CRITERIA
First Year	
1. Make choices to carry out marking of the components for basic fitting operations in the workshop following safety precautions. (NOS:AGR/N9421)	Mark according to drawings by using marking tools on the work pieces.
	Chip the job in accordance with standard specifications and tolerances.
	Measure all dimensions in accordance with standard specifications and tolerances.
2. Perform precision measurements on the components and compare parameters with specifications used in automotive workshop practices. (NOS:AGR/N9422)	Measure all dimensions in accordance with standard specifications and tolerances by using precision measuring instruments.
	Measure the parameters related with the vehicle components for its effective operation by matching with manufacturer's specification using different gauges.
3. Use of different types of fastening and locking devices in a vehicle. (NOS:AGR/N9423)	Identify the different type of fasteners and locking devices used in the vehicle.
	Use different types of locking devices correctly.
	Specify the bolt and nut threads.
	Practice on removing the damaged studs and bolts.
4. Use cutting tools in the workshop, following safety precautions while grinding. (NOS:AGR/N9424)	Identify cutting tool materials and their application.
	Plan and grind cutting and marking tools.
	Measure the tool angles with gauges.
5. Use different types of tools and workshop equipment in the workshop. (NOS:AGR/N1126)	Identify the different types of hand and power tools used in the automotive workshop.
	Operate various tools and workshop equipment.
6. Perform basic fitting operations used in the	Mark according to drawing by using marking tools on flat surfaces.

workshop practices and inspection of dimensions. (NOS:AGR/N9425)	Hack saw and file the job using different methods and perform in accordance with the standard specifications and tolerances.
	Drilling and reaming on flat surfaces.
	Identify and use hand tools for internal and external threading with taps and dies.
	Measure all dimensions in accordance with standard specification and tolerances.
7. Produce sheet metal components using various sheet metal operations. (NOS:AGR/N9426)	Ascertain and select tools and materials for the job and make this available for use in a timely manner.
	Plan and organize the work for different types of sheet metal operations.
	Mark according to drawing by using marking tools on flat surfaces.
	Produce components as per the drawing.
8. Construct electrical circuits and test its parameters by using electrical measuring instruments. (NOS:AGR/N9427)	Plan and organize the work for basic electrical operations.
	Select the tools, instruments and materials required to do the job.
	Comply with safety rules when performing the basic electrical operations.
	Perform electrical wire joints, form electrical circuits and test basic electrical parameters as per the circuit drawings and operating procedures.
9. Perform basic electrical testing in a vehicle. (NOS:AGR/N1129)	Plan and organize the work for auto electrical component testing.
	Tracing the auto electrical components in a vehicle.
	Test continuity and voltage drop in the electrical circuits.
	Operate the electrical components in a vehicle and test lamps.
10. Perform battery testing and charging operations. (NOS:AGR/N1129)	Ascertain and select tools and materials for the job.
	Comply with safety rules when performing the following operations.
	Plan and select different methods for charging the battery.
	Perform battery testing as per the operating procedure.

11. Construct basic electronic circuits and testing. (NOS:AGR/N9428)	Plan and select different types of basic electronic components and measuring instruments.
	Construct and test the basic electronic gate circuits and its components as per the standard procedure.
12. Manufacture components with different types of welding processes in the given job. (NOS:AGR/N9429)	Plan and select appropriate method to produce components with welding process.
	Comply with safety rules when performing the above operations.
	Mark according to the drawing using marking tools on the job.
	Select appropriate tools and equipment to perform the above operations.
	Set up and produce component as per standard operating procedure.
13. Inspect the auto component using Non-destructive testing methods. (NOS:AGR/N1126)	Classify different vehicle components by its manufacturing processes
	Ascertain and select tools and equipment to do NDT test the given job.
	Plan and organize the work for nondestructive testing.
	Perform different types of nondestructive tests using appropriate testing equipment.
	Observe safety/precaution during testing the job.
14. Identify the hydraulic and pneumatic components in a vehicle. (NOS:AGR/N1129)	Comply with safety rules when performing the following operations.
	Locate and identify the hydraulic components in a vehicle.
	Locate and identify the pneumatic components in a vehicle.
15. Demonstrate major assemblies of Tractor. (NOS:AGR/N1130)	Ascertain and select tools and materials for the job and make this available for use in a timely manner.
	Identify different gauges fitted on the dashboard and check for proper functioning
	Perform daily checks before starting the engine.
	Start the engine and allow it to warm up.
	Identify the problem in functionality of particular Gauge fitted on dashboard and record the reading and compare it with standard reading.

	Repair / Replace the defective gauges as per standard operating practice.
	Check for proper functionality.
16. Overhaul Diesel Engine of Tractor. (NOS:AGR/N1128)	Ascertain and select tools and materials for the job and make this available for use in a timely manner.
	Plan work in compliance with standard safety norms.
	Demonstrate possible solutions and agree tasks within the team.
	Drain coolant and lubricants from the engine and remove accessories of engine.
	Service cylinder head assembly.
	Service Oil Sump and Oil Pump.
	Service Piston and connecting Rod Assembly.
	Service Flywheel, Crank shaft, camshaft and its Bearings and gear.
	Service cylinder block.
	Check and adjust valve clearances as per procedure and recommended specification.
	Refit all the accessories.
	Refill all the required coolant and lubricants as per standard specification.
	Start the engine and observe reading of dashboard gauges and record Engine Performance.
17. Perform servicing of Cooling and Lubrication system of Tractor in a workshop. (NOS:AGR/N1128)	Check Engine Coolant and Reverse flush the cooling system using flushing solution.
	Service Radiator and radiator cap
	Check Radiator hoses for crack and replace if necessary.
	Test Thermostat valve for proper functioning as per manufacturer specification and replace if necessary.
	Check water pump for serviceability and replace if faulty.
	Check Fan/Alternator Belt for proper tension.
	Check & Replace Engine Oil
	Replace Oil Filter & oil pump
	Service Oil Cooler and pressure relief valve
18. Service Intake and Exhaust	Service/Replace Air Cleaner

	System of Tractor in a workshop.	Overhaul Air Compressor
		Overhaul Exhauster Assembly
		Service Turbo charger/Super charger as per manufacturer specification.
		Service Intercooler.
		Check Exhaust Leakages and Rubber Mounting of Exhaust System.
		Service Exhaust manifold.
		Check and Replace Catalytic Converter.
		Check and Replace Resonator/Muffler.
19.	Service Fuel Feed System of Tractor in a workshop. . (NOS:AGR/N1128)	Tune up Petrol Engine Tractor as per manufacturer specification
		Check leakages in Diesel/Petrol fuel line.
		Service Fuel Tank and fuel filter
		Service Fuel Feed Pump/Petrol Fuel Pump
		Set Diesel Fuel Injection Pump Timing as per manufacturer specification
		Bleed the Fuel System to vent out any air trapped.
		Start the Engine and check for proper functioning as per standard guidelines specified by manufacturer.
20.	Overhaul Clutch and Gearbox of Tractor in a workshop. (NOS:AGR/N1129)	Ascertain and select tools and equipment for the job and make this available for use in a timely manner.
		Plan work in compliance with standard safety norms.
		Adjust clutch pedal free play and check its performance.
		Monitor performance of Clutch and Gearbox by operating vehicle.
		Service Clutch, Gearbox and Driveline of tractor.
		Refit Clutch, Gearbox and Auxiliary Gearbox to the Tractor and check performance as per standard guidelines.
21.	Overhaul Differential and PTO Unit of Tractor in the workshop. (NOS:AGR/N1129)	Ascertain and select tools and equipment for the job and make this available for use in a timely manner.
		Plan work in compliance with standard safety norms.
		Service Differential unit of the tractor
		Service PTO unit of the tractor.

22. Overhauling Steering system of Tractor in the workshop. (NOS:AGR/N1129)	Inspect steering linkages for excessive play.
	Service Steering Gear Box of the Tractor.
	Remove front Axle assembly from the Tractor.
	Repair Front Axle Assembly as per guidelines laid down by manufacturer
	Refit Front Axle Assembly and check for proper functioning as per manufacturer's guidelines.
	Check front and rear suspension for proper functioning and abnormal noise.
	Service front and rear suspension system.
	Refit the front and rear suspension to the tractor and check for proper functioning as per manufacturer's specification.
23. Carryout Repair of Wheels and Tyres of Tractor in the Workshop. (NOS:AGR/N1129)	Check and service Rim, tires and tube and perform repair/replace if necessary.
	Inflate tires as per manufacturer recommended inflation pressure.
24. Overhaul Brake system of Tractor in the workshop. (NOS:AGR/N1129)	Test the brake of tractor for effectiveness.
	Service Brake.
	Remove Hydraulic Brake cylinder.
	Service Hydraulic brake cylinder.
	Bleed the brake system.
25. Overhaul Major Assemblies of Power Tiller and carryout Field Operation. (NOS:AGR/N1108)	Remove major assemblies of Power tiller.
	Dismantle Transmission, clutch and brake
	Clean and Replace/Repair components of Transmission, clutch and brake.
	Assemble Transmission, clutch and brake components.
	Refit the Transmission, clutch and brake to the Power Tiller.
	Carryout field operation of Power tiller without implements.
26. Overhaul Implements of Tractor. (NOS:AGR/N1119)	Check Plough, Harrows, cultivator, seed drill and tractor trailer for proper functioning.
	Carryout Service of Plough, Harrows, cultivator, seed drill and tractor trailer.
	Perform hitching practice (Single& Three Point).
	Adjust agricultural implements for correct functioning during

	field operations.
27. Overhaul Charging and Starting System of Tractor. (NOS:AGR/N1129)	Check Charging system for proper functioning as per manufacturer guidelines.
	Service alternator.
	Refit Alternator to the tractor and check for functioning.
	Check starting system for proper functioning as per manufacturer guidelines.
	Service starter.
	Refit starter to the tractor and check for functioning.
28. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS:AGR/N9451)	Solve different mathematical problems
	Explain concept of basic science related to the field of study
29. Read and apply engineering drawing for different application in the field of work. (NOS:AGR/N9450)	Read & interpret the information on drawings and apply in executing practical work.
	Read & analyze the specification to ascertain the material requirement, tools and assembly/maintenance parameters.
	Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work.
Second Year	
30. Test and rectify faults in functionality of major components and assemblies of Mould Board Plough, Disc Plough and troubleshoot of tillage and its implements. (NOS:AGR/N1119)	Select, care and use of PPE while dismantling and assembling of Mould Board plough.
	Use the tools and equipment in the way specified by manufacturers to dismantle and assemble Mould Board plough.
	Dismantle and assemble Mould Board/disc plough by reviewing technical data of removal and replacement procedures as per.
	Measure and adjust Horizontal & Vertical suction.
	Select and use safety measures while dismantling and assembling of disc plough.
	Measure and adjust disc and tilt angle.

	Identity the common fault and take corrective action for tillage system as per technical manual.
	Use testing methods that comply with the manufacturer's requirements.
	Adjust the unit's components correctly where necessary to ensure that they operate to meet the specified operating requirements.
	Ensure replaced components and assemblies conform to the specified operating specification.
31. Check, test and troubleshoot faults in functionality of major components and assemblies of Chisel Plough and Rotavator. (NOS:AGR/N9430)	Select and use PPE while dismantling and assembling chisel plough.
	Select tools and materials for the job and make this available for use in a timely manner.
	Use the tools and equipment in the way specified by manufacturers to dismantle and assemble chisel plough.
	Dismantle and assemble chisel plough. by reviewing: Technical data removal and replacement procedures.
	Carryout hitching of sub soiler/ chisel plough.
	Use the tools and equipment in the way specified by manufacturers to dismantle and assemble rotavator.
	Dismantle and assemble rotavator by reviewing: Technical data for removal and replacement procedures complying.
	Carry out workshop adjustments of rotavator
	Identify the common fault and take corrective action for rotavator system as per technical manual
	Adjust the unit's components correctly where necessary to ensure that they operate to meet the specified operating requirements.
32. Troubleshoot & Test the functionality of major components and assemblies of disc harrows (Off set Type/ Double action and single action) and Power harrows. (NOS:AGR/N1119)	Use PPE, tools and equipment as per manufacturer's specified way while dismantling and assembling of disc harrows.
	Dismantle and assemble disc harrows.
	Measure and adjust gang angle.
	Perform Depth adjustment and side deflector.
	Identity the common fault and take corrective action for harrows system as per technical manual.
	Adjust the units components correctly where necessary to

	ensure that they operate to meet the specified operating requirements.
	Ensure replaced components and assemblies conform to the specified operating specification.
33. Check and service proper functionality of major components and assemblies of cultivators and soil forming equipments. (NOS:AGR/N1119)	Select and use PPE while dismantling and assembling of cultivators.
	Select tools and materials for the job and make this available for use in a timely manner.
	Use the tools and equipment in the way specified by manufacturers to dismantle and assembles cultivators.
	Dismantle and assemble cultivator by reviewing: Technical data for removal and replacement procedures.
	Carryout setting of cultivator as per flow diagram.
	Identity the common fault and take corrective action for cultivator system as per technical manual
	Ensure replaced components and assemblies conform to the specified operating specification.
	Dismantle and assemble levelers, scrapers/ blade terracer, ditchers and bund formers/dozer/dumper by reviewing technical data removal and replacement procedures.
	Carryout servicing of post hole digger as per technical manual.
34. Identify and check functionality of major components and assemblies of Lazar leveller, trencher & post hole digger. (NOS:AGR/N9431)	Use PPE while dismantling and assembling of Lazar leveler, trencher & post hole digger.
	Select tools and materials for the job and make this available for use in a timely manner
	Use the tools and equipment in the way specified by manufacturers to Dismantle and assembles of Lazar leveler, trencher & post hole digger.
	Dismantle and assemble Lazar leveler, trencher & post hole digger by reviewing technical data removal and replacement procedures.
35. Dismantle, assemble and troubleshoot seed drills. (NOS:AGR/N9432)	Use the tools and equipment in the way specified by manufacturers to Dismantle and assembles of seed drills
	Carryout their Dismantling and assembling of seed drills by reviewing technical data removal and replacement procedures.

	Carryout Calibration of seed & fertilizer rates.
	Carryout Workshop adjustments of special drills such as zero till strip drill/rotto drill & Happy seeder.
	Identity the common fault and take corrective action for seed drills as per technical manual.
36. Test and verify functions of major components and assemblies of planters and fertilizer applicators. (NOS:AGR/N9433)	Select and use PPE while dismantling and assembling of planters.
	Select tools and materials for the job and make this available for use in a timely manner
	Use the tools and equipment in the way specified by manufacturers to dismantle and assembles of planters
	Carryout dismantling and assembling of planters by reviewing technical data for removal and replacement procedures.
	Set planter with different seed plates &adjust for planting.
	Carryout vegetable trans planter adjustments.
	Carryout raising bed and adjustments of paddy trans planter.
	Dismantle and assemble fertilizer applicators by reviewing given technical data parameters.
	Carryout calibration of fertilizer applicators.
37. Identify and check functionality of major components and assemblies of volute type centrifugal pump and submersible pump. (NOS:AGR/N1114)	Use PPE while dismantling and assembling of volute type centrifugal pump.
	Select tools and materials for the job and make this available for use in a timely manner
	Use the tools and equipment in the way specified by manufacturers to dismantle and assembles volute type centrifugal pump.
	Dismantle and assemble volute type centrifugal pump by reviewing technical data for removal and replacement procedures.
	Carryout adjustments process of centrifugal pump.
	Measure discharge of water.
38. Service irrigation valves and hydrants. (NOS:AGR/N1006)	Use PPE while servicing of irrigation valves and hydrants.
	Select tools and materials for the job and make this available for use in a timely manner
	Use the tools and equipment in the way specified by

	manufacturers' servicing of irrigation valves and hydrants.
	Carryout installation of sprinkler, fogger, pop-up and dippers by reviewing technical data removal and replacement procedures.
	Carryout Field operation & adjustment (angular/ full circle).
39. Service and Trouble shoot power tillers/power weeder. (NOS:AGR/N1111)	Use PPE while servicing of Power tiller/power weeder.
	Use the tools and equipment in the way specified by manufacturers to Servicing of Power tiller/power weeder.
	Carryout Field operation with different attachments and adjustments by reviewing technical data for removal and replacement procedures.
	Identity the common fault and take corrective action for power tillers/power weeder as per technical manual.
40. Identify and check functionality of grain handling seed treating and drying and troubleshoot major components and assemblies of AC motors. (NOS:AGR/N9434)	Use PPE while dismantling and assembling of cultivator.
	Select tools and materials for the job and make this available for use in a timely manner.
	Use the tools and equipment in the way specified bymanufacturers to dismantle and assembles of cultivator.
	Carryout their Dismantling and assembling of cultivator by reviewing technical data for removal and replacement procedures.
	Carryout Adjustment of the cultivator with the help of flow diagrams.
	To carryout Setting of shovels and sweeps.
41. Identify and trouble shoot faults in major components and assemblies of sprayers & dusters. (NOS:AGR/N9435)	Select and use PPE while dismantling and assembling of Sprayers & dusters.
	Select tools and materials for the job and make this available for use in a timely manner
	Use the tools and equipment in the way specified by manufacturers to dismantle and assemble sprayers & dusters.
	Carryout their Dismantling and assembling sprayers & dusters by reviewing technical data removal and replacement procedures.
	Carryout Calibration of sprayers and dusters
	Carryout Field adjustment and operation of sprayers and

	dusters
	Identity the common fault and take corrective action for sprayers & dusters as per technical manual.
	Follow the safety procedure while handling insecticides and pesticides
	Conduct appropriate and target oriented discussions with higher authority and within the team, where a replacement is uneconomic or unsatisfactory to perform
	Use testing methods that comply with the manufacturers requirements.
	Adjust the units components correctly where necessary to ensure that they operate to meet the specified operating requirements.
42. Detect and troubleshoot major components and assemblies of reaper, reaper winder, straw-reapers. (NOS:AGR/N9436)	Use PPE while dismantling and assembling of reaper, reaper winder, straw-reapers
	Use the tools and equipment in the way specified by manufacturers to dismantle and assembles of reaper, reaper winder, straw-reapers as per given technical data.
	Carryout Field adjustment and operation of reaper, reaper winder, straw-reapers
	Identity the common fault and take corrective action for reaper, reaper winder, straw-reapers as per technical manual.
	Conduct appropriate and target oriented discussions with higher authority and within the team, where replacement is uneconomic or unsatisfactory to perform.
	Use testing methods that comply with the manufacturer's requirements.
	Adjust the unit's components correctly where necessary to ensure that they operate to meet the specified operating requirements.
43. Troubleshoot the faults in functionality of major components and assemblies of Thresher, Maize seller, Groundnut decorticator.	Demonstrate care and use of PPE while dismantling and assembling of Thresher, Maize seller, Ground nut decorticator
	Select tools and materials for the job and make this available for use in a timely manner
	Dismantle and assemble Thresher, Maize seller, Ground nut decorticator by reviewing the technical data as per removal

(NOS:AGR/N9437)	and replacement procedures complying.
	Carryout Field adjustment and operation of Thresher, Maize seller, Ground nut decorticator
	Identity the common fault and take corrective action for Thresher, Maize seller, Ground nut decorticator as per technical manual.
44. Identify and check functionality of major components and assemblies of combine harvester- cutter bar assembly, feeder unit, threshing unit, separating unit. (NOS:AGR/N1105)	Demonstrate care and use of PPE while dismantling and assembling of combine harvester- cutter bar assembly, feeder unit, threshing unit, separating unit.
	Select tools and materials for the job and make this available for use in a timely manner
	Use the tools and equipment in the way specified by manufacturers to dismantle and assemble of combine harvester- cutter bar assembly, feeder unit, threshing unit.
	Carryout dismantling and assembling of combine harvester-cutter bar assembly, feeder unit, threshing unit, separating unit as per given technical data.
	Carryout workshop adjustment for combine harvester.
	Compute grain loses.
45. Test and troubleshoot functionality of major components and assemblies of mower, folder harvester, power chaff/silage cutter. (NOS:AGR/N9438)	Use PPE while dismantling and assembling of mower, folder harvester, power chaff/silage cutter.
	Use the tools and equipment in the way specified by manufacturers to Dismantle and assembles of power, folder harvester, power chaff/silage cutter.
	Carryout dismantling and assembling of mower, folder harvester, power chaff/silage cutter by reviewing the technical data.
	Carryout Field operation and workshop adjustment for mower, folder harvester, power chaff/silage cutter
	Identity the common fault and take corrective action for mower, folder harvester, power chaff/silage cutter.
	Adjust the units components correctly where necessary to ensure that they operate to meet the specified operating requirements.
	Identity the common fault and take corrective action for rotary harvester, hay bailer as per technical manual.

46. Detect and rectify functionality of major components and assemblies of rotary harvester, hay bailer. (NOS:AGR/N9439)	Select and use PPE dismantling and assembling of rotary harvester, hay bailer.
	Select tools and materials for the job and make this available for use in a timely manner.
	Use the tools and equipment in the way specified by manufacturers to Dismantle and assembles rotary harvester, haybailer.
	Dismantle and assemble rotary harvester, haybailer as per the technical data for removal and replacement procedures.
	Carryout Field operation and workshop adjustment forrotary harvester, hay bailer.
47. Find and troubleshoot major components and assemblies of groundnut digger, potato / onion digger. (NOS:AGR/N9440)	Demonstrate care and use of PPE while dismantling and assembling of groundnut digger, hay bailer, potato /onion digger.
	Select tools and materials for the job and make this available for use in a timely manner
	Use the tools and equipment in the way specified by manufacturers to dismantle and assembles groundnut digger, haybailer, potato / onion digger
	Carryout dismantling and assembling of groundnut digger, hay bailer, potato /onion diggerby reviewing technical data of removal and replacement procedures.
	Carryout Field operation and workshop adjustment for groundnut digger, hay bailer, potato / onion digger.
	Identity the common fault and take corrective action for groundnut digger, hay bailer, potato / onion digger as per technical manual.
48. Service and troubleshoot winnower, cleaner & grader. (NOS:AGR/N9441)	Demonstrate care and use of PPE while servicing of winnower, cleaner & grader.
	Use the tools and equipment in the way specified by manufacturers to service winnower, cleaner & grader.
	Carryout their adjustments of winnower, cleaner & grader by reviewing technical data for removal and replacement procedures.
	Carryout Field operation and workshop adjustment for

	winnower, cleaner & grader.
	Identity the common fault and take corrective action for winnower, cleaner & grader as per technical manual.
49. Maintain and service rice huller, polisher, feed grinder-cum-mixer, hammer mill. (NOS:AGR/N9442)	Select and use PPE while servicing of rice huller, polisher, feed grinder-cum-mixer, hammer mill.
	Select tools and materials for the job and make this available for use in a timely manner
	Carryout their adjustments of rice huller, polisher, feed grinder- cum-mixer, hammer mill by reviewing technical data removal and replacement procedures.
	Carryout operation of rice huller, polisher, feed grinder-cum-mixer, hammer mill.
50. Detect and rectify functionality of grain handling seed treating and drying equipment. (NOS:AGR/N9443)	Identity the common fault and take corrective action for rice huller, polisher, feed grinder-cum-mixer, hammer mill as per technical manual.
	Adjust the unit's components correctly where necessary to ensure that they operate to meet the specified operating requirements.
51. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS:AGR/N9451)	Solve different mathematical problems
	Explain concept of basic science related to the field of study
52. Read and apply engineering drawing for different application in the field of work. (NOS:AGR/N9450)	Read & interpret the information on drawings and apply in executing practical work.
	Read & analyze the specification to ascertain the material requirement, tools and assembly/maintenance parameters.
	Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work.

SYLLABUS – MECHANIC AGRICULTURAL MACHINERY			
FIRST YEAR			
Duration	**Reference Learning Outcome**	**Professional Skills (Trade Practical) With Indicative Hours**	**Professional Knowledge (Trade Theory)**
Professional Skill 76 Hrs.; Professional Knowledge 14 Hrs.	Make choices tocarry out marking of the components for basic fittingoperations in theworkshop followingsafety precautions. (NOS:AGR/N9421)	1. Familiarization with institute, Job opportunities in the automobile sector, Machinery used in Trade. (07 hrs.) 2. Types of work done by thestudents in the shop floor. (08 hrs.) 3. Practical related to Safety and Health, Importance of maintenance and cleanliness of Workshop. (03 hrs.) 4. Interaction with health centre and fire service station to provide demo on First aid and Fire safety,Use of fire extinguishers. (02 hrs.) 5. Demonstration on safe handling and Periodic testing of lifting equipment, and Safety disposal of used engine oil. (02 hrs.)	**Admission & introduction to the trade:** Introduction to the Course duration, course content,study of the syllabus. General rule pertaining to the Institute, facilities available-Hostel, Recreation, Medical and Library working hours and timetable. **Occupational Safety & Health** Importance of Safetyand general Precautions to be observed in the shop. Basic first aid, safety signs - for Danger, Warning, caution & personal safety message. Safehandling of Fuel Spillage, Fire extinguishers used fordifferent types of fire. Safe disposal of toxic dust, safe handling and Periodic testing of lifting equipment, Authorization of Moving&road-testing vehicles. Safety disposal of Usedengine oil, Electrical safety tips. (04 Hrs.)
		6. Practice using all markingaids, like steel rule with spring calipers, dividers,	**Hand & Power Tools: -** Marking scheme, Marking material-chalk, Prussian blue. Cleaning tools-Scraper, wire brush, Emery

		scriber, punches, Chisel etc. (11 hrs.) 7. Layout a work piece- for line, circle, arcs and circles. (10 hrs.) 8. Practice to measure a wheelbase of a vehicle with measuring tape. (10 hrs.) 9. Practice to measure valve spring tension using springtension tester Practice to remove wheel lug nuts with use of an air impact wrench Practice onGeneral workshop tools & power tools. (23 hrs.)	paper, Description, care and use of Surface plates, steel rule, measuring tape, try square. Calipers-inside and outside. Dividers, surface gauges, scriber, punches-prick punch, center punch, pin punch, hollow punch, number and letter punch. Chisel-flat, crosscut. Hammer-ball peen, lump, mallet. Screw drivers- blade screwdriver, Phillips screw driver Ratchet screwdriver. Allen key, bench vice & C-clamps, Spanners- ring spanner, open end spanner & the combination spanner, universal adjustable open end spanner. Sockets & accessories, Pliers-Combination pliers, multigrip, long nose, flat-nose,Nippers or pincer pliers, Sidecutters, Tin snips, Circlippliers, external circlips pliers. Air impact wrench, airratchet, wrenches-Torquewrenches, pipe wrenches, car jet washers Pipe flaring & cutting tool, pullers-Gear and bearing. (10 hrs.)
Professional Skill 56 Hrs.; Professional Knowledge 15 Hrs.	Perform precision measurements on the components in automotiveworkshop practices. (NOS:AGR/N9422)	10. Practice on measuring the various components using precision instruments Vernier Caliper, Micrometer, Dial Bore Gauge, Telescopic Gauge, Feeler Gauge, Pressure Gauge, Dial Test Indicator by given Job. (56hrs)	**Systems of measurement,** Description, care & use of - Micrometers- Outside and depth micrometer, Micrometer adjustments, Vernier calipers, Telescope gauges, Dial bore gauges, Dial indicators, straightedge,feeler gauge, thread pitch gauge, vacuum gauge, tire pressure

			gauge. (15 hrs.)
Professional Skill 14 Hrs.; Professional Knowledge 05 Hrs.	Use different types of fastening andlocking devices in a vehicle. (NOS:AGR/N9423)	11. Practice on General cleaning, checking and useof nut, bolts, & studs etc. (7 hrs.) 12. Removal of stud/bolt fromblind hole. (7 hrs.)	**Fasteners-** Study of different types of screws, nuts, studs & bolts, locking devices, such as lock nuts, cotter, split pins, keys, circlips, lock rings, lock washers and locating where they are used. Washers &chemical compounds can beused to help secure thesefasteners. Function of Gaskets, Selection of materials for gaskets and packing, oil seals. (05 Hrs.)
Professional Skill 14 Hrs.; Professional Knowledge 05 Hrs.	Use cutting tools in the workshop, following safety precautions while grinding. (NOS:AGR/N9424)	13. Practice on cutting tools like Hacksaw, file, chisel, Sharpening of Chisels, center punch, safety precautions while grinding. (7 hrs.) 14. Practice on Hacksawing and filing to given dimensions. (7 hrs.)	**Cutting tools** :- Study of different type of cutting tools like Hacksaw, File- Definition, parts of a file, specification, Grade, shape, different type of cut and uses., OFF-hand grinding with sander, bench and pedestal grinders, safety precautions while grinding. (05 Hrs.)
Professional Skill 14 Hrs.; Professional Knowledge 05 Hrs.	Use different types of tools and workshop equipment in the workshop. (NOS:AGR/N1126)	15. Practice on Marking and Drilling clear and Blind Holes, Sharpening of Twist Drills Safety precautions to be observed while using a drilling machine. (14 hrs.)	**Limits, Fits &Tolerances:** - Definition of limits, fits & tolerances with examplesused in auto components. **Drilling machine** - Description and study of Bench type Drilling machine, Portable electrical Drilling machine,drill holding devices, WorkHolding devices, Drill bits. (05 Hrs.)
Professional Skill 14 Hrs.; Professional Knowledge 05 Hrs.	Perform basic fitting operations used in the workshop practices and inspection of dimensions.	16. Practice on Tapping a Clear and Blind Hole, Selection of tape drill Size, use of Lubrication, Use of stud extractor. (6 hrs.)	**Taps and Dies:** Hand Taps and wrenches, Calculation of Tap drill sizes for metric and inch taps. Different type of Die and Die stock. Screw extractors. **Hand Reamers** - Different Type

	(NOS:AGR/N9425)	17. Cutting Threads on a Bolt/ Stud. (2 hrs.) 18. Adjustment of two - piece Die, reaming a hole/ Bush to suit the given pin/ shaft, scraping a given machined surface. (6 hrs.)	of hand reamers, Drill size for reaming, Lapping, Lapping abrasives, type of Laps. (05 Hrs.)
Professional Skill 7 Hrs.; Professional Knowledge 01 Hrs.	Produce sheetmetal componentsusing various sheet metal operations. (NOS:AGR/N9426)	19. Brazing of Pipes. (7 hrs.)	Brazing. fluxes used on common joints. (1 hrs.)
Professional Skill 14 Hrs.; Professional Knowledge 07 Hrs.	Construct electrical circuits and test its parameters by using electrical measuring instruments. (NOS:AGR/N9427)	19. Practice in joining wires using soldering Iron, Construction of simple electrical circuits, measuring of current, voltage and resistance using digital multimeter,practice continuity test for fuses, jumper wires, fusible links, circuit breakers. (14 hrs.)	**Basic electricity,** Ground connections, Mulitmeter, Conductors & insulators, Wires, Shielding,Length vs. resistance, Resistorratings. (07 Hrs.)
Professional Skill 14 Hrs.; Professional Knowledge 03 Hrs.	Perform basic electrical testing in a vehicle. (NOS:AGR/N1129)	20. Diagnose series, parallel, series-parallel circuits using Ohm's law, check electrical circuit with a testlamp, perform voltagedrop test in circuits using multimeter, measure current flow using multimeter/ammeter, useof service manual wiring diagram for	Fuses & circuit breakers, Ballast resistor, Stripping wire insulation, cable colour codes and sizes, Resistors in Series circuits, Parallel circuits and Series-parallel circuits, Capacitors and its applications, Capacitors in series and parallel. (03Hrs.)

		Troubles hooting. (14 hrs.)	
Professional Skill 28 Hrs.; Professional Knowledge 03 Hrs.	Perform battery testing and charging operations. (NOS:AGR/N1129)	21. Cleaning and topping up ofa lead acid battery, Testingbattery with hydrometer,connecting battery to acharger for batterycharging, Inspecting &testing a battery aftercharging, Measure and Diagnose the cause(s) of excessive Key-off battery drain (parasitic draw) and do corrective action. (16 hrs.) 22. Testing of relay and solenoids and its circuit. (12 hrs.)	Description of Batteries & cells, Leadacid batteries & Stay Maintenance Free (SMF) batteries, Thermisters, Thermo couples, Relays, Solenoids, Charging system circuit (03 Hrs.)
Professional Skill 14 Hrs.; Professional Knowledge 05 Hrs.	Construct basic electronic circuits and testing. (NOS:AGR/N9428)	23. Identify and test power and signal connectors forcontinuity, Identify andtest different type of Diodes, NPN & PNP Transistors for its functionality, Construct and test simple logic circuits OR, AND & NOT and Logic gates using switches. (14 hrs.)	**Basic electronics:** Description of Semiconductors, Solid state devices- Diodes, Transistors, Thyristors, UniJunction Transistors (UJT), Metal Oxide Field Effect Transistors (MOSFETs), Logic gates-OR, AND & NOT and Logic gates using switches.(05 Hrs.)
Professional Skill 14 Hrs.; Professional Knowledge 3 Hrs.	Manufacture components with different types of welding processes in the given job. (NOS:AGR/N9429)	24. Setting of Gas welding flames, practice to make a straight beads and joints Oxy- Acetylene welding (14 hrs.)	**Introduction to welding and Heat Treatment Welding processes** - Oxy – Acetylene welding-principles, equipment, welding parameters, edge preparation & fit up and welding techniques. (3 Hrs.)
Professional Skill 56 Hrs.;	Identify the hydraulic and	25. Identification of Hydraulic components	**Introduction to Hydraulics & Pneumatics: -**

Professional Knowledge 6 Hrs.	pneumatic components in a vehicle. (NOS:AGR/N1129)	used invehicle. (13 hrs.) 26. Tracing of hydraulic circuiton hydraulic jack, hydraulic power steering,and Brake circuit. (15 hrs.) 27. Identification of different type of Vehicle. (6 hrs.) 28. Demonstration of vehicle specification data; Identification of vehicleinformation Number (VIN).(11 hrs.) 29. Demonstration of Garage,Service station equipments. -Vehicle hoists - Two post and fourpost hoist, Engine hoists,Jacks, Stands. (11 hrs.)	Definition of Pascal law, pressure, Force, viscosity. Description, symbols and application in automobile of Gear Pump-Internal &External, single acting, doubleacting & Double ended cylinder; Directional controlvalves-2/2, 3/2, 4/2, 4/3 way valve, Pressure relief valve, Non return valve, Flow control valve used in automobile. (03 Hrs.) Auto Industry - History,leading manufacturers,development in automobileindustry, trends, newproduct. Brief about Ministry of Road transport & Highways, Definition: - Classification of vehicles on the basis of load as per central motor vehiclerule, wheels, final drive, and fuel used, axles, position of engine and steering transmission, body and load. Brief description and uses of Vehicle hoists - Two post and four post hoist, Engine hoists, Jacks, Stands. (03 Hrs.)
Professional Skill 56 Hrs.; Professional Knowledge 6 Hrs.	Demonstrate Major Assemblies of different types of Tractor. (NOS:AGR/N1130)	30. Demonstration of tractor specification data. (5 hrs.) 31. Identification of different major assembliesof tractor and cleaning of tractors, oil greasing and lubricating all moving parts of tractor. (12 hrs.)	Tractor Industry in India – leading manufacturers, development in Tractorindustry, trends, newproduct. Study of tractors, Different type of Tractor starting method and stopping. (01 Hrs.)

		32. Practice on starting and stopping of tractor engine.(12 hrs.)	
		33. Dismantling of tractor engine as per procedure &Inspection ofcomponents for dimensionand wear. (27 hrs.)	**Engine Basics:** Classification of engines, Principle & working of 2 & 4 stroke diesel engine (Compression ignition Engine (C.I), Principle of Spark Ignition Engine (SI), differentiate between 2-stroke and 4 stroke, C.I engine and S.I Engine, Direct injection and Indirect injection. Brief on common rail diesel injection engine. Engine output, compression pressure**,** Compression ratio. (05 Hrs.)
Professional Skill 77 Hrs.; Professional Knowledge 16 Hrs.	Overhaul Diesel Engine of Tractor. (NOS:AGR/N1128)	34. Remove cylinder head from engine. (5 hrs.) 35. Overhauling of cylinder head assembly with use of service manual for clearance and other parameters. (11 hrs.) 36. Practice on removing rocker arm assembly manifolds, fitting of valve guide. (11 hrs.)	**Engine Components -** Working principle & construction of cylinder heads, types of combustion chambers. Function of Engine Valves, different types, materials, Type of valve operating mechanism. Importance of Valve seats & inserts, importance of Valve movement, Valve stem, oil seals, Valve-timing diagram and concept of Variable valve timing. (04 Hrs.)
		37. Cylinder block overhaul. (5 hrs.) 38. Measurement of cylinder liner & crankshaft for ovality and taperness. (5 hrs.) 39. Overhauling piston and connecting rod assembly with use of service manualfor clearance and other parameters. (10 hrs.)	**Description of Cylinder block, Cylinder block construction,** types of cylinder blocks & cylinder liners. Description & functions of different types of pistons, piston rings and piston pins and materials. Used recommended clearances for the rings andits necessity precautionswhile fitting rings, common troubles and remedy. (06 Hrs.)

		40. Practice on removing oil sump and oil pump - clean the sump. (5 hrs.)	
		41. Practice on removing thebig end bearing, connecting rod with the piston. (2 hrs.) 42. Practice on removing thepiston rings, Dismantle thepiston and connecting rod.(5 hrs.) 43. Check the side clearance of piston rings in the piston groove & lands for wear. (3hrs.) 44. Check piston skirt and crown for damage and scuffing, clean oil holes. Measure -the piston ring close gap in the cylinder,clearance between the piston and the liner,clearance between crank pin and the connecting rodbig end bearing. (2 hrs.) 45. Check connecting rod forbend and twist. (3 hrs.) 46. Setting of Connecting rod big end & main bearing. (2 hrs.) 47. Assembling crank shaft, main bearings, connecting rods and piston assembly in the engine, fittingcylinder	Description & function of connecting rod, importanceof big end split obliquely, Materials used for connectingrods big end & main bearings.Shells piston pins and locking methods of piston pins.Recommended clearances for the cylinder liners & rings. Bearing failure & its causes-care & maintenance. Description of crankshaft & Camshafts. Types of their drives. Description ofOverhead camshaft,importance of Cam lobes. Crankcase ventilation (PCV). Camshaft, Crank-shaft balancing, Firing order of the engine. Description and function of the fly wheel and vibration damper. Timing mark. (06 Hrs.)

		head. (5 hrs.) 48. Setting valve timing. (3 hrs.)	
Professional Skill 56 Hrs.; Professional Knowledge 6 Hrs.	Perform servicing of Cooling and Lubrication system of Tractor in a workshop. (NOS:AGR/N1128)	49. Checking coolingsystem for overheating / under-cooling. (6 hrs.) 50. Dismantling, cleaning, assembling & testing of water pumps, reverse flushing the system. (11 hrs.) 51. Checking of thermostat valve, pressure cap. (6 hrs.) 52. Adjusting the fan belt tension. (5 hrs.)	**Cooling systems: -**Purpose, types, Heat transfer method, effect of boiling point & pressure, coolant properties, preparation andrecommended change of interval, use of anti-freezer. **Cooling system components,** water pump, function of thermostat, pressure cap, Recovery system & Thermo-switch. Function & types of Radiator. (03 Hrs.)
		53. Identification of lubrication oil flow circuit in an engine. (6 hrs.) 54. Overhauling oil pump, servicing of oil cooler & centrifugal oil filter. (11 hrs.) 55. Testing oil pressure. (11 hrs.)	**Lubrication system:** -purposes & characteristics of oil, type of lubricants, gradeas per SAE, & their application, oil additives, typeof lubrication system. Lubrication systemcomponents-different type ofOil pump, Oil filters & oilcooler. Probable reasons forlow / high oil pressure, highoil consumption and their remedies. (03 Hrs.)
Professional Skill 28 Hrs.; Professional Knowledge 04 Hrs.	Service Intake and Exhaust System of Tractor in a workshop. (NOS:AGR/N1128)	56. Servicing of air cleaner (Oilbath) Checking & changingan air filter. (5 hrs.) 57. Dismantling & assemblingof turbocharger, check for axial clearance as per service manual. (6 hrs.) 58. Checking of Exhaust Gas Recirculation. (5 hrs.)	**Intake & exhaust systems** - Description of Diesel induction & Exhaust systems. Description & function of air compressor, Supercharger, Intercoolers, turbocharger, variable turbo charger mechanism. **Intake system components-** Description and function of Air cleaners, Different type air cleaner, Description **of** Intake manifolds and material. **Exhaust**

		59. Check Exhaust system forrubber mounting for damage, deterioration and out of position; for leakage, loose connection,dent and damage; Practiceon Exhaust mani fold removal and installation. (6 hrs.) 60. Practice on Catalytic converter removal and installation. (6 hrs.)	**system components-**Description and function of Exhaust manifold, Exhaust pipe, Mufflers- Reactive,absorptive, Combination, Electronic mufflers, Catalytic converters, Backpressure, Diesel particulate filter,Exhaust Gas Recirculation (EGR). (04Hrs.)
Professional Skill 56 Hrs.; Professional Knowledge 7 Hrs.	Service Fuel Feed System of Tractor in a workshop. (NOS:AGR/N1128)	61. Practice in engine tune up in a vehicle -testing vacuum and compressionof engine, (6 hrs.) 62. Tracing of different partsof fuel system. (5 hrs.) 63. Repairing fuel leaks in pipeline and unions, Servicingand testing of fuel feed pump. Servicing of fuel filters. Servicing of fuel Injection Pump. (8 hrs.) 64. Servicing of pressure pump of (C.R.D.I.). (7 hrs.) 65. Regulator's and Elect/Electronic injectors,checking operation of C.R.D.I. system.Overhauling & testing of injectors. (8 hrs.) 66. Setting injection timing.	Diesel fuel characteristics, concept of Quiet diesel technology & Clean diesel technology, Fuel feed system used in Tractor's descriptionand layout. Diesel fuel system components, Description and function of Diesel fuel injection system, types of fuelinjection pumps, type of drive, injectors-types andfunction. Governor and their types. Distributor-type injection pump, Glow plugs, Cummins & Detroit Diesel injection. Diesel electronic control- Diesel electronic control systems (DEC),Common rail diesel injectionSystem. Method of bleeding fuel supply system. (7 hrs.)

		Bleeding fuel lines for Air locks. (8 hrs.) 67. Testing cylinder compression, checking idlespeed, Obtaining & interpreting scan tool data. (7 hrs.) 68. Fault finding & remedy,care & maintenance. (7 hrs.)	
Professional Skill 28 Hrs.; Professional Knowledge 05 Hrs.	Overhaul Clutch and Gearbox of Tractor in a workshop. (NOS:AGR/N1129)	69. Dismantle clutch assembly. (4 hrs.) 70. Inspect the parts of clutch. (2 hrs.) 71. Relining of clutch plate & assemble. (3 hrs.) 72. Coupling the clutch with fly wheel & join the engine with gear box. (5 hrs.) 73. Adjust clutch pedal free play. Dismantle gear box of a tractor & inspect the parts. (5 hrs.) 74. Assemble the gear box. (5 hrs.) 75. Overhauling Transfer case and auxiliary gear box. (4 hrs.)	**Clutch**: -types, construction and function. Components of clutch - driver & driven plates, torsion spring, cushion springs, operating fingers, clutch shaft, Slave cylinder & oil seal. Clutch release bearing & linkages. **Manual transmissions-** Function, description, typesand their application. Gear box layout. Components of tractor gear box. Principle of epicyclical gear box. Necessity of torque convertor, need of 4 x 4 wheel drive / Front wheel drive, Low & high gear ratio, universal joint and propellershaft. (05 Hrs.)
Professional Skill 28 Hrs.; Professional Knowledge 07 Hrs.	Overhaul Differential and PTO Unit of Tractorin the workshop. (NOS:AGR/N1129)	76. Overhauling of differential. (7 hrs.) 77. Servicing of reduction gear, rear axle wheel hub. (10 hrs.) 78. Servicing of PTO (Power Take Off). Measure rpm of PTO shaft & speed of belt pulley. (11 hrs.)	**Final Drive & Drive Shafts** Differential carriers double reduction gearing, differential lock, crown wheel and pinion adjustments, function and types of power take off (PTO) mechanism. Types of front & rear axles. Common trouble and their remedies, care and

			maintenance. (07 Hrs.)
Professional Skill 56 Hrs.; Professional Knowledge 09 Hrs.	Overhaul Steering System of Tractor in the workshop. (NOS:AGR/N1129)	79. Checking, Layout of Mechanical steering system. Checking/ Inspection ofSteering linkage andnecessary repair. (6 hrs.) 80. Remove steering wheel. Overhauling of steering gear box of tractor. (6 hrs.) 81. Remove front axle and spindle hub and steering linkage. (6 hrs.) 82. Reassembling steering assembly and Test for correct function. (6 hrs.) 83. Checking, inspect layout of different parts of Hydraulic steering system. (11 hrs.) 84. Practice on visual Inspection of chassis frame for crack, bent and twists. (6 hrs.) 85. Overhauling and Inspection of shackle, front & rear suspension. (10 hrs.) 86. Lubricating a suspension system. (5 hrs.)	**Steering Systems-** Function and types of steering system. Description, construction and function of mechanical steering system steering wheel, steering gear box, tie-rod, arms link, ball and socket joints etc. their movement and adjustment. Description and mechanismof foot steerage pedal as incorporated in tractors. Description, working and principle of hydraulic steering system. Different parts such as pump, distributor valves, pipe line and hoses etc Development of mechanicalframing. Use of Power tiller,Tractor & Bulldozer, Chassis frame of tractor. (9 hrs.)
Professional Skill 28 Hrs.; Professional Knowledge 05 Hrs.	Carryout Repair of Wheels and Tyres of Tractor in the Workshop. (NOS:AGR/N1129)	87. Remove wheels from tractor. (4 hrs.) 88. Dismantle wheel for checking rims, tyres for wear and tubes for leaks. (5 hrs.) 89. Repairing, de-rusting,	**Wheels & Tyres-** Description, construction and function of Wheel. Rim sizes. Types & sizes of tyres. Solid, pneumatic & Radial. Ply rating. Tyre materials, Hysteresis & designations, Tyre information,

		painting. (5 hrs.) 90. Fitting of tyres and tubes on rim & inflate to correct pressure. (5 hrs.) 91. Balancing of Tractor wheels. Practice of tyre rotation. Fitting wheels on tractors. Tightening ofwheel in correct sequence.(5 hrs.) 92. Checking & adjusting tire pressure by use of air orby Nitrogen. (4 hrs.)	Tyre treaddesigns, Tyre ratings for temperature & traction. Importance of in-Flatting tyres to correct pressure.Repair and maintenance of tyres and tubes. Storage of tyres. Descriptions TirewearPatterns and causes Nitrogen vs atmospheric air in tyres. (05 Hrs.)
Professional Skill 28 Hrs.; Professional Knowledge 09 Hrs.	Overhaul Brake system of Tractorin the workshop. (NOS:AGR/N1129)	93. Overhauling brakes including cleaning and inspection of all components, relining shoes, setting and actuating shoe clearance. (6 hrs.) 94. Inspection spring of bothshoe and lever. (5 hrs.) 95. Inspecting and setting parking brakes. (5 hrs.) 96. Inspecting and setting hydraulic main brake including replacement of washer and oil seals. (4 hrs.) 97. Overhauling serve mechanism (as applicable) inspecting piston andvalves. (2 hrs.) 98. Bleeding and adjustment of brakes.	**Braking Systems -** Braking fundamentals Principles of braking, Drum & disc brakes, Lever/mechanical advantage, Hydraulic pressure & force, Brake fade. **Braking systems** - Brake type used on tractor -principles, Air brakes, **Braking system components**- Park brake system, Brake pedal, Brake lines, Brake fluid, Bleeding, Master cylinder, Divided systems, Tandemmaster cylinder, Powerbooster or brake unit,Hydraulic brake booster, Applying brakes, Brake force, Brake light switch **Drum brakes & components** - Drum brake system, Drum brake operation, Brake linings& shoes, Backing plate, Wheelcylinders Disc brakes & components-Disc brakesystem, Disc brake

		(2 hrs.) 99. Fault tracing and remedy. (2 hrs.) 100. Skimming of brake drumand disc plate. (2 hrs.)	operation, Disc brake rotors, Disc brake pads, Disc brake calipers, Proportioning valves, Proportioning valveoperation, Brake friction materials. (9 hrs.)
Professional Skill 21 Hrs.; Professional Knowledge 04 Hrs.	Overhaul Major Assemblies of Power Tiller andcarryout Field Operation. (NOS:AGR/N1108)	101. Overhauling power tiller transmission systemincludes main clutches, steering clutch/brakes mechanism-gear box and wheel hub testing for field operation withoutimplements and withimplements. (13 hrs.) 102. Driving practice with trolley/trailer. (8 hrs.)	Description, working principle& use of power tiller (two wheel tractor) power unit. Method of powertransmission to wheel from engine. Main clutch assembling working procedure steering Clutch/brakes mechanism method of power transmission to implement (Rotation), irrigation pump, thresher. Hitching of M.B. Plough, trailer disc harrow. (04 Hrs.)
Professional Skill 15 Hrs.; Professional Knowledge 06 Hrs.	Overhaul Implements of Tractor. (NOS:AGR/N1119)	103. Checking implements such as plough harrows, cultivators, seed drills, tractor trailer, & P.T.O. units etc. for serviceability before use. (5 hrs.) 104. Lubricate them as required. Hitching practice(single & three point). (5hrs.) 105. Exercise in driving a tractor with different implements. (5 hrs.)	**Tractor equipment: -** Description, function of harrows, cultivators, seed drills & tractor trailer.Hitching of equipment. Danger in overloading & incorrect field operation. Average life of Agriculture implements. Description andfunction of tractor accessoriessuch as Draw bar, top link & Belly Pulley. Setting of drawbar to correct height. Use of Hydraulic lift. Maintenance of tractor accessories. (06 Hrs.)
Professional Skill 28 Hrs.; Professional Knowledge 05 Hrs.	Overhaul Charging and Starting System of Tractor. (NOS:AGR/N1129)	106. Practice on removing alternator from vehicle dismantling, cleaning checking for defects, assembling and testing	**Tractor Electrical Maintenance:** Lighting arrangement in tractors (As applicable). Description of chargingcircuit. Operation of alternator, regulator unit

		for motoring action of alternator & fitting to vehicles. (11 hrs.) 107. Practice on removing starter motor vehicle and overhauling the starter motor, testing of starter motor. (11 hrs.) 108. Servicing storage batteries, tracing lighting circuit fault rectification. (6 hrs.)	ignition warning lamp troubles and remedy incharging system. Fault findingin electrical system. Description of starter motor circuit, common troubles and remedy in starter circuit. Description of lighting circuit. Charging & discharging of lead acid battery. (05 Hrs.)
Engineering Drawing: 40 hrs.			
Professional Knowledge ED- 40 Hrs.	Read and apply engineering drawing for different application in the field of work. (NOS:AGR/N9450)	**ENGINEERING DRAWING:** Introduction to Engineering Drawing and Drawing Instruments – Conventions Sizes and layout of drawing sheets Title Block, its position and content Drawing Instrument Lines- Types and applications in drawing Free hand drawing of – Geometrical figures and blocks with dimension Transferring measurement from the given object to the free hand sketches. Free hand drawing of hand tools and measuring tools. Drawing of Geometrical figures: Angle, Triangle, Circle, Rectangle, Square, Parallelogram. Lettering & Numbering – Single Stroke. Dimensioning Types of arrowhead Leader line with text Position of dimensioning (Unidirectional, Aligned) Symbolic representation – Different symbols used in the related trades. Concept and reading of Drawing in Concept of axes plane and quadrant Concept of Orthographic and Isometric projections Method of first angle and third angle projections (definition and difference) Reading of Job drawing of related trades.	
Workshop Calculation & Science: 34 Hrs.			
Professional Knowledge	Demonstrate basic mathematical	**WORKSHOP CALCULATION & SCIENCE:** **Unit, Fractions**	

WCS- 34 Hrs.	concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS:AGR/N9451)	Classification of unit system Fundamental and Derived units F.P.S, C.G.S, M.K.S and SI units Measurement units and conversion Factors, HCF, LCM and problems Fractions - Addition, substraction, multiplication & division Decimal fractions - Addition, subtraction, multilipication & division Solving problems by using calculator **Square root, Ratio and Proportions, Percentage** Square and suare root Simple problems using calculator Applications of pythagoras theorem and related problems Ratio and proportion Ratio and proportion - Direct and indirect proportions Percentage Precentage - Changing percentage to decimal and fraction **Material Science** Types metals, types of ferrous and non ferrous metals Physical and mechanical properties of metals **Mass, Weight, Volume and Density** Mass, volume, density, weight and specific gravity, numerical related to L,C,O section only Related problems for mass, volume, density, weight and specific gravity **Speed and Velocity, Work, Power and Energy** Speed and velocity - Rest, motion, speed, velocity, difference between speed and velocity, acceleration and retardation Speed and velocity - Related problems on speed & velocity Work, power, energy, HP, IHP, BHP and efficiency **Heat & Temperature and Pressure** Concept of heat and temperature, effects of heat, difference between heat and temperature, boiling point & melting point of different metals and non-metals Concept of pressure - Units of pressure, atmospheric pressure, absolute pressure, gauge pressure and gauges used for measuring pressure **Basic Electricity** Introduction and uses of electricity, electric current AC,DC their comparison, voltage, resistance and their units **Mensuration** Area and perimeter of square, rectangle and parallelogram Surface area and volume of solids - cube, cuboid, cylinder, sphere and hollow cylinder Finding the lateral surface area, total surface area and capacity in litres of hexagonal, conical and cylindrical shaped vessels

		Levers and Simple machines Simple machines - Effort and load, mechanical advantage, velocity ratio, efficiency of machine, relationship between efficiency, velocity ratio and mechanical advantage Lever & Simple machines - Lever and its types **Trigonometry** Measurement of angles Trigonometrical ratios Trigonometrical tables
In Plant Training/Project Work		

SYLLABUS – MECHANIC AGRICULTURAL MACHINERY			
Second Year			
Duration	**Reference Learning Outcome**	**Professional Skills (Trade Practical) With Indicative Hours**	**Professional Knowledge (Trade Theory)**
Professional Skill 43 Hrs; Professional Knowledge 08 Hrs	Test and rectify faults in functionality of major components and assemblies of Mould Board Plough, Disc Plough and troubleshoot of tillage and its implements. (NOS:AGR/N1119)	109. Use of PPE while dismantling and assembling of Mould Board plough. (08 hrs.) 110. Explain range of machinery used in the trade & their features. (6 hrs.) 111. Demonstrate precautions to be observed in handling farm machinery. (6 hrs.) 112. Dismantle Mould Board plough. Check, repair & replace their Component. (4 hrs.) 113. Assemble MB plough, measure Horizontal & Vertical suction. (3 hrs.) 114. Dismantle disc plough, check, repair & replace their components. (3 hrs.) 115. Assemble disc plough, measure disc & tilt angle of disc plough. Workshop adjustments. (3 hrs.) 116. Perform Hitching of ploughs. Field operation & adjustments. (5 hrs.) 117. Identify Faults and apply remedies. (2 hrs.) 118. Perform care and maintenance. (3 hrs.)	Introduction to the trade curriculum. Importance of the trade in the advancement of Agriculture technology in the country. Types of tillage & their uses. Working principles of ploughs. Constructional details. Workshop adjustments. Method of hitching. Importance of weight transfer. Considerations while using mounted and semi mounted implements. Method of ploughing. Methods of field operation. Recommended speeds for operation under different field conditions. Daily and periodical maintenance (08 Hrs)
Professional	Check, test and troubleshoot faults	119. Service sub soiler and	Function & working of sub soiler/ chisel plough.

Skill 25 Hrs; Professional Knowledge 8 Hrs	in functionality of major components and assemblies of Chisel Plough and Rotavator. (NOS:AGR/N9430)	dismantle chisel plough. (1 hr.) 120. Check, repair & replace the component. (3 hrs.) 121. Assemble chisel plough. (1 hr.) 122. Hitch sub soiler/ chisel plough. (2 hrs.) 123. Dismantle Rotavator, check repair and replace its components. (5 hrs.) 124. Assemble Rotavator and conduct workshop adjustments. (5 hrs.) 125. Perform field operations & adjustments. (3 hrs.) 126. Find Faults and apply remedies. (3 hrs.) 127. Perform Care and maintenance. (2 hrs.)	Constructional details. Function & working of Rotavator. Workshop adjustments. Method of hitching. Importance of weight transfer. Method of ploughing. Method of Field operation. Recommended speeds for operation of rotavators. Daily and periodical maintenance (08 Hrs)
Professional Skill 25 Hrs; Professional Knowledge 10 Hrs	Troubleshoot &Test the functionality of major components and assemblies of disc harrows (Off set Type/Double action and single action) and Power harrows. (NOS:AGR/N1119)	128. Dismantle & assemble disc harrows (Off set Type/ Double action). (5 hrs.) 129. Dismantle& assemble disc harrows (Single action). (4 hrs.) 130. Measure gang angle. (1 hr.) 131. Dismantle& assemble bar/power harrows. (1 hr.) 132. Service spring/blade harrow. (2 hrs.) 133. Plan and prepare Hitching arrangements. (1 hr.) 134. Perform field operation &adjustments. (7 hrs.) 135. Detect Faults and apply Remedies. (2 hrs.) 136. Perform Care and	Types of harrows & their uses. working principles& Constructional details. Setting and adjustments. Hitching and mode of operation. Difference between disc harrows & drag harrow. Difference between disc harrows & disc plough. Trouble shooting. Safety precautions. (10 Hrs)

		maintenance. (2 hrs.)	
Professional Skill 25 Hrs; Professional Knowledge 06 Hrs	Check and Service proper functionality of major components and assemblies of cultivators and soil forming equipments. (NOS:AGR/N1119)	137. Dismantle the cultivator (Spring /Rigid) and check, repair & replace the components. (6 hrs.) 138. Assemble the cultivator. (1 hr.) 139. Illustrate setting of cultivators with the help of floor diagram. (3 hrs.) 140. Demonstrate Workshop adjustments, and perform field operation & adjustments. (6 hrs.) 141. Trace Faults and implement Remedies. (6 hrs.) 142. Perform Care and maintenance. (3 hrs.)	Types of cultivator. Working Principles & their constructional details, adjustments. Common types of shovels & seeps. Adjustments, mode of operation. Trouble shooting. Care & Maintenance. (06 Hrs)
Professional Skill 20 Hrs; Professional Knowledge 08 Hrs	Identify and check functionality of major components and assemblies of Lazar leveler, trencher & post hole digger. (NOS:AGR/N9431)	143. Dismantle and assemble levelers, scrapers/ blade terracer, ditchers and bund formers/ dozer/ dumper. (4 hrs.) 144. Service Lazar leveler, post hole digger. (4 hrs.) 145. Dismantle, check, repair & replace the components of Lazar leveler, trencher & post hole digger. (4 hrs.) 146. Assemble Lazar leveler, trencher & post hole digger. (3 hrs.) 147. Arrange and perform Workshop adjustments. (2 hrs.) 148. Set, adjust and troubleshoot field operation. (3 hrs.)	Soil forming equipment & their types. Constructional details of levelers, scrapers/ blade terracer, ditchers and bund formers. Constructional details of Lazar leveler, trencher & dozer/dumper and post hole digger. Prime mover & driving practice. Adjustments, mode of operation. Method of Field operation. Recommended speeds for operation. Daily and periodical maintenance, Care & Maintenance. (08 Hrs)

Professional Skill 44 Hrs; Professional Knowledge 09 Hrs	Dismantle, assemble and troubleshoot seed drills. (NOS:AGR/N9432)	149. Dismantle & assemble seed drills. (5 hrs.) 150. Calibrate seed & fertilizer rates. (5 hrs.) 151. Perform Workshop adjustments of special drills such as zero till, strip drill/rotto drill & Happy seeder. (15 hrs.) 152. Conduct Field operation & adjustments of special drills such as zero till, strip drill/rotto drill & Happy seeder. (15 hrs.) 153. Trace Faults and apply remedies. (4 hrs.)	Types of seed drills & their uses. Constructional details of seed cum fertilizer drill. Seed & fertilizer metering devices. Constructional details of special drills such as zero till, strip drill/rotto drill & Happy seeder. Types of furrow openers, methods of transmission of power. Calibration & workshop adjustments. Field calibration and mode of operation. Guide chart for mixing fertilizers. Recommended speeds for operation. Care & maintenance. (09 Hrs)
Professional Skill 85 Hrs; Professional Knowledge 22 Hrs	Test and verify functions of major components and assemblies of planters and fertilizer applicators. (NOS:AGR/N9433)	154. Dismantle& assemble of planters, calibrate seed & fertilizer rates. (08 hrs.) 155. Conduct Workshop adjustments and set planter with different seed plates & adjusts for planting. (10 hrs.) 156. Repair furrow openers. (5 hrs.) 157. Servicing of veg. transplanter. (5 hrs.) 158. Use veg. transplanter and adjustments. (5 hrs.) 159. Service paddy transplanter and raise type of MAT type nursery for paddy. (5 hrs.) 160. Use paddy transplanter. Raise bed and adjustments. (4 hrs.)	Types of planters. Constructional details of Maize, Cotton, G/ nut & potato planters. Constructional details of paddy transplanter, Sugarcane & paddy transplanter. Common metering devices. Types of furrow openers. Power transmission. Function of row marker. Field operation of paddy transplanter. Field operation of veg. transplanter. Use of cage wheels and puddles. (11 Hrs)

		161. Use cage-wheels and paddy 162. Puddles. (4 hrs.)	
		163. Dismantle and assemble fertilizer applicators. (12 hrs.) 164. Perform minor repairs of fertilizer applicator; calibrate fertilizer applicator. (6 hrs.) 165. Perform field operation & adjustments of fertilizer applicators and troubleshoot the problems. (15 hrs.) 166. Follow precautions to be observed in handling fertilizer. (6 hrs.)	Types of fertilizer applicators. Constructional details of fertilizer applicators Types of furrow openers, Methods of transmission of power. Calibration & workshop adjustments. Field operation & adjustments of fertilizer applicators. Recommended speeds for operation Care & maintenance. (11 Hrs)
Professional Skill 50 Hrs; Professional Knowledge 16 Hrs	Identify and check functionality of major components and assemblies of volute type centrifugal pump and submersible pump. (NOS:AGR/N1114)	167. Visit to a tube well boring sites for study of boring and its operation. (8 hrs.) 168. Dismantle and assemble a volute type centrifugal pump. (4 hrs.) 169. Prepare foundations and install a pumping set. (8 hrs.) 170. Check Adjustments and operation of a pumping set. (5 hrs.)	Source of water. Study common irrigation and drainage systems. Types of irrigation systems. Types of pumps. Working principles & constructional details of centrifugal pumps. (08 Hrs)
		171. Service a submersible pump. (10 hrs.) 172. Measure discharge of water and install HDPE, QRC, PVC & dipper pipe line. (15 hrs.)	Types of centrifugal pumps constructional details & principle of operation of a submersible pump. Description of tools and equipment required for boring a tube well. Use a compressor for revitalizing the tube well

			to improve its discharge. (08 Hrs)
Professional Skill 25 Hrs; Professional Knowledge 09 Hrs	Service irrigation valves and hydrants. (NOS:AGR/N1006)	173. Repair and adjust irrigation valves and hydrants. (5 hrs.) 174. Install sprinkler and fogger. (5 hrs.) 175. Install pop-up and drippers. (3 hrs.) 176. Install drippers on level/ hilly ground. (3 hrs.) 177. Field operation & adjustment (angular/ full circle). Faults and remedies. Troubles and remedies. (9 hrs.)	Pump selection, common prime movers, and coupling devices. Different types of irrigation pipes. Working principles of valves and hydrants. Working principles of Popup/sprinkler & mister /fogger. Working principles of drippers. Methods of field operation & adjustment. Daily and periodical maintenance. Precautions to be observed. Care & Maintenance. (09 Hrs)
Professional Skill 25 Hrs; Professional Knowledge 10 Hrs	Service and Trouble shoot power tillers/power weeder. (NOS:AGR/N1111)	178. Service Power tiller/power weeder. (4 hrs.) 179. Perform field operation with different attachments with Common adjustments. (4 hrs.) 180. Dismantle and assemble a cultivator and performer pairing and maintenance. (4 hrs.) 181. Adjust the cultivator with the help of floor diagram. (2 hrs.) 182. Set shovels and sweeps. (1 hr.) 183. Perform field operation of cultivator with shovels and sweeps. (4 hrs.) 184. Troubleshoot faults and apply remedies. (3 hrs.)	Types of power tillers, their uses, constructional details. Method of power transmission for different field operation with different attachments. Common types of weeds and their control. Methods of weed control. Constructional detail of power weeder. Premergence and post emergence applications. Recommended weedicides for different crops. Equipments used for their applications. Trouble shooting and remedies. Daily and periodical maintenance. Precautions in handling weedicides. (10 Hrs)

		185. Plan and prepare care and maintenance work. (3 hrs.)	
Professional Skill 11 Hrs; Professional Knowledge 07 Hrs	Identify and check functionality of grain handling seed treating and drying and troubleshoot major components and assemblies of AC motors. (NOS:AGR/N9434)	186. Familiarize to the trade curriculum. (6 hrs.) 187. Explain importance of the trade in the advancement of Electrical technology in the country. (5 hrs.)	Introduction to the trade curriculum. Importance of safety precaution to be observed in the section. Range of machinery used in the trade & their features. Precautions to be observed in handling farm machinery. (7 Hrs)
Professional Skill 40 Hrs; Professional Knowledge 12 Hrs	Identify and troubleshoot faults in major components and assemblies of sprayers & dusters. (NOS:AGR/N9435)	188. Dismantle and assemble AC motors and identify their parts. (3 hrs.) 189. Demonstrate motor starting devices and its periodical maintenance. (3 hrs.) 190. Detect faults and apply remedies. (3 hrs.) 191. Dismantle and assemble common sprayers. (3 hrs.) 192. Calibrate sprayers and carryout field adjustments & operation of sprayers. (3 hrs.) 193. Dismantle and assemble common dusters. (3 hrs.) 194. Service fogging machine and Calibrate common dusters. (3 hrs.) 195. Carryout field adjustments & operation of duster. (3 hrs.) 196. Service high clearance/ cotton sprayers. (3 hrs.) 197. Service Aero blast sprayers. 198. Calibrate & adjust high clearance/ cotton sprayers	Types of electrical motors used on the farm, their constructional details, selection, operation, care and maintenance. Different types of starters. Fuses and their capacities. Installation of motors. Safety precautions Types of sprayers & dusters. Working principles. Calibrations of sprayers & dusters. Method of operation. Common prime movers. Workshop adjustments. Constructional details, working principles & calibration of high clearance sprayers/ cotton & Aero blast sprayers. Methods of operation. Field operation. Common accidents and their prevention. Care and maintenance. (12 Hrs)

		& Aero blast sprayers. (3 hrs.) 199. Carryout repairs and maintenance work. (3 hrs.) 200. Perform field operation & adjustments. (3 hrs.) 201. Troubleshoot faults and apply remedies. (3 hrs.) 202. Apply precaution measure while handling insecticides and pesticides. (1 hrs.)	
Professional Skill 30 Hrs; Professional Knowledge 07 Hrs	Detect and troubleshoot major components and assemblies of reaper, reaper winder, straw- reapers. (NOS:AGR/N9436)	203. Dismantle and assemble a reaper. (4 hrs.) 204. Carryout Workshop adjustments. (3 hrs.) 205. Dismantle and assemble reaper winder and demonstrate workshop adjustments. (6 hrs.) 206. Dismantle and assemble straw-reapers and carry out their workshop adjustments. (3 hrs.) 207. Carryout hitching and fitting with prime mover. (4 hrs.) 208. Perform field operation& adjustment of reapers/ reaper winder/ straw - reapers. (8 hrs.) 209. Trace faults and ensure correct functioning. (2 hrs.)	Reapers & their types Functions, working principles, constructional details. Field adjustments & operation Care and maintenance. Trouble shooting. Precautions in working & transporting. (07 Hrs)
Professional Skill 25 Hrs; Professional Knowledge 08 Hrs	Troubleshoot the faults in functionality of major components and assemblies of Thresher, Maize seller, Groundnut	210. Dismantle and assemble thresher. (4 hrs.) 211. Carryout workshop adjustments. Fit with prime mover. (3 hrs.) 212. Select tools and use for	Types of threshers, maize Sheller and ground nut decorticators. Working principles, constructional details. Adjustments and operations.

	decorticator. (NOS:AGR/N9437)	adjusting and operating in field. (2 hrs.) 213. Dismantle and assemble Maize seller. (4 hrs.) 214. Dismantle and assemble ground nut decorticator; fit with prime mover. (4 hrs.) 215. Measure important speeds affecting the performance. (1 hr.) 216. Detect fault and apply remedies. (2 hrs.) 217. Demonstrate precautionary measures for safe operation. (5 hrs.)	Prime mover and driving systems. Troubleshooting and remedies. Transmission of power belts and pulleys. Safety precautions. (08 Hrs)
Professional Skill 65 Hrs; Professional Knowledge 25 Hrs	Identify and check functionality of major components and assemblies of combine harvester-cutter bar assembly, feeder unit, threshing unit, separating unit. (NOS:AGR/N1105)	218. Perform on different components systems of combine harvester. (5 hrs.) 219. Describe drive mechanism and controls of combine harvester. (5 hrs.) 220. Drive combine harvester. (4 hrs.) 221. Dismantle cutter bar assembly. Dismantle feeder unit. (2 hrs.) 222. Dismantle threshing unit /separating unit. (2 hrs.) 223. Check, repair and replace the defective components. (6 hrs.) 224. Assemble the components of different systems of combine harvester. (9 hrs.) 225. Carryout workshop adjustments. (3 hrs.)	Purpose of a combine harvester. Advantages and limitations. Types of combine harvester. Special purpose combine harvesters. Working principles & constructional of different systems of combine harvester. Components of different systems of combine harvester. Flow path material of combine harvesters. Power transmission & drive systems. Workshop adjustments. Methods of field operation. Field adjustments according to crop & soil condition. Types of grain losses, their causes and remedies. Factors affecting the performance of a combine.

		226. Transport practice of the combine. (9 hrs.) 227. Operate the combine in the field and adjust according to the field and crop conditions. (9 hrs.) 228. Carryout its servicing and maintenance work. (6 hrs.) 229. Compute grain losses. Storage during off season and perform care and maintenance work. (5 hrs.)	Recommended speeds. Considerations while selecting a combine. Custom hiring of combine. Calculating of combine operation of combine harvesting. Safety precautions. (25 Hrs)
Professional Skill 75 Hrs; Professional Knowledge 15 Hrs	Test and troubleshoot functionality of major components and assemblies of mower, folder harvester, power chaff/silage cutter. (NOS:AGR/N9438)	230. Dismantle and assemble mower / fodder harvester. (12 hrs.) 231. Demonstrate dismantling and assembling of power chaff/ silage-cutter. (12 hrs.) 232. Perform Workshop adjustments. (14 hrs.) 233. Perform hitching and fitting with prime-mover. (13 hrs.) 234. Carryout field operation and adjustments. (12 hrs.) 235. Perform servicing and maintenance. (12 hrs.)	Need of green harvesting equipment. Working principles, constructional details of mover. Functions, working principles, constructional details of folder harvester. Functions, working principles, constructional details power chaff/ silage-cutter. workshop and field adjustments. Methods of field operation. care and maintenance. Trouble shooting. Precautions in working & transporting. (15 Hrs)
Professional Skill 25 Hrs; Professional Knowledge 07 Hrs	Detect and rectify functionality of major components and assemblies of rotary harvester, hay bailer. (NOS:AGR/N9439)	236. Dismantle and assemble rotary harvester/ hay bailer. (2 hrs.) 237. Carryout Workshop adjustments. (3 hrs.) 238. Perform Hitching and fitting with prime- mover. (3 hrs.) 239. Perform field operation and adjustments. (8 hrs.) 240. Use Safety precautions	Function and working of rotary harvester. Function and working of hay-bailer. Workshop adjustments. Method of field operation. Method of transportation. Common accidents and their prevention. Trouble shooting. Care and maintenance. (07 Hrs)

		while servicing and maintenance. (2 hrs.) 241. Troubleshoot Faults and apply remdies for proper functioning. (7 hrs.)	
Professional Skill 50 Hrs; Professional Knowledge 14 Hrs	Find and troubleshoot faults in major components and assemblies of groundnut digger, potato / onion digger(NOS:AGR/N9440)	242. Dismantle groundnut digger /potato / onion digger. (08 hrs.) 243. Check, repair and replace the defective components. (08 hrs.) 244. Assemble groundnut digger potato /onion digger. (07 hrs.) 245. Carryout Workshop adjustments. Attachment of diggers with prime-movers. (07 hrs.) 246. Perform field operation and adjustments, servicing and maintenance work. (13 hrs.) 247. Identify and troubleshoot faults following safety precautions and apply remedies for proper functioning. (07 hrs.)	Need & importance of root harvesting machine. Types & working of diggers. Components of diggers. Prime mover attachments and driving system. Transporting the root harvesting machinery. Settings & Adjustments. Troubles & Maintenance. Safety precautions. (14 Hrs)
Professional Skill 50 Hrs; Professional Knowledge 14 Hrs	Service and troubleshoot winnower, cleaner &grader. (NOS:AGR/N9441)	248. Service and adjust the winnower, cleaner &graders. (10 hrs.) 249. Fit with prime mover attachment. (10 hrs.) 250. Operate winnower, cleaner and grader. (20 hrs.) 251. Trace Common troubles and its causes. (10 hrs.)	Important of winnowing. Types of winnower and its parts. Importance of cleaning & grading. Types of cleaner/ grader. Methods of cleaning/grading. Prime mover attachments and driving system. Settings and Adjustments. Troubles & maintenance. Safety precautions. (14 Hrs)
Professional	Maintain and service	252. Service and adjust the rice	Importance of rice huller

Skill 50 Hrs; Professional Knowledge 14 Hrs	rice huller, polisher, feed grinder-cum-mixer, hammermill. (NOS:AGR/N9442)	huller, polisher, the feed grinder-cum- mixer. (15 hrs.) 253. Service and adjust the hammer mill and fit with prime mover. (10 hrs.) 254. Operate rice huller, polisher, hammer mill. (15 hrs.) 255. Trace Common troubles and its causes. (10 hrs.)	and polisher, feed grinder-cum-mixer, hammer mill, oil extractor and sugarcane crusher. Constructional details, materials used. Principles of operation. Common faults and remedies. Care & maintenance. Safety precautions. (14 Hrs)
Professional Skill 52 Hrs; Professional Knowledge 15 Hrs	Detect and rectify functionality of grain handling seed treating and drying equipment. (NOS:AGR/N9443)	256. Visit to a grain drying and storing plant and study different aspects of the construction, adjustments, controls. (9 hrs.) 257. Operate grain handling seed treating and drying equipment. (12 hrs.) 258. Explain silo structure. (5 hrs.)	Working of fans and blowers. Purpose of grain auger, bucket elevator etc., Constructional details and working of a grain drier. Grain storage structure i.e. concrete and sheet metal bins (sylo structure). Methods and instruments used for measuring moisture contents of grains. Equipment and methods used for treating and fumigating seeds and grains. (07 Hrs)
		259. Prepare Log books. (1 hrs.) 260. Maintain necessary records i.e. Log books of tractors, combines etc. (6 hrs.) 261. Plan and prepare service schedules, off season storage of farm equipment. (6 hrs.)	Operation of transporting and handling equipment i.e. Tractor, tractor trailer, power tiller & combine harvester. (04 Hrs)
		262. Visit to a Government Farms, Haryallee and Co-operative Societies. (2 hrs.) 263. Describe farm records, accounts and log books. (6	Procedure and principle for efficient management and organization of a farm. Discussion on different farm shop layout. (04 Hrs)

		hrs.) 264. Plan and prepare service schedule of farm machinery, off season storing of farm equipment. (3 hrs.) 265. Plan and prepare layout and list of equipment of a typical farm workshop. (2 hrs.)	
Engineering Drawing: 40 Hrs.			
Professional Knowledge ED- 40 Hrs.	Read and apply engineering drawing for different application in the field of work. (NOS:AGR/N9450)	**ENGINEERING DRAWING:** Reading of Electrical, Electronic & Mechanical Sign and Symbols used in Automobile. Sketches of Electrical, Electronic & Mechanical components used in Automobile. Reading of Electrical wiring diagram and Layout diagram used in Automobile. Drawing of Electrical circuit diagram used in Automobile. Drawing of Block diagram of Instruments & equipment of trades	
Workshop Calculation & Science: 16 Hrs.			
Professional Knowledge WCS- 16 Hrs.	Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS:AGR/N9451)	**WORKSHOP CALCULATION & SCIENCE:** **Friction** Friction - Advantages and disadvantages, simple problems related to friction Friction - Lubrication **Estimation and Costing** Estimation and costing - Simple estimation of the requirement of material etc., as applicable to the trade Estimation and costing - Problems on estimation and costing	
In Plant Training/Project Work			

SYLLABUS FOR CORE SKILLS
1. Employability Skills (Common for all CTS trades) (120 Hrs. + 60 Hrs.)

Learning outcomes, assessment criteria, syllabus and Tool List of Core Skills subjects which is common for a group of trades, provided separately in www.bharatskills.gov.in / dgt.gov.in

ANNEXURE-I

List of Tools & Equipment			
MECHANIC AGRICULTURAL MACHINERY (For batch of 24Candidates)			
S No.	**Name of the Tools& Equipment**	**Specification**	**Quantity**
A. TRAINEES TOOL KIT			
1.	Allen Key	set of 12 pieces (2mm to 14mm)	6+1 Nos.
2.	Caliper inside	15 cm Spring	6+1 Nos.
3.	Calipers outside	15 cm spring	6+1 Nos.
4.	Center Punch	10 mm. Dia. x 100 mm.	6+1 Nos.
5.	Dividers	15 cm Spring	6+1 Nos.
6.	Electrician Screw Driver	250mm	6+1 Nos.
7.	Hammer ball peen	0.5 kg with handle	6+1 Nos.
8.	Hands file	20 cm. Second cut flat	6+1 Nos.
9.	Philips Screw Driver	set of 5 pieces (100 mm to 300 mm)	6+1 Nos.
10.	Pliers combination	20 cm.	6+1 Nos.
11.	Screw driver	20cm.X 9mm. Blade	6+1 Nos.
12.	Screw driver	30 cm. X 9 mm. Blade	6+1 Nos.
13.	Scriber	15 cm	6+1 Nos.
14.	Spanner D.E.	set of 12 pieces (6mm to 32mm)	6+1 Nos.
15.	Spanner, ring	set of 12 metric sizes 6 to 32 mm.	6+1 Nos.
16.	Spanners socket with speed handle, T-bar, ratchet and universal	upto 32 mm set of 28 pieces with box	6+1 Nos.
17.	Steel rule	30 cm inch and metric	6+1 Nos.
18.	Steel tool box with lock and key (folding type)	400x200x150 mm	6+1 Nos.
19.	Wire cutter and stripper		6+1 Nos.
B. Tools Instruments and General Shop Outfits			
20.	AC alternator slip ring puller		1No.
21.	Adjustable spanner	Pipe wrench 350 mm	2 Nos.
22.	Air blow gun with standard accessories		1No.
23.	Air impact wrench with standard accessories		4 Nos.
24.	Air ratchet with standard accessories		4 Nos.
25.	Allen Key	set of 12 pieces (2mm to 14mm)	2 Nos.
26.	Alternator for tractor – different type		2 Nos.
27.	Ammeter	300A/ 60A DC with external shunt	4 Nos.

28.	Angle plate adjustable	250x150x175	1No.
29.	Angle plate size	200x100x200mm	2 Nos.
30.	Anvil 50 Kgs with Stand		1No.
31.	Arbor press hand operated	2 ton capacity	1No.
32.	Auto Electrical test bench		1No.
33.	Battery –charger		2 Nos.
34.	Belt Tensioner gauge		1No.
35.	Blow Lamp	1 litre	2 Nos.
36.	Caliper inside	15 cm Spring	4 Nos.
37.	Calipers outside	15 cm spring	4 Nos.
38.	Car Jet washer with standard accessories		1No.
39.	Carburetor repair tool kit		1No.
40.	Chain Pulley Block-	3 ton capacity with tripod stand	1No.
41.	Chaser hard W/V	9 to 40 T.P.I. set of 11 external.	1 set
42.	Chaser, hand W/W	9 to 40 T.P.I. set of 11 internal.	1 set
43.	Chisel	10 cm flat	4 Nos.
44.	Chisels cross cut	200 mm X 6mm	4 Nos.
45.	Circlip pliers Expanding and contracting type	15cm and 20cm each	4 Nos.
46.	Clamps C	100mm	2 Nos.
47.	Clamps C	150mm	2 Nos.
48.	Clamps C	200mm	2 Nos.
49.	Cleaning tray	45x30 cm.	4 Nos.
50.	Clutches, different types such as cone type, disc type		1 each
51.	Compression testing gauge suitable for diesel Engine		2 Nos.
52.	Connecting rod alignment fixture		1No.
53.	Copper bit soldering iron	0.25 Kg	4 Nos.
54.	Cut section model of fuel filter		1No.
55.	Cylinder bore gauge capacity	20 to 160 mm	4 Nos.
56.	Cylinder liner- Dry & wet liner, press fit &slidefit liner		1 each
57.	DC Ohmmeter	0 to 300 Ohms, mid scales at 20 Ohms	2 Nos.
58.	Depth micrometer	0-25mm	4 Nos.
59.	Dial gauge type	1 Gr. A (complete with clamping devices and stand)	4 Nos.
60.	Different type of Engine Bearing model		1 set
61.	Different type of piston model		1each

62.	Dividers	15 cm Spring	4 Nos.
63.	Drift Punch Copper	15 cm	4 Nos.
64.	Drift, copper	10 x 15 1/2 mm	2 Nos.
65.	Drill point angle gauge		1No.
66.	Drill twist	1.5 mm to 15 mm (various sizes) by 0.5 mm	4 Nos.
67.	Electric Soldering Iron	230 V 60 watts 230 V 25 watts	2 each
68.	Electric testing screw driver		2 Nos.
69.	Engineer's square	15 cm. Blade	2 Nos.
70.	Engineers stethoscope		1 No.
71.	Equipment puncture, in box,		1No.
72.	Feeler gauge	20 blades (metric)	2 Nos.
73.	File flat	20 cm bastard	4 Nos.
74.	File, half round	20 cm second cut	4 Nos.
75.	File, Square	20 cm second cut	4 Nos.
76.	File, Square	30 cm round	4 Nos.
77.	File, triangular	15 cm second cut	4 Nos.
78.	Files assorted sizes and types including safe edge file	(20 Nos)	2 set
79.	Flat File	25 cm second cut	4 Nos.
80.	Flat File	35 cm bastard	4 Nos.
81.	Fuel feed pump for diesel		2 Nos.
82.	Fuel injection pump (Diesel) inline		1 No.
83.	Glow plug tester		2 Nos.
84.	Granite surface plate	1600 x 1000 with stand and cover	1 No.
85.	Grease Gun		2 Nos.
86.	Grover	3, 4, 6mm.	1 Each
87.	Growler		2 Nos.
88.	Hacksaw frame adjustable	20-30 cm	10 Nos.
89.	Hammer Ball Peen	0.75 Kg	4 Nos.
90.	Hammer Chipping	0.25 Kg	4 Nos.
91.	Hammer copper	1 Kg with handle	4 Nos.
92.	Hammer Mallet		4 Nos.
93.	Hammer Plastic	(i) for crimping up to 4mm and (ii) for crimping up to 10mm	4 Nos.
94.	Hand operated crimping tool		2 Nos.
95.	Hand reamers adjustable	10.5 to 11.25 mm, 11.25 to 12.75 mm, 12.75 to14.25 mm and 14.25 to 15.75 mm	2sets
96.	Hand Shear Universal	250mm	2 Nos.
97.	Hand vice	37 mm	2 Nos.

98.	High rate discharge tester (cell tester)		1 No.
99.	Hollow Punch set of seven pieces	6mm to 15mm	2 sets each
100.	Hydraulic jack HI-LIFT type -	3 ton capacity,	1 No.
101.	Injector – Multi hole type, Pintle type		4 each
102.	Injector cleaning unit		1 No.
103.	Injector testing set (Hand tester)		1 No.
104.	Insulated Screw driver	20 cm x 9mm blade	4 Nos.
105.	Insulated Screw driver	30 cm x 9mm blade	4 Nos.
106.	Left cut snips	250mm	4 Nos.
107.	Lifting jack screw type	3 ton, 5ton	1 each
108.	Magneto spanner	set with 8 spanners	1 set
109.	Magnifying glass	75mm	2 Nos.
110.	Marking out table	90X60X90 cm.	1 No.
111.	Multi Scan Tool		1 No.
112.	Multimeter digital		5 Nos.
113.	Oil can	0.5/0.25 liter capacity	2 Nos.
114.	Oil pump for dismantling and assembling.		2 Nos.
115.	Oil Stone	15 cm x 5 cm x 2.5 cm	1 No.
116.	Oscilloscope	20MHz	1 No.
117.	Outside micrometer	0 to 25 mm	4 Nos.
118.	Outside micrometer	25 to 50 mm	4 Nos.
119.	Outside micrometer	50 to 75 mm	1 No.
120.	Outside micrometer	75 to 100 mm	1 No.
121.	Pat melting		2 Nos.
122.	Philips Screw Driver	set of 5 pieces (100 mm to 300 mm)	2 sets
123.	Pipe cutting tool		2 Nos.
124.	Pipe flaring tool		2 Nos.
125.	Piston ring compressor		2 Nos.
126.	Piston Ring expander and remover.		2 Nos.
127.	Piston Ring groove cleaner.		1 No.
128.	Pliers combination	20 cm.	2 Nos.
129.	Pliers flat nose	15 cm	2 Nos.
130.	Pliers round nose	15 cm	2 Nos.
131.	Pliers side cutting	15 cm	2 Nos.
132.	Poker		2 Nos.
133.	Portable electric drill Machine		1 No.
134.	Portable oil monitoring Indicator		1 No.
135.	Power Supply	0-12 v, lamp	1 No.
136.	Prick Punch	15 cm	4 Nos.

137.	Punch Letter	4mm	2 set
138.	Radiator cut section-cross flow		1 No.
139.	Radiator cut section-down flow		1 No.
140.	Radiator pressure cap		2 Nos.
141.	Rake		1 No.
142.	Rear axle assembly-gear box steering box assembly of the diesel engine		2 set
143.	Ridger		2 Nos.
144.	Right cut snips	250mm	4 Nos.
145.	Rivet sets snap and Dolly combined	3mm, 4mm, 6mm	4 Nos.
146.	Scraper flat	25 cm	2 Nos.
147.	Scraper half round	25 cm	2 Nos.
148.	Scraper Triangular	25 cm	2 Nos.
149.	Scriber	15 cm	2 Nos.
150.	Scriber with scribing black universal		2 Nos.
151.	Set of stock and dies - Metric		2 sets
152.	Shear Tin Man's	450 mm x 600mm	4 Nos.
153.	Sheet Metal Gauge		2 Nos.
154.	SherTinmans	300mm	4 Nos.
155.	Shovel		2 Nos.
156.	Soldering Copper Hatchet type	500gms	4 Nos.
157.	Solid Parallels in pairs (Different size) in Metric		2 Nos.
158.	Spanner Clyburn	15 cm	1 No.
159.	Spanner D.E.	set of 12 pieces (6mm to 32mm)	4 Nos.
160.	Spanner T. flocks for screwing up and up-screwing inaccessible positions		2 Nos.
161.	Spanner, adjustable	15cm.	2 Nos.
162.	Spanner, ring	set of 12 metric sizes 6 to 32 mm.	2 Nos.
163.	Spanners socket with speed handle, T-bar, ratchet and universal	upto 32 mm set of 28 pieces with box	2 Nos.
164.	Spark lighter		2 Nos.
165.	Spark plug spanner	14mm x 18mm x Size	2 Nos.
166.	Spirit level	2V 250, 05 metre	2 Nos.
167.	Spring tension tester		1 No.
168.	Stake grooving.		2 Nos.
169.	Stake, hatchet.		2 Nos.
170.	Starter motor for tractor –different type		2 Nos.
171.	Steel measuring tape	10 meter in a case	4 Nos.
172.	Steel rule and metric	15 cm inch	4 Nos.
173.	Steel rule and metric	30 cm inch	4 Nos.

174.	Steel wire Brush	50mmx150mm	5 Nos.
175.	Stone, carborandum	15 x 5 x 4 cm smooth and rough.	1each
176.	Straight edge gauge	2 ft.	2 Nos.
177.	Straight edge gauge	4 ft.	2 Nos.
178.	Stud extractor	set of 3	2 sets
179.	Stud remover with socket handle		1 No.
180.	Surface gauge with dial test indicator plunger type	0.01 mm	2 Nos.
181.	Tachometer (Counting type)		1 No.
182.	Taps and Dies complete sets (5 types)		1 set
183.	Taps and wrenches -Metric		2 sets
184.	Telescope gauge		4 Nos.
185.	Temperature gauge	0-100 degree	2 Nos.
186.	Thermostat		2 Nos.
187.	Thread pitch gauge metric, BSW		1 No.
188.	Timing lighter		1 No.
189.	Torque wrenches	5-35 Nm, 12-68 Nm & 50-225 Nm	1 each
190.	Trammel	30 cm	2 Nos.
191.	Turbocharger cut sectional view		1 No.
192.	Tyre pressure gauge with holding nipple		2 Nos.
193.	Universal puller for removing pulleys, bearings		1 No.
194.	V'Block with Clamps	75 x38 mm pair	2 Nos.
195.	Vacuum gauge to read	0 to 760 mm of Hg.	2 Nos.
196.	Valve Lifter		1 No.
197.	Valve spring compressor universal.		1 No.
198.	Vernier calliper	0-300 mm with least count 0.02mm	4 Nos.
199.	Vice grip pliers		2 Nos.
200.	Voltmeter	50V/DC	4 Nos.
201.	Water pump for dismantling and assembling		2 Nos.
202.	Wing compass	25 cm	2 Nos.
203.	Wire Gauge (metric)		4 Nos.
204.	Work bench	250 x 120 x 60 cm with 4 vices 12cm Jaw	4 Nos.
C. General Installation/Machineries			
205.	3 furrow disc plough with scrapersyk		1 No.
206.	9 tine cultivator-spring loaded mounted type		1 No.
207.	Air conditioner		As Required
208.	Arbor press hand operated	2 ton capacity	1 No.

209.	Automotive exhaust	5 gas analyzer (petrol & Diesel) or Diesel Smoke meter	1 No.
210.	Axle flow vegetable thresher		1 No.
211.	Bench lever shears	250mm Blade x 3mm Capacity	1 No.
212.	Bund maker (disc type)		1 No.
213.	Centrifugal Pump with electric motor		1 No.
214.	Chaff cutter and silage cutter		1each
215.	Chisel Plough-	5/7 tone	1 No.
216.	Dal Mill		1 No.
217.	Diesel GEN SET-	25/50 KVA with AMF facility	1 No.
218.	Disc Harrow	(14 Mounted type) off set	1 No.
219.	Disc Harrow	8x8 trailed type	1 No.
220.	Disc Plough	2 Bottom reversible l	1 No.
221.	Disc Plough	3 Bottom	1 No.
222.	Discrete Component Trainer / Basic Electronics Trainer		1 No.
223.	Drier (Solar/Heater)		1 No.
224.	Drilling machine bench to drill	up to 12mm dia along with accessories	1 No.
225.	Dual Magnetization Yoke	AC / HWDC, 230 VAC, 50Hz	1 set
226.	Electric motor	3 Phase 10 H.P.	1 No.
227.	Electric motor	3 Phase 7.5 H.P.	1 No.
228.	Engine - for walking and riding type reapers		2 Nos.
229.	Floor Mill		1 No.
230.	Fodder Harvester/ Chopper Flale type		1 No.
231.	Fodder kit for self Propelled reaper		1 No.
232.	Gas Welding Table	1220mm x760mm	2 Nos.
233.	Grinding machine (general purpose) D.E. pedestal	300 mm dia wheels rough and smooth	1 No.
234.	Groundnut decorticator		1 No.
235.	Header Assembly for maize and sun-flower		1 No.
236.	High capacity multi crop thresher		1 No.
237.	Kino/ Orange grader		1 each
238.	Knapsack /foot sprayer		1 No.
239.	Laser Leveler complete with transmitter, receiver, control box, survey		1 No.
240.	Leveler/spike Leveler	3 meter width	1 No.
241.	Liquid penetrant Inspection kit		1 set

242.	Maize cropthresher		1 No.
243.	Mechanical Power Weeder		1 each
244.	Mould Board Plough-Augur type		1 No.
245.	Mower/Grass Cutter		1 No.
246.	Multi crop thresher		1 No.
247.	Multi Scan Tool		1 No.
248.	P.T.O. operated rotary lawn mower		1 No.
249.	Paddy harrow	(14 Disc mounted type)	1 No.
250.	Paddy transplanter		1 No.
251.	Picking platform		1 No.
252.	Pipe Bending Machine (Hydraulic type)	12mm to 30mm	1 No.
253.	Pneumatic rivet gun		2 Nos.
254.	Power Operated Cleaner		1 No.
255.	Power operated fogging machine		1 No.
256.	Power operated Grader (wheat, maize)		1 No.
257.	Power operated manure spreader		1 No.
258.	Power operated potato Grader		1 No.
259.	Power operated soybean reaper		2. Nos.
260.	Power Tiller		1 No.
261.	Prime movers (Engine Stationery type)		2 Nos.
262.	Pulverizing Roller (Tractor Mounted) with spring loaded (11tyne) cultivator		1 No.
263.	Rice Mill/Paddy dehauskar		1 No.
264.	Rice Polisher		1 No.
265.	Rotary duster		1 No.
266.	Rotary Harvester		1 No.
267.	Rotavator	5.5" cutting Width	1 No.
268.	Self propelled Combine Harvester axial flow/Track type combine Harvester		1 No.
269.	Self propelled high clearance sprayer	20 hp diesel engine	1 No.
270.	Self pr opelled riding type Reaper/Reaper winder		1 No.
271.	Semi-axial flow multi crop thresher		1 No.
272.	Sewing Machine/Bag stitcher		1 No.
273.	Solar streetlight		1 No.
274.	Spring tension tester		1 No.
275.	Sprinkler type and drip irrigation systems complete sets.	Pipes (Different materiel & Sizes) Such as :- PVC, HDPE, QRC & Poly Tubing Dripper(Different materiel & Sizes) Jets, Foggers & Mister Sprinkler (Mini, Micro, angular and	As desired

		circular type) Lawn sprinkler and garden pop-ups Accessories and fitting for spray pop-ups Low volume & High volume rain gun range15 to 30 meter die Accessories and fitting for rain gun Compression Fittings (Elbow, Elbow Treaded, Joiner, Tee, End Cap, adopter Male.) HDPE fittings (Elbow, Elbow Treaded, Joiner, Tee, End Cap, adopter Male.) PVC Fittings (Elbow, Elbow Treaded, Joiner, Tee, End Cap, adopter Male.) PVC Control valve different sizes Air Release Valve different sizes Butterfly / G.M. Gate Valves different sizes Fertigation Tank 30 to 160 Litres Fertigation Equipment Pump 30 to 160 Litres Filters (Primary filter) Sand, Hydro cyclone, Screen, Plastic/metal & Disc and Drip line Poly joiner , reducer, Tee, Elbow ,End stop different sizes Grommet hole plug different sizes Pressure gauge Three way cock for gauge PVC valve box different sizes Water meter, Brase pressure regulator and irrigation drum Jain spanner repair tool kit & Drip line binder Single phase electric motor 3 HP high speed (Booster)	
276.	Straw reaper		1 No.
277.	Sub solier	24 -30 inch.	1 No.
278.	Submersible Pump complete unit		1 No.
279.	Sugar cane transplanter		1 No.
280.	Thresher rasp bar type		1 No.
281.	Tin smiths bench folder	600 x 1.6mm	1 No.
282.	Tractor PTO operated aero blast spray		1 No.
283.	Tractor PTO operated sprayer for cotton		1 No.
284.	Tractor	60 HP power steering	1 No.

285.	Tractor	75 HP 4WD	1 No.
286.	Tractor Diesel Engine	4 stroke for Dismantling and assembling with swiveling stand	2 Nos.
287.	Tractor operated bed farmer cum three rows planter		1 No.
288.	Tractor Operated Combine Harvester multi- crops		1 No.
289.	Tractor operated ground nut digger		1 No.
290.	Tractor operated hay bailer		1 No.
291.	Tractor operated implement loading beam		1 No.
292.	Tractor operated onion digger		1 No.
293.	Tractor operated potato digger		1 No.
294.	Tractor operated two rows Semi /automatic potato planter		1 No.
295.	Tractor operated two rows vegetable trans planter (semi automatic)		1 No.
296.	Tractor operator Angle blade Tracer		1 No.
297.	Tractor Operator ditcher		1 No.
298.	Tractor operator Front mounted dozer with Hydraulic single cylinder		1 No.
299.	Tractor Operator post hole digger		1 No.
300.	Tractor operator scraper and bucket scraper		1 No.
301.	Tractor Operator Seed cum fertilizer drill cum planter		1 No.
302.	Tractor Operator trencher	10” to 16” Width & 4 ft depth	1 No.
303.	Tractor Operator Zero/ strip till Seed cum fertilizer drill	9/11 rows	1 No.
304.	Tractor PTO operated multi - crop direct sowing happy seeder		1 No.
305.	Tractor trailer with hydraulic system		1 No.
306.	Trolley type portable air compressor single cylinder	with 45 liters capacity Air tank, along with accessories & with working pressure 6.5 kg/sq cm	1 No.
307.	Vaccine Machine		1 No.
308.	Weighing balance		2 Nos.
309.	Welding plant Oxy-Acetylene complete (high pressure)		1 No.
310.	Welding Transformer (150-300 Amps)		1 No.
311.	Wheel type tractor fitted with diesel engine with standard accessories and special tools (30 to 40 draw-bar H.P).		2 Nos.

312.	Wind mill		1 No.
313.	Winnower		1 No.
List ofConsumable:			
314.	Automatic Transmission oils		As required
315.	Battery- SMF		As required
316.	Brake fluids		As required
317.	Chalk, Prussian blue.		As required
318.	Chemical compound for fasteners		As required
319.	Diesel		As required
320.	Different type gasket material		As required
321.	Different type of oil seal		As required
322.	Drill Twist (assorted)		As required
323.	Emery paper	36–60 grit , 80–120	As required
324.	Engine coolant		As required
325.	Engine oil		As required
326.	Gear oils		As required
327.	Hacksaw blade (consumable)		As required
328.	Hand rubber gloves tested	5000 V	5 pair
329.	Holders, lamp teakwood boards, plug sockets, solders, flux wires and cables batteries round consumable blocks and other consumables as required		As required
330.	Hydrometer		8 Nos.
331.	Lapping abrasives		As required
332.	Leather Apron		5 Nos.
333.	Petrol		As required
334.	Power steering oil		As required
335.	Radiator Coolants		As required
336.	Safety glasses		As required
337.	Steel wire Brush	50mmx150mm	5 Nos.
338.	Engine Spare Parts		As per req.
339.	Field crops like wheat, Soya bean, paddy etc.		As desired
340.	Gloves for Welding (Leather and Asbestos)		5 sets
Workshop Furniture			
341.	Book shelf (glass panel)	6½ „ x 3‟ x 1½‟	As required
342.	Computer Chair		1+1 Nos.
343.	Computer Table		1+1 Nos.
344.	Desktop Computer	CPU: 32/64 Bit i3/i5/i7 or latest	1+1 Nos.

		processor, Speed: 3 GHz or Higher. RAM: -4 GB DDR-III or Higher, Wi-Fi Enabled. Network Card: Integrated Gigabit Ethernet, with USB Mouse, USB Keyboard and Monitor (Min. 17 Inch. Licensed Operating System and Antivirus compatible with trade related software.	
345.	Discussion Table	8" x 4" x 2½ „	2 Nos.
346.	Fire Extinguishers,	Arrange all proper NOCs and equipment from municipal / competent authorities.	As required
347.	Instructional Material – NIMI Books/Ref.books		Asrequired
348.	Internet connection with all accessories		Asrequired
349.	Laser printer		1 No.
350.	LCD projector/ LED /LCD TV	42"	1 No.
351.	Multimedia DVD for Automotive application/subjects		Asrequired
352.	Online UPS		As required
353.	Stools		26 No.
354.	StorageRack	6½ „ x3" x 1½'	As required
355.	Storageshelf	6½„ x 3" x 1½'	As required.
356.	Suitable class room furniture		As required
357.	Suitable Work Tables with vices		As required
358.	Tool Cabinet -	6½ „ x 3" x 1½"	2 Nos.
359.	Trainees locker	6½ „ x 3" x 1½"	As required

Note: -

1. *Internet facility is desired to be provided in the class room.*

ABBREVIATIONS

CTS	Craftsmen Training Scheme
ATS	Apprenticeship Training Scheme
CITS	Craft Instructor Training Scheme
DGT	Directorate General of Training
MSDE	Ministry of Skill Development and Entrepreneurship
NTC	National Trade Certificate
NAC	National Apprenticeship Certificate
NCIC	National Craft Instructor Certificate
LD	Locomotor Disability
CP	Cerebral Palsy
MD	Multiple Disabilities
LV	Low Vision
HH	Hard of Hearing
ID	Intellectual Disabilities
LC	Leprosy Cured
SLD	Specific Learning Disabilities
DW	Dwarfism
MI	Mental Illness
AA	Acid Attack
PwD	Person with disabilities


कौशलं बलम्