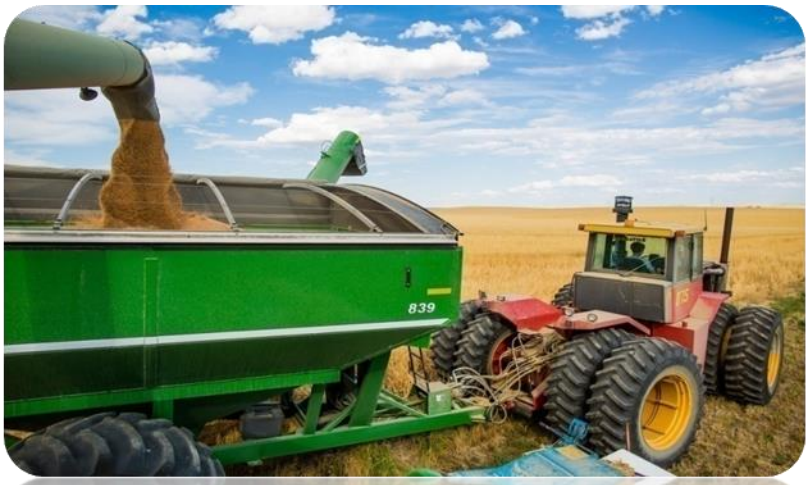
MECHANIC AGRICULTURAL MACHINERY

NSQF LEVEL- 5



SECTOR- AUTOMOTIVE

COMPETENCY BASED CURRICULUM

CRAFT INSTRUCTOR TRAINING SCHEME (CITS)

GOVERNMENT OF INDIA
Ministry of Skill Development & Entrepreneurship
Directorate General of Training
CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE
EN-81, Sector-V, Salt Lake City, Kolkata – 700091

MECHANIC AGRICULTURAL MACHINERY

(Engineering Trade)

SECTOR – AUTOMOTIVE

(Revised in 2023)

Version 2.0

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Developed By
Government of India
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1. COURSE OVERVIEW

The Craft Instructor Training Scheme is operational since inception of the Craftsmen Training Scheme. The first Craft Instructors' Training Institute was established in 1948. Subsequently, 6 more institutes namely, Central Training Institute for Instructors (now called as National Skill Training Institute (NSTI)), NSTI at Ludhiana, Kanpur, Howrah, Mumbai, Chennai and Hyderabad were established in 1960 by DGT. Since then the CITS course is successfully running in all the NSTIs across India as well as in DGT affiliated institutes viz. Institutes for Training of Trainers (IToT). This is a competency based course of one year duration. "Mechanic Agricultural Machinery" CITS trade is applicable for Instructors of "Mechanic Agricultural Machinery" Trade only.

The main objective of Craft Instructor training programme is to enable Instructors explore different aspects of the techniques in pedagogy and transferring of hands-on skills so as to develop a pool of skilled manpower for industries, also leading to their career growth & benefiting society at large. Thus promoting a holistic learning experience where trainee acquires specialized knowledge, skills & develops attitude towards learning & contributing in vocational training ecosystem.

This course also enables the instructors to develop instructional skills for mentoring the trainees, engaging all trainees in learning process and managing effective utilization of resources. It emphasizes on the importance of collaborative learning & innovative ways of doing things. All trainees will be able to understand and interpret the course content in right perspective, so that they are engaged in & empowered by their learning experiences and above all, ensure quality delivery.

2. TRAINING SYSTEM

2.1 GENERAL

CITS courses are delivered in National Skill Training Institutes (NSTIs) & DGT affiliated institutes viz., Institutes for Training of Trainers (IToT). For detailed guidelines regarding admission on CITS, instructions issued by DGT from time to time are to be observed. Further complete admission details are made available on NIMI web portal http://www.nimionlineadmission.in. The course is of one-year duration. It consists of Trade Technology (Professional skills and Professional knowledge), Training Methodology and Engineering Technology/ Soft skills. After successful completion of the training programme, the trainees appear in All India Trade Test for Craft Instructor. The successful trainee is awarded NCIC certificate by DGT.

2.2 COURSE STRUCTURE

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

S No.	Course Element	Notional Training Hours
1.	**Trade Technology**	
	Professional Skill (Trade Practical)	480
	Professional Knowledge (Trade Theory)	270
2.	**Training Methodology**	
	TM Practical	270
	TM Theory	180
	Total	**1200**

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

3	On the Job Training (OJT)/ Group Project	150
4	Optional Course	240

Trainees can also opt for optional courses of 240 hours duration.

2.3 PROGRESSION PATHWAYS

- Can join as an Instructor in vocational training Institute/ technical Institute.
- Can join as a supervisor in Industries.

2.4 ASSESSMENT & CERTIFICATION

The CITS trainee will be assessed for his/her Instructional skills, knowledge and attitude towards learning throughout the course span and also at the end of the training program.

a) The Continuous Assessment (Internal) during the period of training will be done by **Formative Assessment Method** to test competency of instructor with respect to assessment criteria set against each learning outcomes. The training institute has to maintain an individual trainee portfolio in line with assessment guidelines. 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 Method**. The All India Trade Test for awarding National Craft Instructor Certificate will be conducted by DGT at the end of the year as per the guidelines of DGT. The learning outcome and assessment criteria will be the basis for setting question papers for final assessment**.** The external examiner during final examination will also check the individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.

The minimum pass percent for Trade Practical, TM practical Examinations and Formative assessment is 60% & for all other subjects is 40%. There will be no Grace marks.

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 the assessment. While assessing, the major factors to be considered are approaches to generate solutions to specific problems by involving standard/non-standard practices.

Due consideration should also be given while assessing for teamwork, avoidance/reduction of scrap/wastage and disposal of scrap/waste as per procedure, behavioral attitude, sensitivity to the 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 of the following:

- Demonstration of Instructional Skills (Lesson Plan, Demonstration Plan)
- Record book/daily diary
- Assessment Sheet
- Progress chart
- Video Recording
- Attendance and punctuality

- Viva-voce
- Practical work done/Models
- Assignments
- Project work

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

Performance Level	Evidence
(a) Weightage in the range of 60%-75% to be allotted during assessment	
For performance in this grade, the candidate should be well versed with instructional design, implement learning programme and assess learners which demonstrates attainment of an ***acceptable standard*** of crafts instructorship with ***occasional*** **guidance** and engage students by demonstrating good attributes of a trainer.	• Demonstration of ***fairly good*** skill to establish a rapport with audience, presentation in orderly manner and establish as an expert in the field. • Average engagement of students for learning and achievement of goals while undertaking the training on specific topic. • A fairly good level of competency in expressing each concept in terms the student can relate, draw analogy and summarize the entire lesson. • Occasional support in imparting effective training.
(b) Weightage in the range of 75%-90% to be allotted during assessment	
For performance in this grade, the candidate should be well versed with instructional design, implement learning programme and assess learners which demonstrates attainment of a ***reasonable standard*** of crafts instructorship with ***little*** **guidance** and engage students by demonstrating good attributes of a trainer.	• Demonstration of ***good*** skill to establish a rapport with audience, presentation in orderly manner and establish as an expert in the field. • Above average engagement of students for learning and achievement of goals while undertaking the training on specific topic. • A ***good*** level of competency in expressing each concept in terms the student can relate, draw analogy and summarize the entire lesson. • Little support in imparting effective training.
(c) Weightage in the range of more than 90% to be allotted during assessment	
For performance in this grade, the	• Demonstration of ***high*** skill level to

candidate should be well versed with instructional design, implement learning programme and assess learners which demonstrates attainment of a ***high standard*** of crafts instructorship with ***minimal or no support*** and engage students by demonstrating good attributes of a trainer.	establish a rapport with audience, presentation in orderly manner and establish as an expert in the field. • Good engagement of students for learning and achievement of goals while undertaking the training on specific topic. • A ***high*** level of competency in expressing each concept in terms the student can relate, draw analogy and summarize the entire lesson. • Minimal or no support in imparting effective training.

3. GENERAL INFORMATION

Name of the Trade	**MECHANIC AGRICULTURAL MACHINERY-CITS**
Trade Code	**DGT/ 4036**
NCO – 2015	7233.2800, 2356.0100
NOS covered	ASC/N9412, ASC/N9453, ASC/N9454, ASC/N9455, ASC/N9425, ASC/N9456, ASC/N9457, ASC/N9458, ASC/N9459, ASC/N9460, ASC/N9461, ASC/N9410, ASC/N9411
NSQF Level	Level-5
Duration of Craft Instructor Training	One Year
Unit Strength (No. Of Student)	25
Entry Qualification	Degree in Agricultural Engineering from AICTE/UGC recognized engineering college/University. OR 03 years Diploma in Agricultural Engineering after class 10th from AICTE/ recognized Board / University. OR Ex-serviceman from Indian Armed Forces with 15 years of service in related field as per equivalency through DGR. OR 10th Class with 02 year NTC/NAC passed in the trade of "Mechanic Agricultural Machinery" + 1 year of related experience.
Minimum Age	18 years as on first day of academic session.
Space Norms	120 Sq. m
Power Norms	10 KW
Instructor's Qualification for	
1. Mechanic Agricultural Machinery -CITS Trade	B.Voc/Degree in Agricultural Engineering from AICTE/UGC recognized University with two years experience in relevant field. OR 03 years Diploma in Agricultural Engineering from AICTE/recognized Board / University or relevant Advanced Diploma (Vocational) from DGT with five years experience in relevant field. OR Ex-serviceman from Indian Armed Forces with 15 years of service in related field as per equivalency through DGR. Candidate should have

	undergone methods of Instruction of course or minimum 02 years of experience in technical training institute of Indian Armed Forces. OR NTC/ NAC passed in the Mechanic Agricultural Machinery with seven years experience in relevant field. **Essential Qualification:** National Craft Instructor Certificate (NCIC) in Mechanic Agricultural Machinery, in any of the variants under DGT.
2. Workshop Calculation & Science	B.Voc/Degree in any Engineering from AICTE/ UGC recognized Engineering College/ university with two years experience in relevant field. OR 03 years Diploma in Engineering from AICTE /recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with five years' experience in the relevant field. OR NTC/ NAC in any Engineering trade with seven years experience in relevant field. **Essential Qualification:** National Craft Instructor Certificate (NCIC) in relevant trade OR NCIC in RoDA or any of its variants under DGT
3. Engineering Drawing	B.Voc/Degree in Engineering from AICTE/ UGC recognized Engineering College/ university with two years experience in relevant field. OR 03 years Diploma in Engineering from AICTE /recognized board of technical education or relevant Advanced Diploma (Vocational) from DGT with five years' experience in the relevant field. OR NTC/ NAC in any one of the 'Mechanical group (Gr-I) trades categorized under Engg. Drawing'/ D'man Mechanical / D'man Civil' with seven years experience. **Essential Qualification:** National Craft Instructor Certificate (NCIC) in relevant trade OR NCIC in RoDA / D'man (Mech /civil) or any of its variants under DGT
4. Training Methodology	B.Voc/Degree in any discipline from AICTE/ UGC recognized College/ university with two years experience in training/ teaching field. OR Diploma in any discipline from recognized board / University with five years experience in training/teaching field. OR NTC/ NAC passed in any trade with seven years experience in training/ teaching field.

	Essential Qualification: National Craft Instructor Certificate (NCIC) in any of the variants under DGT / B.Ed /ToT from NITTTR or equivalent.
5. Minimum Age for Instructor	21 Years

4. JOB ROLE

Brief description of job roles:

Manual Training Teacher/Craft Instructor; instructs students in ITIs/Vocational Training Institutes in respective trades as per defined job role. Imparts theoretical instructions for the use of tools & equipment of related trades and related subjects. Demonstrate process and operations related to the trade in the workshop; supervises, assesses and evaluates students in their practical work. Ensures availability & proper functioning of equipment and tools in stores.

Agriculture Engineering Technician; Agriculture Engineering Technician maintains, services, repairs or overhauls different farm equipment such as Tractors, Power tillers, Sprayers, Drillers, etc. Receives instructions from Senior Engineers. Studies standing duty chart, sketches, blue prints, etc. and decides methods of work to be adopted. Draws necessary stores, examines their suitability, and issues them to respective workers. Instructs and guides his subordinates on machines and tools to be used, accuracy required, process of work and other details to ensure correct repairs or overhauling. Checks completed work, makes necessary adjustments or replacements. Guides farmers in proper use and upkeep of farm equipment. Lends machines on hire to farmers. Sells spare parts of farm machinery and implements. Prepares contour maps by taking levels and plane table surveying. Examines land and prepares estimates for reforming the land to make it suitable for cultivation. Prepares plans for field channels for surface and sub-surface drainage. Provides bench terraces in hill areas and guides installation of sprinkler irrigation equipment and accessories. May design and fabricate agricultural machinery. May also sell pesticides and fertilizers.

Reference NCO 2015:

a) 2356.0100-Manual Training Teacher/Craft Instructor.
b) 7233.2800-Agriculture Engineering Technician.

Reference NOS:

a) ASC/N9412
b) ASC/N9453
c) ASC/N9454
d) ASC/N9455
e) ASC/N9425
f) ASC/N9456
g) ASC/N9457

h) ASC/N9458
i) ASC/N9459
j) ASC/N9460
k) ASC/N9461
l) ASC/N9410
m) ASC/N9411

5. LEARNING OUTCOME

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

5.1 TRADE TECHNOLOGY

1. Analyse & implement the quality management techniques and safe working practices in workplace; evaluate measurement of tractor's dimensions. (NOS: ASC/N9412)
2. Manage independently the servicing of diesel engine, perform daily periodical maintenance of tractor & hitching of agricultural implements with tractor. (NOS: ASC/N9453)
3. Monitor checking, repairing, servicing& replacement of major components and assemblies of different types of ploughs, rotavator, disc harrow, cultivator, Tracer, leveller, ditcher & bund former. (NOS: ASC/N9454)
4. Perform and manage independently installation, testing, servicing & replacement of major components & assemblies of various types of digger, seed drill machine, planter machine, transplanter Fertilizer applicator, and assess the calibration of seed drill machine & Planter Machine. (NOS: ASC/N9455)
5. Review the installation, testing, repair & servicing of different types of pump, irrigation valve & hydrants, Power tiller & Power weeder. (NOS: AGR/N9425)
6. Monitor testing, repairing, servicing & replacement of major components and assemblies of farming tools, equipments & machines. (NOS: ASC/N9456)
7. Manage independently operations, adjustments, periodical maintenance & care of winnower, cleaner & grader. (NOS: ASC/N9457)
8. Plan & execute independently servicing of rice huller, polisher, feed grinder-cum-mixer, hammer mill. (NOS: ASC/N9458)
9. Review performance of grain handling, seed treating and drying equipment & assess preparation of log books of Tractor & agricultural machinery. (NOS: ASC/N9459, ASC/N9460)
10. Plan & organise service schedule of Farm machinery (Off season storage). (NOS: ASC/N9461)

11. Read and apply engineering drawing for different application in the field of work. (NOS: ASC/N9410)
12. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS: ASC/N9411)

6. COURSE CONTENT

SYLLABUS FOR MECHANIC AGRICULTURAL MACHINERY– CITSTRADE			
TRADE TECHNOLOGY			
Duration	**Reference Learning Outcome**	**Professional Skills (Trade Practical)**	**Professional Knowledge (Trade Theory)**
Practical 12 Hrs Theory 06 Hrs	Analyze & implement the quality management techniques and safe working practices in workplace; evaluate measurement of tractor's dimensions.	1. Practice of safety precaution to be observed in the MAM section& workshop& Practice 5 S & 7 QC techniques in the MAM workshop. 2. Practice of different working system of tractor with the Measurement of dimensions of tractor. 3. Servicing of engine. 4. Dismantling & assembling of hydraulic pump & distributor. 5. Set and adjust hydraulic pressure at ideal rpm of engine. 6. Work on agriculture machinery by handling farm machinery.	• Introduction to the trade curriculum. • Importance of the trade in the advancement of agriculture technology in the country. • Concept of 5 S & 7 QC tools, time management as employed for quality circle. • Importance of healthy environment. • Types of tractor. • Different system of tractor. • Technical terms used in tractor. • Major dimension of tractor. • Types of engine, working & its components. • Daily &periodical maintenance.
Practical 12 Hrs Theory 06 Hrs	Manage independently the servicing of diesel engine; perform daily periodical maintenance of tractor & hitching of agricultural implements with tractor.	7. Hitching practice of trailed type implements. 8. Hitching practice of mounted type implements. 9. Field operation & adjustments of trailed & mounted type implements.	• Tillage, Types of tillage & their uses. • Method of hitching. • Importance of weight transfer. Considerations while using mounted and semi mounted implements. Methods of field operation.
Practical 75 Hrs	Monitor checking, repairing,	10. Servicing, Dismantling & assembling of Mould Board	• Function & working Principle of Mould Board Plough.

Theory 25 Hrs	servicing & replacement of major components and assemblies of different types of ploughs, rotavator, disc harrow, cultivator, Tracer, leveler, ditcher & bund former.	plough. 11. Measuring Horizontal & Vertical suction. 12. Workshop adjustments, hitching, methods of ploughing, field operation& adjustment.	• Constructional details Workshop adjustments. • Methods of field operation. Recommended speeds for operation. • Daily & Periodical maintenance. • Fault& remedies.
		13. Servicing, Dismantling& assembling of Disc plough. 14. Measuring Disc angle & Tilt angle. 15. Workshop adjustments, hitching, methods of ploughing, field operation& adjustment.	• Function &working Principle of Disc Plough. • Constructional details. • Workshop adjustments. • Methods of field operation. Recommended speeds for operation. • Daily& Periodical maintenance. • Fault& remedies.
		16. Servicing of sub soiler. 17. Dismantling & assembling of chisel plough. 18. Hitching of sub soiler/chisel plough. 19. Workshop adjustments. 20. Field operation & adjustment.	• Function &working Principle of Sub soiler & chisel plough. • Constructional details. • Workshop adjustments. • Methods of field operation. Recommended speeds for operation. • Daily& Periodical maintenance. • Fault& remedies.
		21. Servicing, Dismantling& assembling of rotavator. 22. Hitching of rotavator. 23. Workshop adjustments, hitching& field operation.	• Function &working Principle of rotavator. • Constructional details. • Workshop adjustments. • Methods of field operation. Recommended speeds for operation. • Daily& Periodical maintenance. • Fault& remedies.
		24. Servicing, Dismantling& assembling of disc harrows (Single/offset type/double action),Measurement of gang angle. 25. Servicing, Dismantling& assembling of bar/power harrows. 26. Servicing of spring/blade	• Function & working of disc harrow. • Types of harrow & their uses. Constructional details. • Function & working of Rotavator. • Workshop adjustments. • Method of hitching.

		harrow. 27. Hitching arrangements, 28. Field operation &workshop adjustments.	• Difference between disc harrow & drag harrow. • Difference between disc harrow & disc plough. • Daily& periodical maintenance. • Fault& remedies.
		29. Servicing, Dismantling& assembling of cultivator (spring/rigid). 30. Setting of cultivator with the help of floor diagram. 31. Workshop adjustment, Hitching arrangements, field operation & adjustments.	• Function & working of cultivator. • Types of cultivator. • Construction details & uses. • Common types of shovels & sweeps. • Methods of field operation. Recommended speeds for operation. • Daily & periodical maintenance. • Fault& remedies.
		32. Servicing, Dismantling& assembling of scraper, leveller, ditchers & bund former. 33. Workshop adjustments, hitching arrangements. 34. Practice of field operation &adjustments.	• Function & working of scraper/blade, ditchers & bund former. • Construction details & uses. • Methods of field operation. • Recommended speeds for operation. • Prime mover and driving practice adjustment. • Daily& periodical maintenance. • Fault & remedies.
		35. Servicing, Dismantling& assembling of lazer leveller. 36. Workshop & hitching adjustment. 37. Practice of field operation of lazer leveller.	• Function & working of laze leveller. • Construction details & uses. Methods of field operation. • Recommended speeds for operation. • Prime mover and driving practice adjustment. • Daily& periodical maintenance. • Fault & remedies.

Practical 85 Hrs Theory 35 Hrs	Perform and manage independently installation, testing, servicing & replacement of major components & assemblies of various types of digger, seed drill machine, planter machine, transplanter Fertilizer applicator, and assess the performance of calibration of seed drill machine, Planter Machine.	38. Servicing, Dismantling& assembling of trench digger machine & post hole digger. 39. Workshop& hitching adjustment. 40. Practice of field operation & adjustments.	• Function & working of Trench digger & Post hole digger. • Construction details & uses. • Methods of field operation. • Recommended speeds for operation. • Prime mover and driving practice adjustment. • Daily & periodical maintenance. • Fault& remedies.
		41. Servicing, Dismantling& assembling of Seed drill machine. 42. Practice in calibration of seed &fertilizer metering devices rates. 43. Workshop & hitching, field operation & adjustments of special drills such as zero till, strip drill/roto drill & happy seeder. 44. Practice of field operation of special drills.	• Function & working of Seed drill machine. • 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/roto drill & Happyseeder. • Types of furrow openers, methods of transmission of power. • Calibration and mode of operation. • Guide chart for mixing fertilizers. • Recommended speeds for operation. • Daily & periodical maintenance. • Fault& remedies.
		45. Servicing, Dismantling& assembling of Planter machine. 46. Practice in calibration of planter& fertilizer rates. 47. Workshop, field operation & adjustments.	• Function & working of Planter machine. • Types of Planter & their uses. • Constructional details of Planter. • Seed & fertilizer metering device. • Types of furrow openers. • Methods of transmission of power. • Calibration and mode of

			operation. • Daily & periodical maintenance. • Fault& remedies.
		48. Servicing, Dismantling& assembling of Vegetable transplanter. 49. Setting of vegetable transplanter. 50. Workshop adjustments.	• Function & working of vegetable transplanter. • Types of vegetable transplanter& their uses. • Constructional details of vegetable transplanter. • Methods of transmission of power. • Recommended speeds for operation. • Daily & periodical maintenance.
		51. Servicing, Dismantling& assembling of Paddy transplanter. 52. Setting of Paddy transplanter. 53. Practice of cage wheels. Workshop adjustments.	• Function & working of Paddy transplanter. • Types of Paddy transplanter & their uses. • Constructional details of Paddy transplanter. • Methods of transmission of power. • Recommended speeds for operation. • Daily & periodical maintenance.
		54. Servicing, Dismantling& assembling of fertilizer applicator. 55. Practice of calibrations of fertilizer applicator. 56. Workshop adjustments.	• Function & working of fertilizer applicator. • Types of fertilizer applicator & their uses. • Constructional details. • Methods of transmission of power. • Calibration & workshop adjustments. • Recommended speeds for operation. • Daily& periodical maintenance.

Practical 45 Hrs Theory 18 Hrs	Review the installation, testing, repair & servicing of different types of pump, irrigation valve & hydrants, Power tiller & Power weeder.	57. Dismantling & assembling of volute type centrifugal pump. 58. Preparing foundations and installing a pumping set. 59. Adjustments and operation of a pumping set.	• Function & working of centrifugal pump. • Study of boring and its operation. • Types of Pumps & their uses. • Types of irrigation systems. • Constructional details. • Methods of transmission of power. • Recommended speeds for operation. • Daily& periodical maintenance.
		60. Servicing, Dismantling& assembling of a submersible pump. 61. Installation of HDPE, QRC, PVC & dipper pipe line.	• Function & working of submersible pump. • Types of pump & the uses. • Constructional details. • Methods of transmission of power. • Description of tools and equipment required for boring a tube well. • Daily & periodical maintenance.
		62. Installing sprinkler and fogger. 63. Repairing and adjusting of irrigation valves, and hydrants. 64. Installing pop-up and drippers. 65. Installing drippers on level/ hilly ground. 66. Field operation & adjustment (angular/ full circle).	• Function & working of sprinkler/Pop up, fogger and drip irrigation. • Pump selection, common prime movers, and coupling devices. • Different types of irrigation pipes Working principles of valves and hydrants. • Methods of field operation &adjustment. • Daily and periodical Maintenance.
		67. Servicing, Dismantling& assembling of Power tiller/power weeder. 68. Servicing of rotary unit of power tiller. 69. Workshop& hitching adjustment. 70. Practice of field operation & adjustments.	• Function & working of power tiller/power weeder. • 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. • Daily and periodical maintenance.
Practical 170 Hrs Theory 64Hrs	Monitor testing, repairing, servicing & replacement of major components and assemblies of farming tools, equipments& machines.	71. Practice with computer. General purpose & special purpose computer. 72. Practice on data base creation with MS access and data base application.	• Introduction to the trade curriculum. • Importance of the trade in the advancement of agriculture technology in the country. Use of computer. • Features and applications. • Data types. Physical& logical concept of data base.
		73. Servicing, Dismantling & assembling of Knapsack Sprayer & duster. 74. Calibration of Sprayer & duster. 75. Servicing of fogging machine. 76. Servicing of aero blast sprayer, cotton sprayer, and high clearance sprayer. 77. Field operation workshop adjustments.	• Function & working of sprayer & duster, fogger, cotton sprayer, aero blast sprayer & high clearance sprayer. • Types& their uses. • Constructional details. • Calibration of sprayer & duster. • Recommended speeds for operation. Methods of transmission of power. • Common accidents and their prevention. • Daily& periodical maintenance.
		78. Servicing, Dismantling& assembling of reaper, straw reaper & reaper binder machine. 79. Hitching and fitting with prime mover. 80. Field operation &Workshop adjustments.	• Function & working of reaper, straw reaper & reaper binder machine. • Types & their uses. • Constructional details. • Recommended speeds for operation. • Methods of transmission of power. • Common accidents and their prevention. • Daily& periodical maintenance.

		81. Servicing, Dismantling& assembling of thresher, maize sheller & groundnut decorticator. 82. Fitting with prime mover. 83. Field operation & adjustment.	• Function & working of thresher, maize Sheller & groundnut decorticator. • Types & their uses. • Constructional details. • Recommended speeds for operation. • Methods of transmission of power. • Common accidents and their prevention. • Daily& periodical maintenance.
		84. Servicing, Dismantling of cutter bar assembly, feeder unit, threshing unit, separating unit. 85. Checking, repairing and replacing the defective components. 86. Assembling the Components of different systems of combine harvester. 87. Practice with combine on different components systems of combine harvester. 88. Driving practice of combine harvester.	• Function & working of combine harvester. • Types of combiner harvester & their uses. • Flow path material of combine harvesters. • 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. • Recommended speeds for operation. • Methods of transmission of power. • Common accidents and their prevention. • Daily& periodical maintenance.
		89. Servicing, Dismantling& assembling of mower, fodder harvester, chaff cutter & silage cutter. 90. Hitching and fitting with prime mover. 91. Field operation & adjustments.	• Function & working of mower, fodder harvester, chaff cutter & silage cutter, Types & their uses. • Need of green harvesting equipment. • Constructional details. • Methods of transmission of power. • Common accidents and

			their prevention. • Daily& periodical maintenance.
		92. Servicing, Dismantling and assembling rotary harvester, haybailer. 93. Hitching and fitting with prime mover. 94. Field operation and adjustments.	• 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. • Daily& periodical maintenance.
		95. Servicing, Dismantling& assembling of groundnut digger, potato/onion digger. 96. Attachment of diggers with prime- movers. 97. Field operation and adjustments.	• Function and working of groundnut digger, potato/onion digger. • Need & importance of root harvesting. Workshop adjustments. Method of field operation. Method of transportation. • Common accidents and their prevention. Daily & periodical maintenance.
Practical 22Hrs Theory 10Hrs	Manage independently operations, adjustments, periodical maintenance & care of winnower, cleaner & grader.	98. Servicing of winnower, cleaner & grader. 99. Fitting with prime mover attachment. 100. Operation of winnower, cleaner and grader. 101. Workshop adjustments & operation.	• Function and working of winnower, cleaner & grader. • Need & importance of winnowing. • Types and their uses. Workshop adjustments. • Prime mover attachments & driving system. • Method of field operation. • Method of transportation. • Common accidents and their prevention. • Daily& periodical maintenance.
Practical 22Hrs Theory 10Hrs	Plan & execute independently servicing of rice huller, polisher, feed grinder-cum-mixer, hammer mill.	102. Servicing of rice huller, polisher, feed grinder cum mixer, hammer mill. 103. Fitting with prime mover. 104. Operation of rice huller, polisher, feed grinder cum mixer, hammer mill.	• Function and working of rice huller, polisher, feed grinder cum mixer, hammer mill, Need &importance, Types and their uses. • Workshop adjustments. • Prime mover attachments

		105. Workshop adjustments& operation.	& driving system. • Method of transportation. • Common accidents and their prevention. • Daily& periodical maintenance.
Practical 25 Hrs Theory 10 Hrs	Review performance of grain handling, seed treating and drying equipment. &assess preparation of log books of Tractor & agricultural machinery.	106. Operate grain drying and storing plant. 107. Practice different aspects of the construction, adjustments, and controls. 108. Practice operation of grain handling seed treating and drying equipment. 109. Practice of silo structure.	• 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 metalbins (silo structure). • Methods and instruments used for measuring moisture contents of grains. • Equipment and methods used for treating and fumigating seeds and grains.
		110. Practice Preparation of Log books. 111. Practice of necessary records i.e. Log books of tractors, combines etc. 112. Practice Preparation of service schedules. 113. Practice Off season storage of farm equipment.	• Operation of transporting and handling equipment i.e. Tractor, tractor trailer, power tiller & combine harvester.
Practical 12 Hrs Theory 06 Hrs	Plan & organize service schedule of Farm machinery (Off season storage).	114. Practice of farm records, accounts and log books. 115. Practice Service schedule of farm machinery. 116. Practice Off season storing of farm equipment. 117. Preparing layout and list of equipment of a typical farm workshop.	• Procedure and principle for efficient management and organization of a farm. • Discussion on different farm shop layout.
Engineering Drawing: 40 Hrs.			
Professional Knowledge ED- 40 Hrs.	Read and apply engineering drawing for different application in the	**CIRCLES, TANGENTS AND ELLIPSE:** Practical applications procedure for constructing tangent to given circle-lines- loop pattern--tangential circles- external tangents- internal tangents ellipse **PARABOLIC CURVES, HYPERBOLA:** Involutes - Properties and their application. Procedure for constructing parabolic curve-hyperbolic curve-in volute curve. epicycloids, hypocycloid, Involutes, spiral &	

	field of work.	Archimedes spiral **TECHNICAL DRAWING/ SKETCHING OF COMPONENTS' PARTS:** Views of object Importance of technical sketching-types of sketches-Isometric drawing sketching- Oblique drawing sketching. **PROJECTIONS**: Theory of projections (Elaborate theoretical instructions), Reference planes, orthographic projections concept 1st Angle and 3rd Angle, Projections of points, Projections of Lines–determination of true lengths & inclinations. Projections of plane, determination of true shape. Exercises on missing surfaces and views. Orthographic drawing or interpretation of views. Introduction to first angle projections of solids. **ISOMETRIC VIEWS**: Fundamentals of isometric projections (Theoretical Projections) Isometric views from 2 to 3 given orthographic views. Preparation of simple working drawing of Furniture items like table, stool and any job prepared in the workshop. **SECTIONAL VIEWS:** Importance and salient features, Methods of representing sections, conventional sections of various materials, classification of sections, conventional in sectioning. Drawing of full section, half section, partial or broken out sections, offset sections, revolved sections and removed sections. Drawing of different conventions for materials in section, conventional breaks for shafts, pipes, Rectangular, square angle, channel, rolled sections. Exercises on sectional views of different objects. - **DEVELOPMENT AND INTERSECTIONS:** Development of surfaces-Types of surface- Methods of development-Intersection- Methods of drawing intersection lines-critical point or key point. **FASTENERS**: Sketches of elements of screw threads, Sketches of studs, cap screws machine screws, set screws, Locking devices, bolts, Hexagonal & square nuts & nut bolt & washer assembly. Sketches of plain spring lock, toothed lock, washers, cap nut, check nut, slotted nut, cassel nut, sawn nut, wing nut, eye blot, tee bolt & foundation bolt. Sketches of various types of rivet heads (snap–pan–conical–countersunk) Sketches of keys (sunk, flat, saddle, gib head, woodruff) Sketches of hole & shaft assembly. **DETAIL DRAWING AND ASSEMBLY DRAWING:** Details of machine drawing- Assembly drawing- surface quality-surface finish standard-Method of indicating surface roughness for general engineering drawing-symbols used for indication of surface roughness-symbols for direction of lay. Geometrical tolerance. Detail drawing of the following with complete dimensioning, tolerances, material and Surface finish specifications 1. Universal couplings 2. Ball bearing and roller bearing. 3. Fast and loose pulley. 4. Stepped and V belt pulley. 5. Flanged Pipe joints, right angle bend. 6. Tool Post of Lathe Machine.

		7. Tail Stock of Lathe Machine 8. Stepped and V belt pulley. 9. Flanged Pipe joints, right angle bend. 10. Tool Post of Lathe Machine. 11. Tail Stock of Lathe Machine Practice of blue print reading on limit, size, fits, tolerance, machining symbols, and reading out of assembly drawing etc., ISO Standards. **READING OF ENGINEERING DRAWING:** Blue print and machine drawing reading exercises. **GRAPHS & CHARTS**: Types (Bar, Pie, Percentage bar, Logarithmic), Preparation & interpretation of the graphs and charts. **AUTO CAD:** Familiarization with AutoCAD application in engineering drawing. Practice on AutoCAD using Draw & Modify commands. Practice on AutoCAD with Rectangular snap using Draw, Modify, Inquiry commands. Practice on AutoCAD using text dimensioning& dimensioning styles Practice on AutoCAD to draw nuts, bolts & washers. Isometric views-isometric views with square, taper and radial surface-simple & complex views. Perspective views. Practice on AutoCAD using isometric snap to make isometric drawings Practice on AutoCAD using Hatch command and application. Practice on AutoCAD using 3D primitives with UCS (User Co-ordinate system).
WORKSHOP CALCULATION & SCIENCE: 40 Hrs.		
Professional Knowledge WCS- 40 Hrs.	Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study.	**WORKSHOP CALCULATION:** **Fraction:** Concept of Fraction, Numbers, Variable, Constant, **Ratio & Proportion**: - Trade related problems **Percentage:** Definition, changing percentage to decimal and fraction and vice versa. Applied problems related to trade. Estimation and cost of product. **Algebra:** Fundamental Algebraic formulae for multiplication and factorization. Algebraic equations, simple & simultaneous equations, quadratic equations and their applications. **Mensuration 2D:** Concept on basic geometrical definitions, basic geometrical theorems. Determination of areas, perimeters of triangles, quadrilaterals, polygons, circle, sector etc. **Mensuration 3D:** Determination of volumes, surface areas of cube, cuboids cylinders, hollow cylinder, sphere prisms, pyramids cone spheres, frustums etc. Mass, Weight, Volume, Density, Viscosity, Specific gravity and related problems. **Trigonometry:** Concept of angles, measurement of angles in degrees, grades and radians and their conversions. Trigonometrical ratios and their relations. Review of ratios of some standard angles (0, 30,45,60,90 degrees), Height & Distances, Simple problems. **Graphs:** basic concept, importance. Plotting of graphs of simple linear equation. Related problems on ohm's law, series-parallel combination.

		Statistics: Frequency tables, normal distribution, measure of central tendency – Mean, Median & Mode. Concept of probability. Charts like pie chart, bar chart, line diagram, Histogram and frequency polygon. **WORKSHOP SCIENCE:** **Units and Dimensions:** Conversions between British & Metric system of Units. Fundamental and derived units in SI System, Dimensions of Physical Quantities (MLT)-Fundamental & Derived. **Engineering Materials:** Classification properties and uses of ferrous metals, non-ferrous metals, alloys etc. Properties and uses of non-metals such as wood, plastic, rubber, ceramics industrial adhesives. **Heat & Temperature:** Concepts, differences, effects of heat, different units, relation, specific heat, thermal capacity, latent heat, water equivalent, mechanical equivalent of heat. Different Temperature measuring scales and their relation. Transference of heat, conduction, convection and radiation. Thermal Expansion related calculations. **Force and Motion**: Newton's laws of motion, displacement, velocity, acceleration, retardation, rest & motion such as linear, angular. Force – units, different laws for composition and resolution of forces. Concept on centre of gravity and equilibrium of forces in plane. Concept of moment of inertia and torque. **Work, power & energy**: Definitions, units, calculation & application. Concept of HP, IHP, BHP and FHP – related calculations with mechanical efficiency. S.I. unit of power and their relations. **Friction:** Concept of friction, laws of friction, limiting friction, coefficient of friction and angle of friction. Rolling friction & sliding friction with examples. Friction on inclined surfaces **Stress & Strain:** Concepts of stress, strain, modulus of elasticity. Stress- strain curve. Hook's law, different module of elasticity like Young's modulus, modulus of rigidity, bulk modulus and their relations. Poisson's ratio. **Simple machines:** Concept of Mechanical Advantage, Velocity Ratio, Efficiency and their relations. Working principles of inclined plane, lever, screw jack, wheel and axle, differential wheel and axle, worm and worm wheel, rack and pinion. Gear train.

		Electricity: Basic definitions like emf, current, resistance, potential difference, etc. Uses of electricity. Difference between ac and dc. Safety devices. Difference between conductors and semiconductors and resistors, Materials used for conductors, semiconductors and resistors. Ohm's Law. Series, parallel and series-parallel combination of resistances. Concept, definitions and units of electrical work, power and energy with related problems. **Fluid Mechanics:** Properties of fluid (density, viscosity, specific weight, specific volume, specific gravity) with their units. Concept of atmospheric pressure, gauge pressure, absolute pressure, vacuum and differential pressure.

SYLLABUS FOR CORE SKILLS
1. Training Methodology (Common for all trades) (270Hrs + 180Hrs)

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

7. ASSESSMENT CRITERIA

LEARNING OUTCOME	ASSESSMENT CRITERIA
TRADE TECHNOLOGY (TT)	
1. Analyse & implement the quality management techniques and safe working practices in workplace; evaluate measurement of tractor's dimensions. (NOS: ASC/N9412)	Analyze, plan & execute procedures to achieve a safe working environment in line with occupational health and safety regulations.
	Demonstrate implementation of safety precaution, 5 S techniques, 7QC techniques in the MAM workshop.
	Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures.
	Demonstrate management of store/dispose off dangerous goods and substances according to site policy and procedures following safety regulations and requirements.
	Analyze measurement of dimensions of tractor and explain procedures for servicing of diesel engine**.**
	Monitor dismantling &assembling of hydraulic pump & distributor. Set and adjust hydraulic pressure at ideal rpm of engine.
2. Manage independently the servicing of diesel engine, perform daily periodical maintenance of tractor & hitching of agricultural implements with tractor. (NOS: ASC/N9453)	Plan & demonstrate the sequence of hitching of agriculture implements.
	Plan & execute work processes with due consideration to safety precautions during hitching practice.
	Monitor Field operation & adjustments of trailed & mounted type implements.
3. Monitor checking, repairing, servicing & replacement of major components and assemblies of different types of ploughs, rotavator, disc harrow, cultivator, Tracer, leveller, ditcher & bund former. (NOS: ASC/N9454)	Review the selection of tools &equipments and demonstrate care and safety measures in the way specified by manufacturers to dismantle and assemble Mould Board plough/ disc plough/ chisel plough/ rotavator/ disc harrows (Offset type/Single & Double action)/ cultivator (spring/rigid)/ scraper/blade, ditchers & bund former/ lazer leveller.
	Analyze the Technical data to be followed during removal and replacement procedures of Mould Board Plough.
	Evaluate measure and adjustment of Horizontal & Vertical suction.
	Assess measurement and adjustment of disc and tilt angle.
	Plan & execute hitching of sub soiler/ chisel plough.
	Plan & carry out workshop adjustments, hitching & field operation of rotavator.
	Check measurements and adjustment of gang angle as per given specification.
	Plan & carryout adjustment of the cultivator with the help of floor diagrams.

	Explain to carryout Setting of shovels and sweeps.
4. Perform and manage independently installation, testing, servicing & replacement of major components & assemblies of various types of digger, seed drill machine, planter machine, transplanter Fertilizer applicator, and assess the calibration of seed drill machine, Planter Machine. (NOS: ASC/N9455)	Dismantle & Assemble components/sub assemblies of trench digger machine/ Seed drill machine/ Planter machine/ Vegetable transplanter/ Paddy transplanter/ fertilizer applicators in a manner appropriate to the location & their functionality.
	Take all stipulations into account in setting up the work piece.
	Record & evaluate servicing of post hole digger as per technical Manual.
	Demonstrate review of workshop & hitching adjustment & practical field operation.
	Assess the calibration of seed & fertilizer metering devices rates.
	Plan & execute workshop & hitching, field operation & adjustments of special drills such as zero till, strip drill/roto drill & Happy seeder.
	Monitor and assess the practice of field operation of special drills.
	Select & implement care and use of safety while dismantling and assembling of trencher & post hole digger/ planters/ vegetable transplanter/ paddy transplanter/ fertilizer applicators.
	Use the tools and equipment in the way specified by manufacturers to dismantle and assembles of trencher & post hole digger/ planters/ vegetable transplanter/ paddy transplanter/ fertilizer applicators.
	Explain & demonstrate care and use of PPE while dismantling and assembling of seed drills.
	Plan & execute to carryout calibration of seed & fertilizer rates/ Planter machine/ Vegetables transplanter/ Fertilizer applicator/ paddy transplanter.
	Select tools and materials for the job and make this availablefor use in a timely manner.
	Analyze& carryout setting of planters with different seed plates & adjust for planting/ vegetable transplanter/Paddy transplanter.
	Plan & carryout veg. transplanter adjustments/ workshop adjustments of fertilizer applicator.
5. Review the installation, testing, repair & servicing of different types of pump, irrigation valve & hydrants, Power tiller &Power weeder. (NOS: AGR/N9425)	Select & implement the care and use of safety measures while dismantling and assembling of volute type centrifugal pump.
	Plan & prepare foundations and installing a pumping set.
	Demonstrate selection & use of the tools and equipment as per the specifications set by the manufacturers to dismantle

	and assemble volute type centrifugal pump/ submersible pump.
	Review the technical data removal and replacement procedures legal requirements while dismantling and assembling volute type centrifugal pump.
	Carryout independently adjustments of centrifugal pump.
	Plan & carryout installation /servicing of submersible Pump/ HDPE/ QRC/PVC / dipper pipe line/ sprinkler and fogger/ pop-up and drippers/ drippers on level/ hilly ground/ Power tiller/power weeder.
	Select tools and materials for the job and make this availablefor use in a timely manner
	Ensure implementation of care and use of safety measures while servicing of irrigation valves and hydrants.
	Apply use of the tools and equipment in the way specified by manufacturers for servicing of irrigation valves and hydrants.
	Plan & carryout installation of sprinkler, fogger, pop-up and dippers by reviewing Technical data removal and replacement procedures legal requirements.
	Plan & execute field operation & adjustment (angular/ full circle).
6. Monitor testing, repairing, servicing & replacement of major components and assemblies of farming tools, equipments & machines. (NOS: ASC/N9456)	Plan & perform the servicing, dismantling & assembling of Knapsack Sprayer & Duster/ reaper/ straw reaper / reaper binder machine/ thresher/ maize Sheller & groundnut decorticator /rotary harvester/hay bailer/ groundnut digger, potato/onion digger.
	Analyze& evaluate calibration of sprayer & duster.
	Plan & execute servicing of fogging machine/ cutter bar assembly, feeder unit, threshing unit/ separating unit.
	Test, repair & replace the defective components of the machine or equipment.
	Assemble components of different systems of combine harvester.
	Carryout Field adjustment and operation of sprayers and Dusters.
	Perform hitching & fitting with prime movers/ attachment of diggers with prime movers.
7. Manage independently operations, adjustments, periodical maintenance & care of winnower, cleaner & grader. (NOS: ASC/N9457)	Operate and handle adjustments of winnower, cleaner & grader.
	Perform fitting with prime mover attachment.
	Plan & execute care & periodical maintenance procedure.
	Carry out optimum & effective servicing of winnower, cleaner & grader.

8. Plan & execute independently servicing of rice huller, polisher, feed grinder-cum-mixer, hammer mill. (NOS: ASC/N9458)	Explain functions & working process of huller, polisher, feed grinder cum mixer, hammer mill.
	Demonstrate the operations and servicing of huller, polisher, feed grinder cum mixer, hammer mill.
	Plan & organize workshop adjustments & operations.
9. Review performance of grain handling, seed treating and drying equipment & assess preparation of log books of Tractor & agricultural machinery. (NOS: ASC/N9459, ASC/N9460)	Apply care and use of safety measures while operating grain handling, seed treating and drying equipment.
	Perform operations on grain drying & storing plant.
	Analyze different aspects of the construction, adjustments, controls.
	Demonstrate effective practice of Silo Structure.
	Plan & Prepare service schedule for the machineries.
	Plan & prepare log books for necessary records of data.
	Record & evaluate necessary specifications in Log books of tractors, combines etc.
	Care and use of safety while operating log books of Tractor, combine& Agricultural machinery.
	Carryout their procedures & legal requirements.
10. Plan & organise service schedule of Farm machinery (Off season storage). (NOS: ASC/N9461)	Maintain farm records, accounts &log books.
	Develop Service schedule of farm machinery.
	Plan & execute Off season storing of farm equipment.
	Demonstrate care and use of safety measures while operating service schedule of agricultural machinery (Off season storage).
	Plan & prepare layout and list of equipment of a typical farm workshop.
	Carryout required procedures for Off season storage.
11. Read and apply engineering drawing for different application in the field of work. (NOS: ASC/N9410)	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.
12. Demonstrate basic mathematical concept and principles to perform practical operations. Understand and explain basic science in the field of study. (NOS: ASC/N9411)	Solve different mathematical problems
	Explain concept of basic science related to the field of study

8. INFRASTRUCTURE

LIST OF TOOLS AND EQUIPMENT FOR "MECHANIC AGRICULTURAL MACHINERY" (CITS)			
For batch of 25 candidates			
S No.	**Items**	**Specification**	**Quantity**
A. TRAINEES TOOL KIT			
1.	Caliper spring inside	15 cm	25+1 nos.
2.	Caliper spring outside	15 cm	25+1 nos.
3.	Centre punch	100 mm	25+1 nos.
4.	Chisel cold flat	20 mm x 150 mm	25+1 nos.
5.	Feeler Gauge	26 blades(Metric)	25+1 nos.
6.	Hammer sledge	4 &5 Kg	25+1 nos.
7.	Hammer Cross peen	0.5 kg	25+1 nos.
8.	Hammer ball peen	0.5 kg	25+1 nos.
9.	Hammer copper with handle.	1 kg	25+1 nos.
10.	Hammer plastic with handle.	0.25 kgs	25+1 nos.
11.	Hammer, Planishing.		25+1 nos.
12.	File square second cut	20 cm.	25+1 nos.
13.	File square rough.	30 cm	25+1 nos.
14.	Hand file second cut flat	20 cm	25+1 nos.
15.	Hand file second cut half-round	20 cm	25+1 nos.
16.	Hand file smooth triangular	20 cm	25+1 nos.
17.	Hand file Round	30 cm	25+1 nos.
18.	Hand file Bastard	30 cm	25+1 nos.
19.	Pliers Circlip flat nose	15 cm	25+1 nos.
20.	Pliers Circlip round nose (Internal & external)	15& 20 cm	25+1 nos.
21.	Pliers side cutting	15 cm	25+1 nos.
22.	Screw driver	150 mm x 8 mm	25+1 nos.
23.	Screw driver	200 mm x 9 mm	25+1 nos.
24.	Screw driver	300 mm x 9 mm	25+1 nos.
25.	Steel rule	15 cm	25+1 nos.
26.	Steel rule	30 cm	25+1 nos.
27.	Steel tool box with lock and key (folding type)	400 x 200 x 150 mm	25+1 nos.
28.	Dividers spring	15 cm	25+1 nos.
29.	Pipe wrench	350 mm	25+1 nos.
30.	Cleaning Tray	45 x 30 cm	25+1 nos.
31.	Plier combination	15 cm	25+1 nos.
32.	Plier side cutting	15 cm	25+1 nos.
33.	Plier round nose	15 cm	25+1 nos.

34.	Scriber bit with scribing block universal	15 cm	25+1 nos.
35.	Spanner, double ended	set of 12 metric sizes 6 mm to 32 mm.	25+1 nos.
36.	Spanner, ring	set of 12 metric size 6 mm to 32 mm	25+1 nos.
37.	Spanner socket	6-32 mm.	25+1 nos.
B. MEASURING INSTRUMENT SHOP OUTFIT			
38.	Allen key	set of 12 pieces (2 mm to 14 mm)	4 set
39.	Bearing puller screw powered/ hydraulic powered with attachments	Max spread 80, 200 and 300 mm	2 nos.
40.	Spanner socket pneumatic/power tool kit		2 sets
41.	Blow lamp.		2 nos.
42.	Cage Wheel		1 set
43.	Chain and pulley block electric type	3000 kg. Capacity	1 no.
44.	Chisel cross cut	9 x 3 mm	1 set
45.	Chisel diamond point	9 mm	1 set
46.	Chisel half round	9 mm	2 nos.
47.	Chisel cross cut	200 mm x 6 mm	2 nos.
48.	Pliers Circlip long nose internal and external type	15 cm	2 nos.
49.	Pliers Circlip long nose internal and external type	20 cm	2 nos.
50.	Dial test indicator	to read 0.25 mm	2 each
51.	Drift punch copper	15 cm	2 each
52.	Drill post.		1 each
53.	Drill twist	metric 3 mm to 12 mm x 1 mm	1 no.
54.	Drill twist	S.S. 1/8" to ½" x 1/64" set	1 no.
55.	Drilling machine bench 1 H.P.	to drill up to 12 mm dia	2 nos.
56.	Dynamo and voltage regulator		2 nos.
57.	Engineers square	15 cm blade	1 no.
58.	Engineers stethoscope		2 nos.
59.	Ex-tractor stud	(EZYOUT TYPE)	1 no.
60.	Fire buckets with stand		2 nos.
61.	Fire extinguisher		2 nos.
62.	Hand Drill Pneumatic type / Elect.		1 no.

63.	Hand reamers adjustable	10.5 to 11.25 mm, 11.25 to 12.75 mm, 12.75 to 14.25 mm, and 14.25 to 15.75 mm	1 no.
64.	Hand vice	37 mm	2 nos.
65.	Hand vice	up to 3.75 cm	2 nos.
66.	Hollow punch	set of seven pieces 6 mm to 15 mm	
67.	Horses and wheel choke		1 no.
68.	Hydraulic jack Hi-Lift type with trolley	capacity 3 Ton	1 no.
69.	Hydraulic Pump, control valves	(two types)	1 no.
70.	Inspection lamp with guard and wandering lead	50 ft. length	1 no.
71.	Lifting jack screw type	3050 kg.	2 nos.
72.	Lockers with 8 drawers	(standard size)	1 no.
73.	Magnet spanner set.		1 no.
74.	Mallet	(Wooden/plastic)	1 no.
75.	Marking out table	90 x 60 x 90 cm.	1 no.
76.	Mechanical jack		2 nos.
77.	Metal rack	180 x 150 x 45 cm	1 no.
78.	Vernier caliper set 10” or 8” inside and outside, depth to read inches and mm.		2 set
79.	Spanner Ring & open ended	36 to 41 mm	1 set
80.	Spanner socket pneumatic/Power tool kit		1 set
81.	Spanner, T-flax for screwing up and screwing in accessible position.		1 no.
82.	Spanners adjustable	15 cm	2 nos.
83.	Surface plate	60 x 60 cm	1 no.
84.	Taps and dies complete set in Box B.A., B.S.W., B.S.F. American and Metric.		1 set each.
85.	Tacho meter (counting type)		5 nos.
86.	Toe-in, toe-out gauge		2 nos.
87.	Torque wrench	(0 to 20 kg. meter)	1 no.
88.	Torque wrench	12-68 Nm	1 no.
89.	Tray cleaning assorted sizes.		5 nos.
90.	Triple leg grip puller with	max. spread 80, 160, 250, 450	1 no.

	bearings attachment screw/ hydraulic powered	mm	
91.	Twist drills for ratchet brace	6 to 20 by 1.5 cm.	1 set
92.	Vernier caliper set inside and outside, depth to read inches and mm.	10" or 8"	1 no.
93.	Vice grip pliers		4 nos.
94.	Wheel alignment gauge		1 no.
95.	Wing compass	25 cm	2 nos.
96.	Screw jack double lift	4 ton capacity	4 nos
C. GENERAL INSTALLATION /MACHINERY			
97.	Tractor power steering with AC Cabin	60 HP	1 no.
98.	Tractor	45 HP	1 no.
99.	Mould Board Plough	2/3 Bottom	1 no.
100.	Disc Plough	3 Bottom	1 no.
101.	Disc Plough reversible	2 Bottom	1 no.
102.	Chisel Plough	5/7 tine	1 no.
103.	Rotavator	5.5' cutting Width	1 no.
104.	Sub solier	24 -30 inch	1 no.
105.	Disc Harrow	8x8 trailed type	1 no.
106.	Disc Harrow (Mounted type) off set	14 Discs	1 no.
107.	Paddy harrow (mounted type)	14 Discs	1 no.
108.	Pulverizing Roller (Tractor Mounted) with spring loaded cultivator	9/11tyne	1 no.
109.	Bund maker (disc/blade type)		1 no.
110.	Leveler/spike Leveler	3 meter width	1 no.
111.	Laser Leveler complete with transmitter, receiver, control box, survey equipment		1 set
112.	Tractor operator Front mounted dozer with Hydraulic single cylinder		1 no.
113.	Tractor operator scraper and bucket scraper		1 no.
114.	Tractor Operator ditcher		1 no.
115.	Trencher	10" to 16" Width & 4 ft depth	1 no.
116.	Tractor Operator post hole		1 no.

	digger		
117.	Tractor Operator Zero/ strip till Seed cum fertilizer drill	9/11 rows	1 no.
118.	Tractor PTO operated multi - crop direct sowing happy seeder		1 no.
119.	Tractor Operator Seed cum fertilizer drill cum planter		1 no.
120.	Tractor operated two rows Semi /automatic potato planter		1 no.
121.	Tractor operated bed farmer cum three rows planter		1 no.
122.	Tractor operated two rows vegetable trans planter	(semi automatic)	1 no.
123.	Paddy transplanter		1 no.
124.	Sugar cane transplanter		1 no.
125.	Centrifugal Pump with electric motor		1 Unit
126.	Submersible Pump complete unit		1 no.
127.	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 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,		As per requirement

	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)		
128.	Tractor PTO operated sprayer for cotton		1 no.
129.	Self propelled high clearance sprayer	20 hp diesel engine	1 no.
130.	Tractor PTO operated aero blast spray		1 no.
131.	Power operated fogging machine		1 no.

132.	Knapsack /foot sprayer	16 Liter Cap.	1 no.
133.	Power operated manure spreader		1 no.
134.	Rotary duster		1 no.
135.	Mechanical Power Weeder		1 each
136.	Tractor trailer with hydraulic system		1 no.
137.	Multi crop thresher		1 no.
138.	Groundnut decorticator		1 no.
139.	Winnower		1 no.
140.	Self propelled riding type Reaper/Reaper winder		1 no.
141.	Straw reaper		1 no.
142.	Rotary grass mower/Grass Cutter		1 no.
143.	Power Tiller /weeder	Up to 10 HP	1 no.
144.	Prime movers	Engine Stationery type	1nos.
145.	Engine - for walking and riding type reapers		2nos.
146.	Self-propelled Combine Harvester axial flow/Track type combine Harvester fitted with AC cabin.		1 no.
147.	Tractor Operated paddy straw chopper cum spreader,		1 no.
148.	Tractor Operated Straw/HayBaler.		1 no.
149.	Chaff cutter and silage cutter		1each
150.	Field crops like wheat, Soya bean, paddy etc.		As per requirement
151.	Fodder Harvester		1 no.
152.	Tractor operated potato planter		1 no
153.	Tractor operated potato digger		1 no.
154.	Tractor operated ground nut digger		1 no.
155.	Tractor operated onion digger		1 no.
156.	Power operated Grader (wheat, maize)		1 no.
157.	Power operated potato Grader		1 no.
158.	Power Operated Cleaner		1 no.

159.	Drier (Solar/Heater)		1 no.
160.	Dal Mill		1 no.
161.	Rice Mill/Paddy dehusker		1 no.
162.	Rice Polisher		1 no.
163.	Flour Mill		1 no.
164.	Wind mill		1 no.
165.	Solar street light		1 no.
166.	Weighing balance		2 nos.
167.	Measuring tape		4 nos.
168.	Sewing Machine		1 no.
169.	Electric motor 3 Phase	10 H.P	1 no.
170.	Electric motor 3 Phase	7.5 H.P	1 no.
171.	Laptop Computers with Trade Related Software		2 nos.
172.	Desktop computer	CPU: 32/64 Bit i3/i5/i7 or latest 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.	13 nos.
173.	Air conditioner 1.5 ton & 2 ton		As required
D. GENERAL MACHINERY			
174.	Air Compressor double pressure	12c.ft. piston type with pressure gauge	1 no.
175.	Diesel GEN Set with AMF facility	25-50 KVA	1 no
176.	Electric Arc welding Set portable (inverter type)		1 set
177.	Electric pedestal grinder with two 18 cm Wheel	18cm	1 no.
178.	Grinder with two18 cm wheels with twist drill grinding attachment	18 cm	1 no.
179.	Mounted type three bottom mould Board 30 cm. size with coulter and jointer.	30 cm	1 no.
180.	Washing unit/Car Washer, Tractor 35 to 45 HP	35 to 45 HP	1 no.

181.	Steel Almirah large		1 no.
182.	Locker 8 drawer		1 no.
183.	Work bench with 4 vices 12.5 cm jaw.	295 x 120 x 80 cm	4 nos.
E. CLASS ROOM FURNITURE			
184.	Instructor's table and Chair (Steel)		1 set
185.	Students chairs with writing pads		25 nos.
186.	White board size	1200mm X 900 mm	1 no.
187.	Instructors lap top with latest configuration pre-loaded with operating system. and MS Office package.		1 no.
188.	LCD projector with screen.		1 no.


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