REPAIR & MAINTENANCE OF AGRICULTURE MACHINERIES (RMAM)

General Information :

1. Name of the Trade : **REPAIR & MAINTENANCE OF AGRICULTURE MACHINERIES (RMAM)**
2. Entry Qualification : Passed class VIII
3. Duration of Training : 06 Months [Under Vocational Short Term Course]

Objective of the Course :

The objective of the course is to impart necessary competencies focusing on technical skill and knowledge so that they become emptoyable in small scale industry as well as able to be self employed after being trained and obtaining certificate from the Vocational Council.

Considering the magnificent achievement in food grain production and introduction of globalization in this country, the need of new generation of Technicians for rural India in the field of agriculture is needed badly.

At the end of the training, a large numbers of Engine, Tractor and Power Tiller Mechanics will be produced.

Self-employment opportunities are there in machinery repairing and servicing workshop centre.

Course Break — up :

(a) Practical instruction	: 288 Hours.
(b) Theoretical instruction	: 67 Hours.
(c) Entrepreneurial instruction	: 05 Hours.

Marks allotted :

(a) Practical	: 400
(b) Theory	: 100
Total	: 500

The course content is to be covered in less than 26 weeks since some weeks will be used for enrollment procedures, Leave of the instructors, holidays, examination and tests, industrial visits etc.

Industrial Visit :

Industrial cum Study Tour of at least two different related units.

COURSE CURRICULUM
THEORY [67 Hours]

CROP PRODUCTION MACHINERY — 22 Hours

1. Tillage Implements -
   Tillage definition, types and necessity; Functions and types of implements for primary and secondary tillage operations. 6 hrs.
   Constructional parts and working of Mouldboard plough, Disk Plough, Cultivators, Disk Harrow, Bund former.
   Adjustment, care and safety precautions, common faults and remedies.

2. Seeding Machinery -
   Methods of sowing- drilling, dibbling, planting; implements for sowing/planting and transplanting.
   Constructions and working of seeddrill, planters, seed cum fertilizer drill.
   Adjustment, care and safety precautions, common faults and remedies. 6 hrs.

3. Harvesting Machinery -
   Conventional and mechanized harvesting Tools and Machines; Sickle, Reaper, Harvester.
   Construction and working of Power Tiller operated Vertical Conveyor Reaper.
   Adjustment, care and safety precautions, common faults and remedies. 5 hrs.

4. Threshing Machinery -
   Types of threshers - manual and power operated.
   Construction and working of hand and paddle threshers, power threshers.
   Brief introduction of Combine Harvester.
   Adjustment, care and safety precautions, common faults and remedies of manual and power operated threshers. 5 hrs.

ENGINE TRACTOR AND POWER TILLER — 20 Hours

1. IC Engine -
   Engine classification - CI and SI Engines, 2S and 4S Engines; working principles of the IC engines and difference between 2S & 4S, CI & SI Engines. 8 hrs.
   Brief description of Engine components.

2. Engine Systems -
   Brief description of engine systems and their necessity.
   Understanding of fuel system, cooling system, lubrication system, inlet and exhaust system using flow charts. 6 hrs.

3. Tractor -

Different makes and models of Tractor.

Study of different components and systems of Tractor. 3 hrs.

Study of tractor controls and matching implements.

4. Power Tiller -

Different makes and models of Power Tiller.

Study of different components and systems of Power Tiller. 3 hrs.

Study of power tiller controls and matching implements.

PLANT PROTECTION AND IRRIGATION EQUIPMENTS, ELECTRIC MOTORS **15 Hours**

1. Plant Protection Equipment

Use and application of Agricultural Chemicals.

Types of sprayers & their uses, construction and function, Types of dusters and their uses, construction and function. Safety precautions in handling of chemicals and operational techniques. Proper off-season storage. 5 hrs.

2. Irrigation Equipment -

Importance of irrigation and methods of Irrigation.

Types of pumps, principles of operation, their constructional details and application.

Estimation of head, discharge and power requirement Laying of pipes.

Sprinkler irrigation system and equipment, importance and utility. Drip irrigation system and equipment, importance and utility. Pipe fiitting techniques and field layouts. 5 hrs.

3. Electric Motors—

Types of electric motors used in pump sets, tube wells, threshers etc. Selection of electric motors.

Care, maintenance and installation of electric motors.

Electric motor trouble shooting, periodic servicing and off-season storage

Installation of electric motor, checking of circuit, starter fitting and setting

Safety, precautions in handling electrical appliances & motors. 5 hrs.

POST HARVEST MACHINERY

5 Hours

Introduction to post-harvest technology and its importance.

Definition, of different terms like cleaning, grading sorting, drying and dehydration, storage, milling, handling, packaging & transportation.

Types of commonly used cleaners and grader like air screen cleaners, rotary cleaners, vibratory screen cleaners, disc separator, indented cylinder separator spiral Separator, specific gravity separator, magnetic separator, cyclone separator, their uses and suitability to different farm produce.

Drying methods-convection drying, conduction drying, vacuum drying their uses.

Introduction to different types of commonly used hard and power opera chaff cutters. Introduction to commonly used manual and power operated maize shell and ground nut decorticators. 25 hrs.

MANAGEMENT OF FARM EQUIPMENT

Factors in Analysis of Cost of Operation:

- Fixed cost: initial cost, salvage value, useful life, depreciation, interest, taxes and insurance, housing.
- Variable cost: repair and maintenance, fuel and oil consumption, wages.
- Theoretical and actual field capacities, field efficiency. 5 Hours

PRACTICAL [288 Hours]

CROP PRODUCTION MACHINERY

80 Hours

1. Tillage Implements -
   Familiarization with Primary and Secondary tillage implements
   Demonstration and Identification of constructional and working parts of Mould-board plough, Disk Plough, Cultivators, Disk Harrow, Bund former.
   Assembling of different parts of Mould-board plough, Disk Plough and Disc Harrow. 30 hrs.
   Adjusting of horizontal and vertical suctions of MB Plough; Adjusting disc angles, tilt angles of disc plough and harrow.
   Demonstration and identification of different parts of Rotatiller.
2. Seeding Machinery -
   Identification of different parts of seeders, planters and seed cum fertilizer drills.
   Adjustments of furrow openers, replacement of worn-out / damaged parts of seed drill/ seed cum fertilizer drills.
   Calibration of seed drill/ seed cum fertilizer drills. Familiarization of rice transplanters.
   Operation of seed drill/ seed cum fertilizer drills and rice transplanters.

3. Harvesting Machinery -

Identification of different parts of Vertical Conveyor Reaper.

Adjustments of cutter bar, registration and alignment. 15 hrs.

Operation, care and maintenance of Vertical Conveyor Reaper.

4. Threshing Machinery -

Identification of different parts of power thresher. Dismantling and assembling of power thresher. Identification of mini combine/ combine harvester. Operation of mini combine. 10 hrs.

ENGINE, TRACTOR AND POWER TILLER **90 Hours**

1. IC Engine -

Identification of Engine parts.

Cleaning and inspection of various parts. 25 hrs.

Engine overhauling- dismantling, cleaning & adjusting and Assembling.

2. Engine Systems -

Inspection of Air cleaning System, fuel system, cooling system, lubrication systems for their proper functioning.

Engine trouble shooting; understanding possible causes and their solution. 20 hrs.

3. Tractor -

Identification of different parts and systems of tractor.

Operation of tractor without implements. 25 hrs.

Implement hitching and tractor operation.

4. Power Tiller -

Identification of different parts and systems of power tiller.

Operation of power tiller with matching implements - rotatiller and MB Plough. 20 hrs.

PLANT PROTECTION AND IRRIGATION EQUIPMENTS, ELECTRIC MOTORS **80 Hours**

1. Plant Protection Equipment

Identification of different parts of sprayers. Dismantling of sprayers, replacement of worn out parts. 10 hrs.

Calibration and operation of sprayers for specific purposes. Identification of common faults and corrective measures.

2. Irrigation Equiprnent

Demonstration of different methods of Irrigation.

Identification of different types of pump sets.

Dismantling of centrifugal pump, reconditioning and assembling. Installation of a pump, prime mover, fitting of pumps, valves, pulleys. Identification of different components of sprinkler and drip irrigation systems.

Dismantling and assembling of nozzles, drips and other associated components of an irrigation system. 45 hrs.

3. Electric Motors

Use of Voltmeters, ammeters, multimeters. Checking of a circuit.

Electric motor trouble shooting, storage and servicing. 25 hrs.

POST HARVEST MACHINERY **30 Hours**

1. Cleaning and grading machinery

Identification of different parts and components of commonly used cleaners and graders, their adjustments, operation and functions.

Identification of different parts and components of drying equipments/ machinery, their adjustments, operation and functions. 8 hrs.

Safety and precaution in use of drying equipments, cleaners and graders.

2. Drying Equipment/Machinery

Familiarization and identification of different parts of components of commonly available different type of dryer including solar dryers, function of different parts and adjustment for their efficient use. 10 hrs.

3. Chaff Cutters

Familiarization and identification of different components of commonly used chaff cutters, function of different parts and their adjustment for efficient use.

Common faults and corrective measures. Safety and precautions in use of chaff cutters. 7 hrs.

4. Maize Shellers and Groundnut Decorticators

Familiarization and identification of different components of commonly used maize shellers, function of different parts for efficient use.

Common faults and their rectification.

Safety and precaution in use of maize shellers anc' groundnut decouicator 5 hrs.

MANAGEMENT OF FARM EQUIPMENT **8 Hours**

- Calculating cost per hour/per hectare of tractors, power tillers, engine, and various agricultural implements and machines.
- Laying out a store, fabrication racks; familiarization with fire extinguishers, visit to a store.

Note :- The Teacher / Instructor / Trainer may arrange the sequence of items of syllabus properly so as to convey the required knowledge to the trainees according to technically represn table and acceptability - both in Theory and Practical.

ENTREPRENEURIAL INSTRUCTION

SL No.	Course Curriculum	Hours
1.	Brief idea on nature of small business management and Industrial Technical skill.	
2.	Preparation of schemes and vetting to Financial Institutions/ Lead Bank for obtaining loans.	
3.	Rules for setting up of business / production Unit.	
4.	Maintenance of Accounts; Labour Capital etc.	
5.	Man Management, Communication, Motivation.	
6.	Operational Management.	
7.	Market Survey.	
8.	Quality Control.	
9.	Visit to Industrial units for gathering idea to start the unit.	
10.	Choice of technology as per demand of local people of the District / State.	
11.	Knowledge of Sales Tax etc.	
12.	Brief idea for Registration of SSI, Trade License, Project Report, Proposal for loans etc.	
		Total 05