Annexure – I

**Details of Theory Syllabus**

 **CROP PRODUCTION MACHINERY**

1. Tillage Implements -

Tillage definition, types and necessity; Functions and types of implements for primary and secondary tillage operations.

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.

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.

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.

 **ENGINE TRACTOR AND POWER TILLER**

1. IC Engine -

Engine classification - Cl and SI Engines, 2S and 4S Engines; working principles of the IC engines and difference between 2S & 4S, Cl & SI Engines.

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.

3. Tractor -

Different makes and models of Tractor.

Study of different components and systems of Tractor.

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.

Study of power tiller controls and matching implements.

**PLANT PROTECTION AND IRRIGATION EQUIPMENTS,**

**ELECTRIC MOTORS**

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.

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**

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.

**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.

**Diesel Pump Set**

 **Course Curriculum :**

(1) Introduction.

 (2) Demonstration of diesel pump set used in agriculture.

 (3) Different types of diesel engines-idea of 2-strock & 4-strock engines- singlecylinder & multi-cylinder engines.

 (4) Different parts of a diesel engine, identification by physical verification *&* function of each part.

 (5) Different parts of pump, Identification by physical observation & function of each part.

**Detail of Practical Syllabus**

**CROP PRODUCTION MACHINERY**

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 30 hrs. and Disc Harrow.

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.

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.

 **ENGINE, TRACTOR AND POWER TILLER**

1. IC Engine - Identification of Engine parts.

Cleaning and inspection of various parts.

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.

3. Tractor -

Identification of different parts and systems of tractor.

Operation of tractor without implements.

Implement hitching and tractor operation.

4. Power Tiller -

Identification of different parts and systems of power tiller.

Operation of power tiller with matching implements - roiatiller and MB Plough.

**PLANT PROTECTION AND IRRIGATION EQUIPMENTS,**

**ELECTRIC MOTORS**

1. Plant Protection Equipment

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

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

2. Irrigation Equipment

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.

3. Electric Motors

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

Electric motor trouble shooting, storage and servicing.

  **POST HARVEST MACHINERY**

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.

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.

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.

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

 **MANAGEMENT OF FARM EQUIPMENT**

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 *I* 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.

**Diesel Pump Set**

**Shop Practice:**

(1) Practice on fitting, use of file, chisel, hammer, vice, measuring tools etc.

 (2) Practice of gas & arc welding on simple job & precautions to be taken during the work.

 (3) Idea, identification & use of different repairing jobs tools, measuring tools, special tools e.g., puller, piston ring expander, piston, ring squeezer, groove cleaner, value lifter, torque wrench, grease gun etc. their mainte­nance & servicing.

**Fuels & lubricants:**

 Different types, qualities of fuels, lubricants and their specific applications.

**Pump:**

(1) General ideas on pumps; common faults, dismantling of a pump.

 (2) Assembly of the parts to make a complete pump set.

 (3) Alignment test for pump & engine and its adjustment.

**Engine:**

(1) Dismantling of engine, cleaning of parts, fault-detection, rectification and refitting.

**Parts**, e.g., couplings, pipes, glands, gaskets etc defects identification & repair.

**Complete overhauling of a pump set**, dismantling, different parts, defect identification, minor repairing, replacement of damaged parts, refitting.

**Preventive Maintenance:**

(1) Preventive maintenance schedule-precaution.

 (2) Trouble shooting in running condition.

**Estimation and costing :**

(1) Costing for different parts, their costs, Brand names of parts, costs etc., Market survey.

(2) Preparation of an estimate for a repair work-overhauling of an engine etc.

**Detail of Employability Skills Syllabus**

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| **Sl. No.** | **Content** | **Details** |
| 1. | English Literacy & Communication Skills | Accentuation (mode of pronunciation) on simple words, Diction (use of word and speech) Transformation of sentences, Voice change, Change of tense, Spellings. Reading and understanding simple sentences about self, work and environment. Construction of simple sentences, Writing simple English.Speaking with preparation on self, on family, on friends, classmates, on know, picture reading gain confidence through role-playing . Taking messages, passing messages on and filling in message forms Greeting and introductions office hospitality, Resumes or curriculum vita essential parts, letters of application reference to previous communication.Communication and its importance, Principles of Effective communication, Types of communication – verbal, non verbal, written, email, talking on phone. Non verbal communication –characteristics, components-Para-language, Body – language, Barriers to communication and dealing with barriers.Handling nervousness/ discomfort. Self awareness, Importance of Commitment, Ethics and Values, Ways to Motivate Oneself, Personal Goal setting and Employability Planning. Manners, Etiquettes, Dress code for an interview, Do’s & Don’ts for an interview, Problem Solving, Confidence Building, Attitude. |
| 2. | I.T. Literacy | Introduction, Computer and its applications, Hardware andperipherals, Switching on-Starting and shutting down ofcomputer.Basics of Operating System, WINDOWS, The user interfaceof Windows OS, Create, Copy, Move and delete Files andFolders, Use of External memory like pen drive, CD, DVDetc, Use of Common applications.Basic operating of Word Processing, Creating, opening andclosing Documents, use of shortcuts, Creating and Editing ofText, Formatting the Text, Insertion & creation of Tables.Printing document.Basics of Excel worksheet, understanding basic commands,creating simple worksheets, understanding sample worksheets,use of simple formulas and functions, Printing of simple excelsheetsInternet, Concept of Internet (Network of Networks),Meaning of World Wide Web (WWW), Web Browser, WebSite, Web page and Search Engines. Accessing the Internetusing Web Browser, Downloading and Printing Web Pages,Opening an email account and use of email. Social media sitesand its implication. Information Security and antivirus tools, Do’s and Don’ts in Information Security, Awareness of IT – ACT, types of cyber crimes. |
| 3. | Entrepreneurship Skills | Entrepreneurship vs. management, Entrepreneurial motivation. Performance & Record, Role & Function of Entrepreneur, Qualities of a good Entrepreneur, SWOT and RiskAnalysis. Concept & application of PLC, Sales &distribution Management. Different Between Small Scale & Large Scale Business, Market Survey, Method of marketing, Publicityand advertisement, Marketing Mix.Preparation of Project. Role of Various Schemes andInstitutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non financing support agencies to familiarizes with the Policies /Programmes & procedure & the available scheme.Project formation, Feasibility, Legal formalities i.e.,Shop Act, Estimation & Costing, Investment procedure – Loan procurement – Banking Processes. |
|  | Productivity & Quality Tools | Definition, Necessity, Meaning of GDP.Personal / Workman – Incentive, Production linked Bonus,Improvement in living standard. Industry Nation.Skills, Working Aids, Automation, Environment, Motivation. How improves or slows down.Banking processes, Handling ATM, KYC registration, safecash handling, Personal risk and Insurance.Meaning of quality, Quality characteristic. Definition, Advantage of small group activity, objectives of quality Circle, Roles and function of Quality Circles in Organization, Operation of Quality circle. Approaches to starting Quality Circles, Steps for continuation Quality Circles.Idea of ISO 9000 and BIS systems and its importancein maintaining qualities.Purpose of Housekeeping, Practice of good Housekeeping.Basic quality tools with a few examples |
|  | Occupational safety, health and Environment Education &Labour WelfareLegislation | Introduction to Occupational Safety and Health importanceof safety and health at workplace.Basic Hazards, Chemical Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards.Occupational health, Occupational hygienic, OccupationalDiseases/ Disorders & its prevention.Basic principles for protective equipment.Accident Prevention techniques – control of accidents andsafety measures.Care of injured & Sick at the workplaces, First-Aid &Transportation of sick person.Benefits guaranteed under various acts- Factories Act, Apprenticeship Act, Employees State Insurance Act (ESI), Payment Wages Act, Employees Provident Fund Act, The Workmen’s compensation Act. |