AGPC2001 Farm Machinery and Equipment –I (3-0-0)

Objective: To know the various agricultural machines starting from tillage to seeding and planting- construction and operation of farm machinery used in agricultural production, operating parameters and performances, cost of operations.

MODULE – I (8 Hours)

Farm Mechanization and Farm Machinery

Farm Mechanization- Objectives, constraints and status, types and level of mechanization, needs and strategy; Farm Machinery- cclassifications of farm machinery as per unit operations in agricultural production, determination of field capacity, field efficiency, field machine index, factors affecting field capacities and field efficiencies; calculations of cost of operations: depreciation, fixed cost, variable cost, cost of operations, comparison of ownership with hiring of machines, solution of numerical problem, selection of optimum size of machines for different farm size. Selection of matching power source for optimum machine sizes .

MODULE - II (11 Hours)

Land Reclamation and Land Preparation Machinery

Land Reclamation - Methods of land reclamation, details of construction and working principles of earth moving equipment like bull dozer, trencher, elevator and working principle of laser land leveller; Land Preparation Machinery - objectives of tillage, types of tillage, advantage and disadvantages of tillage; requirement and type of seed bed preparation; classification of tillage tools for primary tillage, secondary tillage, rotary tillage, deep tillage and minimum tillage; types, operations, construction and performances of MB plough, factors affecting their performances, forces acting on MB plough; types, operations, construction and performances of disc plough, factors affecting their performances, forces acting on disc plough; types, operation, construction, performance of chisel plough and sub-soiler; types, operations, construction and performances of disc harrow, factors affecting their performances, forces acting on disc harrow; types, operations, construction and performances of puddler, factors affecting their performance; types, operations, construction and performances of cultivators, factors affecting performance.

MODULE – III (9 Hours)

Sowing and Planting Equipment

Types of sowing and planting equipment, their components; Types of seed drills, construction, functions, parameters affecting performance, types of no till drill and strip till drills, details of construction, function and parameters affecting performance; types of planter, their construction, operations and performance; different types of sugarcane planters, their construction, operations and performance; types of potato planter, their construction, operations and performance; Types of furrow openers, constructions and performances and suitability to different crops; types of metering mechanisms , constructions and performances and suitability to different crops; seed drills and planter calibration procedure, adjustment of seed drills during operations.

MODULE – IV (8 Hours)

Hitching System Control and Draft Measurement

Hitching System and Control- Introduction to hitching; *vertical hitching:* implements having hinged pull members and support wheels, implements having hinged pull members without gauge wheels, single axle implements with rigid pull member getting vertical support through wheels, Horizontal hitching of pull type implements: MB plough and disc plough, hitching for mounted implements, free link operation of 3-point hitch, restrained link operation of 3-point hitch, vertical effect of hitching on tractor, Draft Measurement- Draft measurement of animal drawn and tractor drawn implements and, determination of power.

MODULE – V (9 Hours)

Attachment with Tillage Machinery and Materials used in Farm Machinery

Study of different attachment with tillage machines like combination tools of plough and cultivator, tillage with seeding; materials used in Farm Machinery- materials used in construction of farm machinery, engineering requirement of materials, stress strain relationship; properties of materials, types of materials: ferrous and non–ferrous materials; heat treatment processes, procedure of achieving heat treatment, carbon iron phase diagram usefulness in farm machinery; ferrous metals: cast irons, wrought irons, their properties; steel, alloys of steel and non-metals used in agricultural machinery.

Books

- Principles of Farm Machinery by R.A. Kepner, Roy Bainer, and E. L. Berger
- Farm Machinery and Equipment by H. P. Smith
- Farm Machinery and equipment by C. P. Nakra
- Engineering principles of Agril. Machines by Dr. Ajit K. Srivastav, Caroll E. Goering and Roger P. Rohrbach
- Farm Machinery – an Approach by S. C Jain & Grace Phillips
- Agril. Engineering through worked out examples by Dr. R. Lal and Dr. A.C. Dutta
- Farm Power and Machinery Engineering by Dr.R. Suresh and Sanjay Kumar
- A work book on practical farm machinery (Voil. I, II) by Dr T. K . Bhattacharya
- A Practical manual on Farm Machinery by Dr. B. K. Behera & Dr. S. Swain