16AG308 FARM MACHINERY AND EQUIPMENT – I

Hours Per Week :

L	T	P	C
2	-	2	3

Total Hours :

L	T	P
30	-	30

WA/RA	SSH/HSH	CS	SA	S	BS
5	40	5	8	5	-

Course Description and Objectives:

This course deals with the machinery used for cultivation of crops right from tillage to plant protection. The objective of the course is to familiarize the students with different machinery used for tillage, sowing, planting, inter-cultivation and plant protection operations of agricultural crop production. It also enables to understand the basics of designing and maintaining the machines used for these operations.

Course Outcomes:

The students will be able to :

- understand necessities of farm mechanization.
- understand usage of tillage, sowing, planting, inter-cultivation and plant protection machines.
- design machinery with available inputs.

SKILLS:

- ✓ *Operate tillage implements for paddy cultivation.*
- ✓ *Operate sowing and plant protection implements for paddy cultivation.*
- ✓ *Select machines for paddy cultivation based on field conditions.*
- ✓ *Compute the cost of operation of farm machinery.*
- ✓ *Select material of construction for tillage implements.*

UNIT - 1 **L-06**

INTRODUCTION TO FARM MECHANIZATION: Status of farm mechanization in India, Objectives of farm mechanization, Benefits farm mechanization, Bottlenecks of Indian farm mechanization system, Classification of farm machines, Materials of construction, Field capacities and cost economics.

UNIT - 2 **L-06**

TILLAGE EQUIPMENT : Tillage- Primary and secondary tillage equipment, Working principles, Forces acting on tillage tools, Field operation patterns, Draft measurement of tillage equipment, Earth moving equipment - Construction and working principles of bulldozer, trencher, excavators etc.

UNIT - 3 **L-06**

SOWING AND PLANTING EQUIPMENT : Seeding methods, Seed drill - Components, Calibration, Seed metering mechanisms, Test for seed uniformity, Pneumatic seed drill, Planters - Potato planter, Sugarcane planter, Zero till drill, Strip till drill, Rice transplanters, Vegetable transplanters, Drum seeders, Numerical on design.

UNIT - 4 **L-05**

INTER-CULTIVATION AND MISCELLANEOUS EQUIPMENT : Inter-cultivation equipment- Introduction, Types of weeders, Hoes, Puddler, Bund former, Ridger, Post hole digger, Brush cutter, Laser leveler.

UNIT - 5 **L-07**

PLANT PROTECTION EQUIPMENT : Basic terminologies related to plant protection, Sprayers, Dusters, Basic components, Types and working principle, Spray characteristics, Care and maintenance, Numericals, Fertilizer application equipment, Manure application equipment, Flame weeding, Variable rate application of fertilizers and chemicals.

LABORATORY EXPERIMENTS

LIST OF EXPERIMENTS **Total hours: 30**

1. Determination of field capacity and field efficiency of primary tillage implements.
2. Field capacity and field efficiency of secondary tillage implements.
3. Draft and fuel consumption measurement for different implements.
4. Dismantling and assembling of mould board plough.
5. Different types of plough bottoms and shares.
6. Disc angle, tilt angle and concavity of a disc plough.
7. Calculation of draft and horse power.
8. Estimation of cost of operation of various implements.
9. Study of seed –cum –fertilizer drill and seed metering mechanisms.
10. Calibration of seed drill and problems.
11. Study of sprayers, dusters and measurement of nozzle discharge and field capacity.
12. Construction and working of rotavators and weeding equipment.

TEXT BOOK:

1. R.A. Kepner, Bainer Roy, and E. C. Barges, “Principles of Farm Machinery”, 2nd edition, CBS Publishers and Distributors, Delhi, 2005.

REFERENCE BOOKS:

1. A. M. Michael and T.P. Ojha, “Principles of Agricultural Engineering (Vol. I)”, 3rd edition, Jain brothers, New Delhi, 2011.

2. Jagdishwar Sahay, “Elements of Agricultural Engineering”, 4th edition, Standard Publishers Distributors, New Delhi, 2015.

WEB LINK:

1. http://ecoursesonline.iasri.res.in/course/view.php?id=12

ACTIVITIES:

- *Operation of tillage, sowing and plant protection implements in paddy cultivation.*
- *Development of software for machinery selection.*
- *Collection of specifications of implements used in cultivation of local crops.*
- *Identify and study various materials used for construction of machinery.*