EXTENDED LECTURE OUTLINE

FPM6 221 Farm Machinery and Equipment-II (2+1)

S.No	Lectures
1	Introduction to plant protection equipment – Functions and components of sprayer Classification of sprayers sprays. – Manual operated, battery operated & power operated Manual operated – hand compression, knapsack, foot operated, rocking sprayer Battery operated – Battery operated knapsack, electrostatic, spinning disc Power operated – self-propelled, blower Classification of sprays – high volume, low volume & ultra-low volume Types of nozzles – Hollow cone, solid cone, flat fan, flooding nozzle
2	Calculations for calibration of sprayers and chemical application rates. Terminologies – VMD, NMD, UC, drift, droplet density, LAI, spread factor Dusters – introduction, functions of duster Basic components of duster Types of dusters – plunger, rotary, knapsack, power operated Care and maintenance of sprayers & dusters General precautions for the use of insecticides Definitions : fumigator, flame gun, suction capacity, volumetric efficiency & pump efficiency
3	Introduction to intercultural equipments and functions Definitions – weed, weeder, weeding efficiency Method of weeding – mechanical, chemical, flame weeding, manual uprooting, thinning Factors affecting the selection of weeder Classification of weeders – Manual, animal drawn and power operated Manual – hand hoe, spades, khurpi, long handle tools, wheel hoes, cono weeder Animal drawn- single row, multi row, tool bars, multipurpose hoes Power operated – self-propelled, tractor operated, rotary hoes & row crop cultivators Advantages and disadvantages of power operated weeders
4	Fertilizer application equipment – introduction Selection of fertilizer application equipment Types- manually broadcasting, spreading disc, tractor operated broadcasting Fertilizer drills – manual, animal drawn and tractor mounted. Furrow openers, ground wheels, metering devices Fertilizer application for dryland and wetland Manure application, slurry distributor
5	Study of harvesting operation – Introduction, principles of harvesting Harvesting methods - Manual, animal drawn, power tiller operated & tractor operated. Harvesting terminology-mower, reaper, reaper binder, swath, windrow, windrower. Types of mowers –cylindrical, reciprocating, horizontal rotary, gang & flail mower Cutter bar details – frame, power transmitting unit, cutter bar, shoe, ledger plate, wearing plate, knife, knife section, knife back, grass board, pitman, Working of mower, alignment and registration of mower Types of reapers – horizontal conveying, bunch conveying, reaper binder, tractor mounted and self propelled.

6	Threshing – definition and working principal. Types of threshing drums – syndicator, wire loop, rasp bar, spike tooth & hammer mill Types of threshers- tangential and axial, their constructional details Components of thresher – concave, cylinder and cleaning unit Components of cleaning unit – blower, aspirator, winnower and winnower fan Study of factors affecting thresher performance. Terminology related to thresher- feed rate, clean grain, concave clearance, cleaning efficiency, threshing efficiency and calculation of losses
7	Study of grain combines, combine terminology, Classification of grain combines, Functional components of combine harvesters Study of material flow in combines. Computation of combine losses, study of combine troubles and troubleshooting. Study of straw combines – working principle and constructional details.
8	Study of chaff cutters Types of chaff cutter – basis of cutting mechanism -cylinder and flywheel type. Basis of dropping positions of cut chaff – let fall, throw away and blow up type Blade composition and Capacity calculations. Care and adjustments of chaff cutter
9	Importance of hay conditioning, Types of hay conditioning – smooth roll, corrugated roll and flail type Conventional balers, hay stackers, hay rakes, Moisture content of hay.
10	Study of root crop diggers – principle of operation, blade adjustment Study of potato digger and groundnut diggers shaker – digging shaking and windrowing
11	Study of Cotton harvesting – Cotton harvesting mechanisms, study of cotton pickers – mechanical pickers - spindles, types of spindle arrangements – drum type and chain belt spindle, conveying and carrying. Strippers and its functional components. Factors affecting mechanical harvesting of cotton
12	Study of maize harvesting - tubular maize shellers, Maize combines – working and components
13	Introduction to vegetables and fruit harvesting equipment and tools. Vegetable pickers, Bendhi plucker and leafy vegetables harvestor Fruit harvesters –bamboo cone, wire cone, push & twist, pull & cut and hold & twist type. Mechanical tree shakers and grape harvesting tools.

Reference Text Books

1. Farm Machinery principles and Applications – Surendra Singh
2. Fundamentals of Agricultural Engineering – Sanjay Kumar, Vishal Kumar & Ram kumar sahu
3. Elements of Agricultural Engineering – Dr.Jagadishwar Sahay
4. Principles of farm machinery – R.A Kepner, Roy Bainer & E.L.Barger