

5th Semester	RAG5C001	Farm Machinery and Equipment – II	L-T-P 3-0-0	3 CREDITS
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Module I (8 Hours)

Intercultural Equipment- Requirement of weeding and weeders in crop production, Study of Weed control equipment, types, components and functions; Fertilizer application equipment- Types of fertilizer application equipment, soil amendment, placement of fertilizers, application of dry commercial fertilizer, metering devices, factors affecting discharge rate, factors affecting uniformity of distribution, application of liquid fertilizer, application of granular pesticides; Plant protection equipment; pest control equipment, their construction and operation, drift, factors affecting drift, types atomizing devices (nozzles) , factor affecting droplet sizes, distribution and uniformity; pumps for sprayer, factor affecting discharge, agitation of spray materials, safety precautions during spraying, duster: types, construction and operations; calibration of sprayer and numerical problems

Module II (7 Hours)

Study of harvesting operations- harvesting methods and terminologies; Types of mowers and their components: Cutter bar mower, Rotary mower, flail mower; Cutter-bar and its components, registration, alignment and lead of cutter-bar, knife drive system, cutter-bar balancing and vibration control, cutter-bar, inertial forces, counterbalancing, terminology, cutting pattern; Force analysis of pitman drive cutter-bar and numerical problems; Reaper: types, components of reaper- engine, power transmission unit, types of drive to cutter-bar mechanism, lifting and gathering unit, cutting and windrowing unit; Cutter-bar parameters affecting performance of reaper, cutting force, power requirement for cutting and total power requirement; Reaper binder and windrower: types, operation and performance and numerical problems

Module III (5 Hours)

Hay Management

Importance of hay conditioning, methods and calculation of moisture content, Forage harvesters- types, their components; gathering unit, conveying and feeding unit, chopping and impelling unit, types of cutter head, performance parameters; Balers- Types, construction and operation and numerical problems; Chaff cutters- Manual and mechanical chaff cutter: components, operation, length of cut, capacity, location of fly wheel; Shape of knife and power requirement and numerical problems; New developments and innovations for hay management in-situ for Indian conditions

Module IV (7 Hours)

Threshing Systems and Combine Harvesters

Threshing Systems - Mechanics of threshing, power requirement in threshing, Types of threshing drums and their applications, determination of length of drum; Types of threshers- tangential and axial, performance characteristics of axial and tangential

threshers; Machine factors affecting performance, threshing losses, performance index and numerical problems; Combine Harvesters- Grain Combine: Components and operation of combine harvester: Header unit: reel and its adjustment, cutter bar, adjustment and drive to cutter-bar; feeding unit; threshing unit; principle and types of threshing methods, performance criteria of threshing methods like axial and cross flow separating unit; straw walker, shoes, blower, factors affecting their performance; Combine harvester losses and performances; header, threshing, rack, shoe losses; factors affecting threshing performance and numerical problems; Straw combine: Types of straw combines; operation, performances, advantages and economics; combine troubles and troubleshooting

Module V

(5 Hours)

Root crop harvesting equipment- Potato harvester/digger: Methods of harvesting, Functions and components of different types of potato harvester, factors affecting performance of potato harvester; Groundnut: Types of groundnut diggers/harvester, components of groundnut digger, basic operations in groundnut digging, factors affecting performance of groundnut digger; Maize harvesting and shelling- Snapper, husker, sheller and combine

Module VI

(5 Hours)

Cotton Harvesting: cotton harvesting stage, pre-harvest treatments, harvesting requirement, types of harvesters: Cotton picker and stripper; Cotton picker: picking mechanism: drum type spindle mechanism and chain belt type; conveying and carrying; Cotton Stripper: Principles of stripping, types of cotton strippers and their working principles, effect and cost of mechanical harvesting of cotton and numerical problems; vegetables and fruits harvesters: Problems of mechanical harvesting, Harvesting functions, Methods and principles of vegetables and fruits harvesters: Uprooting, cutting, combing, stripping, vibration and threshing; Types of harvesters: Carrot, cabbage, strawberry, snap bean, tomato, harvesting of fruits: methods of harvesting, types of harvesting, tree shakers

Books

1. Kepner RA, Bainer R & Berger EL., 1978. Principles of Farm machinery
AVI Publication Co
2. C P Nakra, Farm machines and Equipment. Dhanpat Rai Publishing Company
Pvt. Ltd, 4787/23, Ansari Road, Dayaganja, New Delhi
3. Jain S C, Philip Grace. Farm Machinery – An approach. Standard Publishers and
Distributors, 1705-B, Nai Sarak, Post Box No-1066, New Delhi
4. Bhattacharya, T K. A workbook of Practical Farm Machinery (Vol-I & II), Saroj
Prakashan, Allahabad
5. Engineering principles of Agril. Machines by Dr. Ajit K. Srivastav, Caroll E.
Goering and Roger P. Rohrbach
6. Michael A M and Ojha, T.P. Principles of Agricultural Engineering. Jain
Brothers, 873, East Park Road, Karol Bagh, New Delhi
7. Farm Power and Machinery Engineering by Dr. R. Suresh and Sanjay Kumar