GANPAT UNIVERSITY

FACULTY OF DIPLOMA ENGINEERING

Programme	Diploma		Branch/Spec.	Agricultural Engineering	
Semester	IV		Version	2.0.0.1	
Effective from Academic Year		2026-27	Effective for the Batch admitted in		July 2025
Course Code	1AE4101	Course Name	Farm Machinery and Implements		

I. TEACHING, LEARNING AND ASSESSMENT SCHEME

Course Type	Course Code	Course Title	Total IKS Hrs for Sem	Learning Scheme					Credits	Examination Scheme										
				Actual Contact Hrs/week			SLH	NLH		TH				PR				SLA		Total
				CL	TL	LL				FA-TH	SA-TH	TOTAL		FA-PR	SA-PR	TOTAL				
												Max	Min			Max	Min	Max	Min	
DSC	1AE4101	Farm Machinery and Implements	-	2	0	2	2	6	3	40	60	100	40	30	20	50	20	20	8	170

Abbreviations:			
	CL- Classroom Learning	**TL**- Tutorial Learning	**LL**- Laboratory Learning
	SLH- Self Learning Hour	**NLH**- National Learning Hour	**SLA**- Self Learning Assessment
	FA- Formative Assessment (Term work + Mid Exam + Attendance)		**SA**- Summative Assessment

II. PRE-REQUISITES

Basic knowledge of crop production, farm operations, soil conditions, and fundamental mechanical principles related to agricultural machinery and mechanization.

III. INDUSTRY / EMPLOYER EXPECTED OUTCOMES

After completing this course, students are expected to identify and select appropriate farm machinery for different crops and soil conditions, operate, adjust, and maintain agricultural equipment efficiently and safely, evaluate machinery performance and economic feasibility, apply mechanization principles to enhance crop production and reduce post-harvest losses, and demonstrate problem-solving and decision-making skills that meet industry standards and employer expectations.

IV. COURSE LEARNING OUTCOMES

CO-1. Identify and recall different types of farm machinery and implements used in crop production, including their functions and classifications.

CO-2. Explain the working principles, constructional details, and functions of various tillage, planting, and harvesting equipment used in modern farming.

CO-3. Demonstrate the proper adjustment, calibration, and operation of seed drills, planters, sprayers, and other farm implements for efficient crop production.

CO-4. Compare and evaluate the efficiency of different types of farm machinery in terms of performance, suitability for various soil conditions, and economic viability.

CO-5. Assess the impact of mechanization on farm productivity, labor efficiency, and post-harvest losses, while recommending appropriate machinery for different agricultural practices.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT:

Unit	Content	Hrs.
1	Introduction: - Importance of farm mechanization, Classification of machinery &implements used in the farm for raising crops	5
2	Primary Tillage Equipment: -Introduction to various primary tillage implements used on the farm. Functions, constructional details, adjustments and study of different plough viz. mould board plough, disc plough, rotary plough (rotator) and chisel plough. Secondary Tillage Implements: -Introduction to the various secondary tillage implements. Study of cultivators &harrows, their types, functions &constructional details.	6
3	Seeding and Planting Equipment: -Introduction to various seeding and planting machinery used for various crops. Study of components &functions of seed drills &planters; Concept of minimum tillage technology. Calibration of seed drills and planters. Interculture Tools, Weeding Tools	6

4	Introduction to various tools used for interculture, study of their functions and constructional details. Types of sprayers and dusters, their uses and constructional details. Fertilizer Manure Application Equipment: - Familiarization with the manure spreaders &granular fertilizer spreading equipment, study of their functions and importance. Study of various types of the nozzles used in the sprayers.	6
5	Harvesting and Threshing Machinery: - Familiarization with the harvesting machines for various crops e. g. hay harvesters, forage harvesters, vertical conveyer reapers, cotton pickers, com harvester, potato diggers, ground nut diggers. Constructional details & principles of working: -Study of power thresher main components, function and constructional details. Safety requirements in threshing operations. Introduction to combine harvesters and straw combines and study of their operation.	7

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL

To study the constructional features and different components of the following agricultural implements/ farm machines.

1) Primary tillage implements: Mould board plough /Disc plough.

2) Secondary tillage implements: Harrow/Cultivators, Rotavators.

3) Sowing Machines: Seed Drill/Planter/Transplanter, no-till, strip-till drill, bed planter, sugarcane planters, potato-planter.

4) Interculture equipment/tools: Wheel hand hoe/Cultivators. Harvesting Machines: Vertical Conveyer Reaper/Mower/Potato digger/ Groundnut Digger.

5) Threshing Machines: Wheat/paddy thresher, axial flow thresher, High capacity multicrop thresher. Seed treater, different types of sprayers and dusters

VII. SUGGESTED MICRO PROJECT / ASSIGNMENTS / ACTIVITIES FOR SELF LEARNING / SKILL DEVELOPMENT (SELF LEARNING)

- Study and draw labeled diagrams of primary tillage implements like mould board plough and disc plough, showing main parts.
- Observe the working of secondary tillage implements (harrow, cultivator, or rotavator) and write a brief note on their uses.
- Study the construction and working of a seed drill or planter and note the method of seed rate adjustment.
- Compare manual and mechanized tools used for interculture operations such as wheel hand hoe and cultivator.
- Study one harvesting or threshing machine and list its advantages over traditional methods.

VIII. LIST OF INSTRUMENTS / EQUIPMENT / TRAINER BOARD

- Mould board plough
- Disc plough
- Cultivator
- Rotavator
- Seed drill
- Planter / Transplanter
- Wheel hand hoe
- Reaper / Mower
- Wheat / Paddy thresher
- Power sprayer

IX. LIST OF REFERENCE BOOKS

1. Element of Farm Machinery by AC. Srivastava and RajuPrimlari; Oxford &IBH Publishing Co. Pvt Ltd, New Delhi
2. Principle of Farm Machinery by R.A. Kepner, Roy Bainer, and E.H. Barger; CBS Publishers and Distributors, Delhi
3. Elements Of Agricultural Engineering Part 1 & 2 by Dr. O.P. Singhal and Naresh Chandra Aggarwal; Mumfordganj, Allahabad
4. Principle of Agricultural Engineering Volume-I by A.M. Michael & T.P. Ojha; Jain brothers.
5. Farm Power Machinery Volume-I by ISAE; Jain brothers
6. 6. Farm Power Machinery & Surveying by Irshad Ali ; KitabMahal, NaiSarak, Delhi

X.LINK OF LEARNING WEB RESOURCE

1. https://icar.org.in
2. https://ciae.icar.gov.in
3. https://tnau.ac.in
4. https://kvk.icar.gov.in
5. https://agricoop.nic.in
6. https://www.fao.org/agriculture/engineering

7. https://www.youtube.com

XI. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE

Unit	Unit Title	Aligned COs	Learning Hours	U-Level	R-Level	A-Level	Total Marks
1.	Introduction to Farm Machinery & Implements (Classification, Functions, Importance of Mechanization)	CO-1	8	10	5	–	15
2	Primary & Secondary Tillage Implements (MB plough, Disc plough, Rotavator, Chisel plough)	CO-2	12	10	10	5	25
3	Sowing, Planting & Fertilizer Application Equipment (Seed drills, Planters, Calibration)	CO-3	12	8	10	7	25
4	Plant Protection & Harvesting Machinery (Sprayers, Harvesters, Threshers)	CO-3, CO-4	10	5	10	10	25
5	Farm Mechanization Impact, Performance Evaluation & Economic Analysis	CO-4, CO-5	8	4	6	10	20

XII. COs AND POs AND PSOs MAPPING

Course outcome (Cos)	Programme Outcomes (POs)							Programme Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	1	0	0	0	0	1	2	1	0
CO2	3	2	1	0	1	0	0	3	2	0
CO3	2	3	2	1	2	0	0	2	3	1
CO4	1	3	2	2	3	0	1	1	2	2
CO5	1	2	3	2	2	1	3	2	1	2