GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

Course Curriculum

FARM MACHINERY AND IMPLEMENTS
(Code: 3346301)

Diploma Programme in which this course is offered	Semester in which offered
Agricultural Engineering	4th

1. RATIONALE.

Farm mechanization is important in farm for raising crops. Mould board plough, disc plough, rotary plough, harrow, cultivators, etcwhich are primary and secondary farm equipment used for perpetration of field and seed bed to grow different of crops. Introduction of Equipment / Machinery in farming operations will not only increase production but also reduce labor requirements on farms. Students have to study the various parameters, equipments and machineries related to Farm mechanization. They have to apply this knowledge in farming on the field for increased production at reduced cost of cultivation.

2. COMPETENCY

The course content should be taught and implemented with the aim to develop required theoretical knowledge & skill of practical significance by acquiring following competencies in various farm activities.

1. Comprehend Engineering Properties / Farm mechanization in agricultural operations and its applications to achieve higher working efficiency.
2. Determine various types of equipment in different farm operations
3. Evaluate Engineering Properties / machinery for their suitability according to field and crop requirement.
4. Economic application of fertilizer and pesticides to enhance crop production.
5. Land development machinery and their use in perpetration of field and to bring the field under cultivation.

2. TEACHING AND EXAMINATION SCHEME.

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PA	ESE	PA	150
3	0	2	5	70	30	20	30	

Legends: L-Lecture; T – Tutorial/Teacher Guided Theory Practice; P -Practical; C – Credit,ESE -End Semester Examination; PA - Progressive Assessment

3. COURSE DETAILS.

Unit	Outcomes (in cognitive domain)	Major Learning Topics and Sub-topics
Unit – I Introduction	1.1 Discuss farm mechanization 1.2 Explain Transmission of power on farm 1.3 Understand Balancing	1.1 Importance of farm mechanization, status of farm mechanization in India. Classification of machinery &implements used in the farm for raising crops. 1.2 Power Transmission on Farms : Flat and V -belt drives, length of belt, ratio of tensions, Horse power transmitted effect of centrifugal tension, condition for maximum power transmission, 1.3 Gear drives and numerical problems on drives.
Unit– II Tillage implements which are used in farm, Plant protection equipments.	2a. Introduce Primary Tillage Equipment their classification and uses 2b. Enlist Secondary Tillage Implements and their classification, uses 2c. Sowing and Planting Equipment -Their adjustments and uses. 2d.EnlistIntercultural Tools and their uses 2e. Plant Protection equipments, their components and uses.	**2.1** Tillage objectives, Primary and secondary tillage. Introduction to various primary tillage implements used on the farm. constructional details, adjustments and study of different plough viz. mould board plough, disc plough, rotary plough (rotator) , chisel plough and subsoiler. **2.2**Introduction to various secondary tillage implements. Study of cultivators, harrows, their types, functions & constructional details. **2.3** Introduction to various sowing and planting machineries used for different crops. Study of components & functions of seed drills & planters; Calibration of seed drills, seed cum fertilizer drill and planters. Numerical problems on seed drill. **2.4** Intercultural Tools, Weeding Tools-their functions and constructional details. **2.5** Draft, Unit Draft, Side draft, Effect of speed on draft, Power requirement in field operation. Numerical Problems. **2.6** Field capacity of Agricultural machine, Theoretical and effective field capacity, field efficiency of machines, Factor affecting field efficiency. Numerical Problems. **2.7** Different types of Dusters and Sprayers, their components and uses. Precautions in using Sprayers and Dusters.

Unit	Outcomes (in cognitive domain)	Major Learning Topics and Sub-topics
Unit–III Harvesting and Threshing Machinery and Fertilizer and Manure Application Equipment	3a.Explain Fertilizer spreading equipment 3b. Explain harvesting and Threshing equipment	**3.1**Familiarization with the manure spreaders &granular fertilizer spreading equipment, study their functions and importance. **3.2**Familiarization with the harvesting machines for various crops e. g. crop harvesters, forage harvesters, reapers, cotton pickers, potato diggers, ground nut diggers and combine harvester. **3.3**Study of power thresher including axial flow thresher - main components and their function. Safety requirements in threshing operations. Losses during harvesting and threshing operations and their management. Determination of Threshing efficiencies, Numerical Problems on threshing efficiency.
Unit–IV Land development machinery	4a.Explain Land development Machines and their function	**4.1**Familiarization with various land development machines e.g. Dozer, scraper, Laser levelers, Power shovel, Drag hoe and Dragline. Study of their functions and adaptability.

4. SUGGESTED SPECIFICATION TABLE WITH HOURS AND MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	Introduction	05	08	04	03	15
2	Tillage implement which are used in farm	17	10	05	10	25
3	Harvesting and threshing machinery and fertilizer manure application equipment	12	06	04	10	20
4	Land development machinery	08	02	02	06	10
	Total	**42**	**26**	**15**	**29**	**70**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy).

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

5. SUGGESTED LIST OF EXERCISES/PRACTICALS.

The exercises/practical/experiments should be properly designed and implemented with an attempt to developdifferent types of skills leading to the achievement of the competency. Following is the list ofexercises/practical/experiments for guidance.

Sr. No.	Unit No.	Practical Exercises (outcomes in Psychomotor Domain)	Teaching Hours
1	1	Primary tillage implements: Mould board plough /Disc plough / Rotavators. Motivators Components and adjustments.	06
2	2	Secondary tillage implements: Harrow/Cultivators,	04
3	3	Sowing Machines: Seed Drill/Planter/Transplanter, no-till, strip-till drill, bed planter, sugarcane planters, potato-planter.	04
4	4	Interculture equipment/tools.	02
5	4	Harvesting Machines: Vertical Conveyer Reaper/Mower/Potato digger/ Groundnut Digger.	04
6	4	Threshing Machines: Wheat/paddy thresher, axial flow thresher. Determination of Threshing efficiency.	04
7	4	Seed Treater, different types of sprayers and dusters	04
		Total	**28**

7. LIST OF STUDENT ACTIVITIES:

1. Farming and perpetration field for sowing.

8 SUGGESTED LEARNING RESOURCES

A. List of Books

Sr No.	Title Of Book	Author	Publication
1	Element of Farm Machinery	AC.srivastava and Raju Primlari	Oxford &IBH Publishing Co. Pvt Ltd, New Delhi
2	Principle of Farm Machinery	R.AKepner, Roy Bainer, and E.H. Barger	CBS Publishers and Distributors, Delhi
3	Elements Of Agricultural Engineering	Dr. O.P. Singhal and Naresh Chandra Aggarwal	-
4	Principle of Agricultural Engineering Volume-I-II	A.M. Michael &T.P. Ojha	Jain brothers.
5	Farm Power Machinery & Surveying	Irshad Ali ; Kitab Mahal, Nai Sarak	-
6	Farm Machinery	smith	
7.	Fundamentals of Agricultural Engineering	Sanjay kumar Vishal kumar Ramkumar shah	Kalyani Publishers

B. List of Major Equipment/ Instrument

1. Tractor
2. Farm equipment
3. Laser Leveller
4. Plant Protection equipments
5. Sowing and planting equipments
6. Weighing Machine

C. List of Software/Learning Websites

- http://www.agricoop.nic.in/dacdivision/mmsoil280311.pdf
- http://ecoursesonline.iasri.res.in/