

FMPE 502 : Testing and Evaluation of Agriculture Equipment 2+1 Objectives:

To enable the student to learn the procedure for testing of different farm machinery and the concept behind evaluation of different performance parameters of farm machinery and the standards adopted therein.

Unit-I

Importance and significance of testing and types of testing. Test equipment, usage and limitations. Test procedures and various test codes: National and International. testing terminology, standardise testing procedures to be adopted, protocol for testing of agricultural machinery

Unit-II

Lab testing of stationary diesel engine for full load, variable load and governor test. Tractor Test Codes and Data Interpretation Estimation of error. Laboratory and field testing of tillage and sowing machinery: Sub-soiler, laser land leveler, mould board Plough, disc plough, rotavator, cultivator, disc harrow, seed cum fertilizer drill and planter.

Unit-III

Laboratory and field testing of manual and power operated intercultural machinery and plant protection machine.

Unit-IV

Laboratory and field testing of reaper, thresher and chaff cutter.

Unit-V

Laboratory and field testing of straw combine and combine harvester. Review and interpretation of test reports. Importance and need of standardization of components of agricultural equipment.

Practical:

Lab testing of stationary diesel engine for full load, variable load and governor test. Laboratory and field testing of selected farm equipment: Tillage, sowing and planting, chaff cutter, threshers and plant protection equipment. Material testing of critical components. Accelerated testing of fast wearing components.

Course Outcome:

The student will be able to test farm machinery, prepare performance reports and also analyze the performance reports to find the suitability of a machinery for a given farm operation.

Teaching Schedule

Sr. No	Topic	No. of lectures
1.	Introduction, standardization efforts, Testing programme and procedures, testing terminology, type of testing systems, Various test codes, standardise testing procedures to be adopted, protocol for testing of agricultural machinery	2
2.	Study of different types of dynamometers and function and working procedure of load cell for determination of draft	2

3.	Stationary diesel engine performance testing	2
4.	Tractor Test Codes and Data Interpretation Estimation of error	2
5.	Testing and evaluation of tillage machinery	2
6.	Testing and evaluation of seed-cum-fertilizers drills/planters	3
7.	Testing and evaluation of manually and power operated Sprayers	3
8.	Testing and evaluation of reapers and straw combines	1
9.	Testing and evaluation of combine harvester and threshers	3
10.	Testing and evaluation of manually and power operated chaff cutters	2
11.	Testing and evaluation of advanced machinery	2
12.	Reliability in Engineering with emphasis on agricultural machinery	2
3.	Discussion on Farm machinery codes	2
14.	Interpretations of the information given in different codes on farm machinery	1
15.	Formulation of test-code for machines that do not have any code.	2
16.	Current topics/discussion	1
	Total	32

List of Practicals

Sr. No	Topic	No. of lectures
1.	Lab testing of Stationary diesel engine for full load, variable load and governor test	2
2.	Lab Testing and evaluation of seed-cum-fertilizers drills	1
3.	Lab Testing and evaluation of seed-cum-fertilizers planters	1
4.	Lab Testing and evaluation of knapsack Sprayers	1
5.	Lab Testing and evaluation of nozzles	1
6.	Field testing of rotavators	1
7.	Lab testing of rotavators for soil sample analysis	1
8.	Testing and evaluation of reapers	1

9.	Testing and evaluation of combine harvester and threshers	1
10.	Testing and evaluation of chaff cutters	1
11.	Testing and evaluation of laser land leveler	1
12.	Case study of test reports of different agricultural implements	3
	Total	15

Suggested Reading:

1. Barger E L, Liljedahl J B and McKibben E C 1967. Tractors and their Power Units. Eastern Wiley 4th Edition.
2. Indian Standard Codes for Agricultural Implements. Published by BIS, New Delhi.
3. Inns F M 1986. Selection, Testing and Evaluation of Agricultural Machines and Equipment. FAO Service Bull. No.115.
4. Mehta M L, Verma S R, Rajan P and Singh S K 2019. Testing and Evaluation of Agricultural Machinery. Daya Publishing House, Delhi.
5. Nebraska Tractor Test Code for Testing Tractor, Nebraska, USA.
6. Smith D W, Sims B G and O'Neill D H 2001. Testing and Evaluation of Agricultural Machinery and Equipment -Principle and Practice. FAO Agricultural Services Bull. 110.
7. Training Manual on Testing of Agricultural Machinery for testing centers of Department of Agriculture & Co-operation, Ministry of Agriculture, Govt. of India. Compiled by Dr. Surendra Singh, CIAE, Bhopal.