

16AG402 FARM MACHINERY AND EQUIPMENT – II

Hours Per Week :

L	T	P	C
2	-	2	3

Total Hours :

L	T	P	WA/RA	SSH/HSB	CS	SA	S	BS
30	-	30	5	40	5	8	5	



Course Description and Objectives:

This course deals with the principles of operation, selection, and maintenance of machinery used for harvesting and threshing of crops and biomass handling equipment. The objective of this course is to enable the students to have the knowledge about the different machinery used for harvesting and threshing operations. It also enables the students to understand biomass handling of various agricultural crops and deals the basics of designing, application of ergonomics, testing and maintenance of the machinery.

Course Outcomes:

The student will be able to:

- understand the working principles and usage of harvesting, threshing and biomass handling machinery of agricultural and horticultural crops.
- analyze the importance of testing and evaluation of agricultural machines and different standard codes available for testing in India.
- apply ergonomic principles for efficient tool and equipment design.

SKILLS:

- ✓ *Select harvesting machinery for paddy cultivation.*
- ✓ *Perform forage chopping using small scale forage chopper.*
- ✓ *Operate reaper for paddy cultivation.*

ACTIVITIES:

- o *Design and development of small scale forage chopper.*
- o *Design and development of fruit harvesting tools.*
- o *Anthropometric data collection and its use in equipment design.*

UNIT - 1**L-07**

HARVESTING OF AGRICULTURAL CROPS - I : Principles and types of cutting mechanisms, Construction and adjustments of shear and impact type cutting mechanisms, Crop harvesting machinery-mowers, Windrowers, Reapers, reaper binders and forage harvesters, Bailers, Forage chopping and handling equipment. Threshing mechanics and various types of threshers. Threshers, straw combines and grain combines.

UNIT - 2**L-05**

HARVESTING OF AGRICULTURAL CROPS - II : Maize harvesting and shelling equipment, Root crop harvesting equipment- potato, groundnut etc., Cotton picking and sugarcane harvesting equipment.

UNIT - 3**L-06**

HARVESTING OF HORTICULTURAL CROPS : Principles of fruit harvesting tools and machinery, Manual fruit and vegetable harvesters, Robotic fruit and vegetable harvesters.

UNIT - 4**L-06**

TESTING OF AGRICULTURAL MACHINERY : Testing of farm machine, Test codes and procedure, Interpretation of test results, Selection and management of farm machines for optimum performance.

UNIT - 5**L-06**

ERGONOMICS : Introduction, Role of ergonomics in agriculture, Psychological cost of work, Work rest schedules Equipment / work place design- Anthropometric data, Strength data; Application of anthropometric and strength data in equipment design.

LABORATORY EXPERIMENTS**LIST OF EXPERIMENTS****Total hours: 30**

I Study and operation of :

- 1) Various types of threshers
- 2) Mowers
- 3) Reapers
- 4) Combine harvester
- 5) Straw combines
- 6) Bailers
- 7) Root crop harvesters
- 8) Sugarcane harvesters
- 9) Maize sheller
- 10) Sugarcane harvester
- 11) Cotton pickers and strippers
- 12) Fruit harvesting equipment

II Collection of anthropometric data of individuals for use in equipment design.

TEXT BOOK:

1. R. A. Kepner, R. Bainer and E. L. Barger, "Principles of Farm Machinery", 3rd edition, CBS Publishers and Distributors, New Delhi, 2005.

REFERENCE BOOKS:

1. H. P. Smith, "Farm Machinery and Equipment", 6th edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2010.
2. M. L. Mehta, S. R. Verma, S. K. Misra, and V. K. Sharma, "Testing and Evaluation of Agricultural Machinery", 2nd edition, Daya Publishing House, New Delhi, 2005.

WEB LINK:

1. <http://ecoursesonline.iasri.res.in/course/view.php?id=57>