Year I, Semester I, Design of Farm Machinery Systems 2 1 3 6 to 5

Course Description & Objective:

To acquaint and equip with the latest design procedures of farm power and machinery systems.

Course outcomes'

At the end of the course, the student would be

1. *Able to design the agricultural machines for tillage, planting/ sowing, threshing and combine harvesting etc.*
2. *Able to testing of agricultural machines for tillage, planting/ sowing, threshing and combine harvesting etc.*
3. *Mastering the methods and processes of design.*
4. *Having fundamental knowledge of theories of agricultural machinery and equipment.*
5. *Having knowledge and transfer of new technologies in the field of design and construction of agricultural machines and equipment.*
6. *monitoring and implementation of new and contemporary solutions*

UNIT I

Modern trends, principles, procedures, fundamentals and economic considerations for design and development of farm machinery systems. Design considerations, procedure and their applications in agricultural machines. Reliability criteria in design and its application.

UNIT II

Mechanics of tractor chassis, Forces acting upon tillage implement, Mechanics of tillage

UNIT III

Design of selected farm equipments: – tillage, seeding, planting, interculture, plant protection, harvesting and threshing. Design of rotary, vibrating and oscillating machines.

UNIT IV

Tractor –Implement matching and operation, Tractor Implement performance

UNIT V

Safety devices for tractors & farm implements. Cabs & HVAC designs- designs of ROPS and FOPS, safety locations of PTO

Practical:

Statement and formulation of design problems of

1. Mould board ploughs
2. Disc ploughs
3. Harrows
4. Cultivators
5. Rotary tiller
6. Seed drills and planters
7. Transplanters and fertilizer applicators

8. Harvesters
9. Threshers
10. Forage handling equipment

Suggested Readings

1. Bernacki C, Haman J &Kanafajski CZ.1972. *Agricultural Machines.* Oxford & IBH.
2. Bindra OS & Singh Harcharan 1971. *Pesticides Application Equipments*. Oxford & IBH.
3. Bosoi ES, Verniaev OV & Sultan-Shakh EG. 1990. *Theory, Construction and Calculations of Agricultural Machinery.* Vol. I. Oxonian Press.
4. Klenin NI, Popov IF &Sakoon VA. 1987. *Agricultural Machines. Theory f Operations, Computing and Controlling Parameters and theCondition of Operation.* Amrind Publ.
5. Lal R &Dutta PC. 1979. *Agricultural Engineering* (through solved examples). SarojParkashan.
6. Ralph Alcock.1986. *Tractor Implements System*. AVI Publ.
7. Raymond N, Yong Ezzat A & Nicolas Skiadas 1984. *Vehicle Traction Mechanics*. Elsevier.
8. Sharma PC &Aggarwal DK. 1989. *A Text Book of Machine Design*. Katson Publishing House.
9. Thornhill EW & Matthews GA. 1995. *Pesticide Application Equipment for Use in Agriculture*. Vol. II. *Mechanically Powered Equipment*. FAO Rome.
10. Yatsuk EP.1981. *Rotary Soil Working Machines Construction, Calculation and Design*. American Publ. Co.