

Machinery Systems for Precision Agriculture 3 1 0 4 to 4

Course Description & Objective:

To acquaint and equip with the farm machinery used for natural resources management and machinery for precision farming. Use of GIS and GPS in farm machinery.

Course outcomes:

- 1. Students interested in technology will learn how satellite based guidance systems and other related technologies can be utilized to track and manage agricultural inputs (i.e. seed, fertilizer, fuel) and better manage their farming operation*
- 2. Take this knowledge directly to industry working for agricultural consultants and manufacturers*
- 3. Understanding how to set up an auto guidance system is only a small piece of the puzzle.*
- 4. Students master precision agriculture technologies like soil and crop health sensors, yield monitors, GNSS, GIS and mapping, variable rate controllers, and automated guidance.*
- 5. Graduates of this program are challenged to understand management and troubleshooting of the entire agricultural system*

UNIT I

Functional design, specifications, requirements and working of farm machinery needed for natural resources management like rotavator, Precision sowing and planting machines, laser guided leveller, powersprayer, straw chopper cum spreader, straw bailer, combine harvester etc.

UNIT II

Ag GPS parallel swathing option, data base management, functional systems documentation. Application of relevant software.

UNIT III

An introduction to precision farming. GIS/GPS positioning system for precision farming, Yield monitoring and mapping, soil sampling and analysis. Computers and Geographic information systems. Precision farming- Issues and conditions. Role of electronics in farm machinery for precision farming.

UNIT IV

Engineering fundamentals related to earth moving machinery: Swell, shrinkage and compaction measurements. Use of tractors & Crawlers and effects of altitude & temperature on their performance. Grade resistance and gradability.

UNIT V

Land cleaning and reclamation equipment. Land leveling equipment. Powershovels, drag lines, cam shells. Rubber tire for earth moving machinery. Trenching machineries and wagons. Economic analysis of land development machinery. Application of PERT and CPM to the problems related to land development.

Suggested Readings

1. De Mess M. N. Fundamental of Geographic Information System. John Willy and Sons, New York
2. Dutta SK. 1987. Soil conservation and land management. International distributors, Dehradun.
3. Kuhar, John. E. 1977. The precision farming guide for agriculturalist. Lori J. Dhabalt, USA.
4. Lille Sand, T and Kaiffer, R. Remote Sensing and Image Interpretation, John Willy and Sons, London.
5. Nichols HL& Day DH.1998. Moving the earth. The work book of excavation. Mcgraw Hill.
6. Peurifoy RL 1956.Construction, planning, equipment and methods. Mcgraw Hill
7. Sabbins, F. Remote Sensing Principle and Interpretation. Freeman, New York
8. Singh G.1991. Manual of soil and water conservation engineering. Oxford and IBH, Co.
9. Sigma & Jagmohan.1976. Earth moving machinery. Oxford & IBH
10. Wood & Stuart. 1977. Earth moving machinery. Prentice Hall.