

Objective(s)

Making student conversant with the different aspects of Agricultural Engineering and application of information technology in addressing issues related to it.

UNIT I

Farm mechanization, sources of farm power, renewable energy sources, IC engines- principle and working, tractor types, systems and selection, different agricultural operation viz., tillage, sowing, plant protection, intercultural operations, harvesting, threshing, and different implements used for these operation. biomass management techniques.

UNIT II

Watershed concept and theory, soil erosion, measures to control soil erosion, hydrological cycle and its components, soil-plant-water relationship, irrigation methods-surface irrigation, drip & sprinkler irrigation, devices to measure irrigation water viz, weirs, flumes and orifices, Water conveyance systems, Water harvesting, Occurrence and movement of ground water, aquifer and its types, interaction of water resources with the changing environment.

UNIT III

Engineering properties of biological materials, concept of heat and mass transfer, devices for cleaning, grading, milling and storage of farm produce. Drying and dehydration of perishable and non-perishable products, importance, function and features of green house.

UNIT IV

Resource conservation management, precision farming-application of RS and GIS, automated irrigation scheduling, variable rate seed and chemical applicators, different types of sensors and robotics-concept and working principle.

UNIT V

Rainfall-runoff prediction models, watershed modeling, climate change impact analysis on bio-resources, drying characteristics, storage or process kinetics, simulation and modeling in tillage implements.

Reference Book(s):

1. Elements of Agricultural Engineering, Jagdishwar Sahay, Standard Publishers Distributors.
2. Principles of Agricultural Engineering, Vol I & II. A. M. Michael & T. P. Ojha, Jain Brothers.
3. Soil and Water Conservation Engineering, R. Suresh, Standard Publishers.
4. Elementary Hydrology, Vijay P. Singh, Prentice Hall
5. Unit operations of Agricultural Processing, K M Sahay, K. K. Singh, Vikas Publishing House Pvt Ltd
6. Robotics & Automation in the food Industries (Current & Future Technologies), Da-Wen Sun, Wood Head Publishing Ltd, Oxford.
7. Remote Sensing and Geographical Information System, A. M. Chandra, S. K. Ghosh, Alpha Science.

Practical(s):

1. Visit to meteorological observatory.
2. Exercises on empirical and hydrograph based methods to calculate runoff.

3. Problems on Universal Soil Loss Equation (USLE).
4. GIS supported case studies in water resources management.
5. Estimation of specific yield and specific retention.
6. Measurement of irrigation water.
7. Measurement of uniformity coefficient of sprinkler & drip irrigation.
8. Principles, working and components of 2 & 4 stroke IC engines.
9. Study on different systems of tractor.
10. Constructional details, adjustment and working of different agricultural implements.
11. Field operation and adjustments of agricultural implements.
12. Measurement of field capacity and field efficiency of agricultural implements.
13. Study on conventional and non-conventional sources of energy.
14. Study of cleaning and grading equipment.
15. Familiarization with grain storage structures.
16. Measurement of moisture content during drying and aeration.
17. To find out different engineering properties of grains and fruits and vegetables.