

Objective

To acquaint and equip with the importance and phenomenon of drainage system along with design consideration of surface and sub-surface drainage systems.

TheoryUNIT I

Theories and applications of surface and sub-surface drainage, steady state, unsteady state drainage equations for layered and non-layered soils, horizontal sub-surface drainage.

UNIT II

Principle and applications of Earnst, Glover Dumm, Kraijenhoff-van-de- leur equations.

UNIT III

Salt balance, leaching requirement and management practices under drained conditions.

UNIT IV

Design of different components of sub-surface drainage systems, theories of vertical drainage and multiple well points system.

UNIT V

Disposal of drainage effluents, Management of drainage projects of waterlogged and saline soils, case studies.

Practical

Measurement of in-situ hydraulic conductivity, estimation of drainage coefficient and leaching requirements, Delineation of waterlogged areas through isobar, isobath and topographic maps. Design of surface and sub-surface drainage systems, design of filter and envelop materials.

Suggested Readings

- Battacharaya AK & Micheal AM. 2003. *Land Drainage*. Vikas Publ.
Clande Ayres & Daniel Scoates A.E. 1989. *Level Drainage and Reclamation*. McGraw Hill.
Luthin JN. 1978. *Drainage Engineering*. Wiley Eastern.
Ritzema HP. (Ed.). 1994. *Drainage Principles and Applications*.
ILRI Roe CE 1966. *Engineering for Agricultural Drainage*.
McGraw Hill.