

## SWC211 FUNDAMENTALS OF SOIL, WATER CONSERVATION ENGINEERING

### Theory

Surveying and Leveling – Chain, Compass and Plane Table survey – leveling – Land measurement and computation of area – Simpson’s rule and Trapezoidal rule.

Soil Erosion – causes and evil effects of soil erosion – geologic and accelerated erosion - water erosion - causes - erosivity and erodibility - Universal soil loss equation - mechanics of water erosion - splash, sheet, rill and gully erosion – Erosion control measures for Agricultural lands – biological measures – contour cultivation – strip cropping – cropping systems – vegetative measures – vettiver and other natural grass barriers - mechanical measures – contour bund – graded bund – broad beds and furrows – basin listing – random tie ridging – mechanical measures for hill slopes – contour trench – bench terrace – contour stone wall – gully control structures – permanent and temporary structures.

Wind erosion - factors influencing wind erosion - mechanics of wind erosion — suspension, saltation, surface creep-control measures - windbreaks and shelterbelts – sand dunes and their stabilization.

Rainwater harvesting methods - in-situ soil moisture conservation - micro catchments – roaded catchments - Roof water harvesting – storage and its use for domestic and groundwater recharge - Farm ponds and percolation ponds - Watershed concept and watershed management.

Groundwater wells – aquifers – types of wells and sizes - pumps – reciprocating pumps – centrifugal pumps – turbine pumps – submersible pumps – jet pumps – airlift pumps – selection of pumps – operation and their maintenance.

### Lecture Schedule

#### Theory

1. Principles of surveying and leveling – applications in the field of agriculture.
2. Chain surveying – purposes and procedures.
3. Compass surveying– purposes and procedures.
4. Plane Table surveying– purposes and procedures.
5. Leveling features of dumpy level – computation of slope, area and volume – Simpson’s rule and Trapezoidal rule.
6. Soil erosion – causes and effects of soil erosion - Mechanics of water erosion – various forms of water erosion.
7. Erosion control measures – vegetative measures.

8. Mechanical measures for plain – contour bund – graded bund – broad bed and furrow.
9. **Mid semester Exam.**
10. Mechanical measures for hill – contour trench – bench terrace – contour stone wall.
11. Wind erosion – mechanics of wind erosion – various forms of wind erosion.
12. Wind breaks – shelter belts – sand dunes and their stabilization.
13. Rainwater harvesting – methods – in-situ and ex-situ conservation.
14. Roof water harvesting – methods – storage – uses.
15. Aquifers – types of wells and sizes.
16. Pumps – reciprocating – centrifugal – turbine – submersible – jet and airlift pumps.
17. Selection criteria – operation and maintenance of pumps.

## **REFERENCES**

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2. Ghanashyam Das, 2000. Hydrology and Soil Conservation engineering, Prentice hall of India Private Limited New Delhi.
3. Gurmail singh, 1982. A Manual on Soil and Water Conservation, ICAR Publication, New Delhi.
4. Kanetkar, I.P. and S.V.Kulkarni, 1984. Surveying and Levelling, Part I Pune Vidyarthi Giiha: Prakasan, Pune.
5. Murthy, V.V.N. Land and Water Management Engineering. 1998. Kalyani Publishers, Ludhiana.
6. Suresh.R. 1982. Soil and Water Conservation Engineering. Standard Publication, New Delhi.