



SOIL AND WATER CONSERVATION ENGINEERING

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IIT Kharagpur

TYPE OF COURSE : Rerun | Core | UG

COURSE DURATION : 12Weeks (24 Jan' 22 - 15 Apr' 22)

EXAM DATE : 24 Apr 2022

INTENDED AUDIENCE : Agricultural Engineering

COURSE OUTLINE :

The course deals with the engineering principles involved in soil and water conservation. It includes the classification of the water erosion, and the agronomical and engineering measures adopted for erosion control. The design of bunds and terraces are dealt in detail, followed by gully control measures. The wind erosion and measures to control it, e.g., the windbreaks and shelterbelt, are also included. Many examples and problems are included to emphasize the design principles and to facilitate an understanding of the subject matter. Computer models will be described where applicable.

ABOUT INSTRUCTOR :

Prof. Rajendra Singh has been a faculty in the Agricultural & Food Engineering Department, IIT Kharagpur since 1989. He has been associated with the Soil & Water Conservation Engineering discipline of the Department (presently known as Land & Water Resources Engineering), and has taught "Soil & Water Conservation Engineering" at both UG and PG levels. Dr. Singh has also won the "Recognition Award" in the area of 'Soil & Water Conservation Engineering' from National Academy of Agricultural Sciences.

COURSE PLAN :

Week 1: Soil erosion - introduction, causes and types; Geological and accelerated erosion; Erosion agents; Factors affecting and effects of erosion.

Week 2: Water erosion - Mechanics and forms; Gullies – Classification & stages of development

Week 3: Soil loss estimation – Universal soil loss equation (USLE) and modified USLE; Rainfall erosivity – estimation by $KE > 25$ and $EI > 30$ methods; Soil erodibility and other management factors.

Week 4: Measurement of soil erosion - Runoff plots, soil samplers.

Week 5: Water erosion control measures - agronomical measures - contour farming, strip cropping, conservation tillage and mulching; Engineering measures – Bunds and terraces.

Week 6: Bunds - contour and graded bunds - design and surplussing arrangements

Week 7: Terraces - level and graded broad base terraces, bench terraces - planning, design and layout procedure, contour stonewall and trenching.

Week 8: Gully and ravine reclamation - principles of gully control - vegetative measures, temporary structures and diversion drains.

Week 9: Grassed waterways and design

Week 10: Wind erosion- Factors affecting, mechanics, soil loss estimation and control measures vegetative, mechanical measures.

Week 11: Design of wind breaks and shelter belts and stabilization of sand dunes

Week 12: Land capability classification. Rate of sedimentation, silt monitoring and storage loss in tanks.