

19AG214 SOIL AND WATER CONSERVATION ENGINEERING

Hours Per Week :

L	T	P	C
2	0	2	3

Total Hours :

L	T	P	WA/RA	SSH/HS	CS	SA	S	BS
30	-	30	10	45	-	-	-	-



Source :

<http://xososonla.vn/img/AnhHoatDong/636268970135331032.jpg>

COURSE DESCRIPTION AND OBJECTIVES:

To enable the students to acquire knowledge on different runoff estimation methods and soil loss estimation models.

To impart the knowledge on land use capability classification, land treatment measure, types and design.

To enable the students to acquire knowledge in the design of various gully control structures.

COURSE OUTCOMES:

Upon completion of the course, student will able to achieve the following outcomes:

COs	Course Outcomes	POs
1	Apply the knowledge, to identify different types of erosions and quantify the annual soil loss using USLE from a watershed.	1,5,6,12
2	Evaluate mechanics of wind erosion, control measures and land use capability classification.	1,3,6
3	Analyse the peak runoff rate by rational method and runoff by curve number and cook's methods.	1,2,3,6
4	Creative of various erosion control measures.	2,3,5,6
5	Creative the concept of sedimentation and vegetated grassed.	1,3,6

SKILLS:

- ✓ *Design prototype models of drop spillway, drop inlet spillway and chute spillway with standard procedures.*
- ✓ *Prepare an estimation of various costs and benefits of different structures.*
- ✓ *Analyze various soil and water conservation structure designs using software.*

UNIT - I **L-6**

SOIL EROSION: Introduction, causes and types - geological and accelerated erosion, agents, factors affecting and effects of erosion. Water erosion - Mechanics and forms - splash, sheet, rill, gully, ravine and stream bank erosion. Gullies - Classification, stages of development.

UNIT - II **L-6**

SOIL LOSS ESTIMATION: Universal soil loss equation (USLE) and modified musle. Rainfall erosivity-estimation by KE>25 and EI30 methods. Soil erodibility - topography, crop management and conservation practice factors. Measurement of soil erosion - Runoff plots and soil samplers.

UNIT - III **L-6**

WATER EROSION CONTROL MEASURES: Agronomical measures - contour farming, strip cropping, conservation tillage and mulching. Engineering measures - Bunds and terraces. Bunds - contour and graded bunds - design and surplussing arrangements. Terraces - level and graded broad base terraces, bench terraces - planning, design and layout procedure, contour stonewall and trenching.

UNIT - IV **L-6**

GULLY AND RAVINE RECLAMATION: Principles of gully control - vegetative measures, temporary structures and diversion drains. Grassed waterways and design. Use of Geotextiles in soil and water conservation.

UNIT - V **L-6**

WIND EROSION: Factors affecting, mechanics, soil loss estimation and control measures - vegetative, mechanical measures, wind breaks and shelter belts and stabilization of sand dunes. Land capability classification. Rate of sedimentation, silt monitoring and storage loss in tanks.

LABORATORY EXPERIMENTS**LIST OF EXPERIMENTS****TOTAL HOURS: 30**

1. Study of different types and forms of water erosion.
2. Exercises on computation of rainfall erosivity index.
3. Computation of soil erodibility index in soil loss estimation.
4. Determination of length of slope (LS) and cropping practice (CP) factors for soil loss estimation by USLE and MUSLE.
5. Exercises on soil loss estimation/measuring techniques.
6. Study of rainfall simulator forerosion assessment.
7. Estimation of sediment rate using coshocton wheel sampler and multi slot devisor determination of sediment concentration through oven dry method.
8. Design and layout of contour bunds.
9. Design and layout of graded bunds.
10. Design and layout of broad baseterraces.
11. Design and layout of bench terraces.
12. Design of vegetative waterways.
13. Exercises on rateof sedimentation and storage loss in tanks.
14. Computation of soil loss by wind erosion.
15. Design of shelter belts and wind breaks for wind erosion control .
16. Visit to soil erosion sites and watershed project areas for studying erosion control and water conservation measures.
17. Practical examinations.

TEXT BOOK :

1. Suresh, R. 2014, "Soil and Water Conservation Engineering". Standard publilsher Distributors, New Delhi.

RE.FERENCE BOOKS:

1. Mahnot, S.C. 2014, "Soil and Water Conservation and Watershed Management", InternationalBooks and Periodicals Supply Service, New Delhi.
2. Mal, B.C. 2014. "Introduction to Soil and Water Conservation Engineering", 2014. KalyaniPublishers.
3. Michael, A.M. and T.P. Ojha. 2003, "Principles of Agricultural Engineering", Volume II, 4th edition, Jain Brothers, New Delhi.
4. Murthy, V.V.N. 2002, "Land and Water Management Engineering". 4th edition, KalyaniPublishers, New Delhi.