



- I. Course Title : Modeling Soil Erosion Processes and Sedimentation**
II. Course Code : SWCE 604
III. Credit Hours : 2+1

IV. Aim of the course

To acquaint students about the concept of modeling upland erosion, reservoir sedimentation and sediment yield models for estimation of soil erosion.

V. Theory

Unit I

Mechanics of soil erosion. Erosion-sedimentation systems of small watersheds. Overland flow theory and simulation. Basic theory of particle and sediment transport. Sediment deposition processes.

Unit II

Modeling upland erosion and component processes. Modes of transport and transport capacity concept and computation. Channel erosion. Erosion and sediment yield measurement and estimates.

Unit III

Reservoir sedimentation surveys and computation. Classification of models, structure and mathematical bases of sediment yield models. Nature and properties of sediment: Individual and group of particles. Critical tractive force, lift and drag forces. Shield's analysis.

Unit IV

Calibration and testing of models. Universal soil loss equation, its modification and revisions. Stochastic and dynamic sediment yield models.

Unit V

Evaluation of erosion control measures. Computer models used for hydrologic and/or watershed modeling.

VI. Practical

Computation of soil erosion index. Estimation of soil erodibility factor. Design of erosion control structures. Computation of suspended load and sediment load using empirical formulae. Application of sediment yield models. Prediction of sediment loss. Computation of reservoir sedimentation, sounding method.

VII. Learning outcome

The students will be able to estimate the sediment from the particular watershed by using various instruments. Development of the common understanding of mechanics of sediment transportation process and remedies to reduce sedimentation of watersheds

VIII. Lecture Schedule

S.No.	Topic	No. of Lectures
1.	Mechanics of soil erosion	1
2.	Erosion-sedimentation systems of small watersheds	1
3.	Overland flow theory and simulation	2
4.	Basic theory of particle and sediment transport. Sediment deposition processes	2



S.No.	Topic	No. of Lectures
5.	Modeling upland erosion and component processes	2
6.	Modes of transport and transport capacity concept and computation	2
7.	Channel erosion	1
8.	Erosion and sediment yield measurement and estimates	1
9.	Reservoir sedimentation surveys and computation	2
10.	Classification of models, structure and mathematical bases of sediment yield models	2
11.	Nature and properties of sediment: Individual and group of particles	2
12.	Critical tractive force, lift and drag forces	2
13.	Shield's analysis	2
14.	Calibration and testing of models	2
15.	Universal soil loss equation, its modification and revisions	2
16.	Stochastic and dynamic sediment yield models	2
17.	Evaluation of erosion control measures	2
18.	Computer models used for hydrologic and/or watershed modeling	2
	Total	32

IX. List of Practicals

S.No.	Topic	No. of Practicals
1.	Computation of soil erosion index	2
2.	Estimation of soil erodibility factor	2
3.	Design of erosion control structures	4
4.	Computation of suspended load and sediment load using empirical formulae	2
5.	Application of sediment yield models	2
6.	Prediction of sediment loss	2
7.	Computation of reservoir sedimentation, sounding method	2
	Total	16

X. Suggested Reading

- Garde RJ and Ranga Raju KG. 1977. *Mechanics of Sediment Transport and Alluvial Stream Problems*. Wiley Eastern Ltd.
- Morgan RPC (Ed. D A Davison). 1986. *Soil Erosion and Conservation*. ELBS.
- Longman USDA. 1969. *A Manual on Conservation of Soil and Water*. Oxford & IBH.
- Tripathi RP and Singh HP. 1993. *Soil Erosion and Conservation*. Publisher- New Age International, New Delhi.

I. Course Title : Waste Water Treatment and Utilization

II. Course Code : SWCE 605

III. Credit Hours : 3+0

IV. Aim of the course

To acquaint students about types of waste water and the various treatment measures alongwith the utilization of waste water in agriculture and other sectors.

V. Theory

Unit I

Types of waste water, causes of pollution, analysis of pollutants in the waste effluents, Biological wastewater treatment, biological sludge treatment. Biological