SWCE 505 Watershed Management and Modeling 2+1

Objectives:
To acquaint students with watershed management concept and its benefit for sustainable rural development through participatory approach, including environmental impact as well as policy frame work.

Unit-I
Concept of watershed, its hydrological and geo-morphological characteristics. Status of watershed management programs in India. Problems of desertification and degradation.

Unit-II
Concept of watershed management and sustainability, participatory approach and operational watershed. Surveys, monitoring, reclamation and conservation of agricultural and forest watersheds, hill slopes and ravines.

Unit-III
Watershed management research instrumentation and measurement, problem identification, simulation and synthesis. Rainfed farming and drought management. Modeling of flood and drought phenomenon.

Unit-IV
Use of Remote Sensing and GIS in watershed management and modeling. Watershed modelling approaches.

Unit-V
Environmental impact assessment of watersheds. Quantitative evaluation of management techniques. National land use policy, legal and social aspects. Case studies of watershed management.

Practical:
Selection and delineation of a watershed. Benchmark surveys. Preparation of watershed land use map. Preparation of watershed development proposal. Preparation of watershed evaluation and impact assessment report. Application of watershed models for evaluation of conservation treatments. Use of Remote Sensing and GIS in watershed management and modeling.

Course Outcome:
The students will be able to understand different conservation practices and their effect on watershed behavior. They can also estimate the geomorphologic parameters of particular watershed which is quite useful for watershed planning and development of watershed models.

Teaching Schedule

S.No.	Topic	No. of Lectures
1	Concept of watershed, its hydrological and geo-morphological characteristics	2
2	Status of watershed management programs in India	2
3	Problems of desertification and degradation	2
4	Concept of watershed management and sustainability, participatory approach and operational watershed	3

5	Surveys, monitoring, reclamation and conservation of agricultural and forest watersheds, hill slopes and ravines	3
6	Watershed management research instrumentation and measurement, Problem identification, simulation and synthesis	3
7	Rainfed farming and drought management	2
8	Modeling of flood and drought phenomenon	2
9	Use of Remote Sensing and GIS in watershed management and modeling	2
10	Environmental impact assessment of watersheds	3
11	Quantitative evaluation of management techniques	2
12	National land use policy, legal and social aspects	3
13	Case studies of watershed management	3
	Total	**32**

List of Practical

S.No.	Topic	No of Practical
1	Selection and delineation of a watershed	3
2	Bench mark surveys	2
3	Preparation of watershed land use map	2
4	Preparation of watershed development proposal	3
5	Preparation of watershed evaluation and impact assessment report	2
6	Application of watershed models for evaluation of conservation treatments	2
7	Use of Remote Sensing and GIS in watershed management and modelling	2
	Total	**16**

Suggested Readings

1. Tideman EM 1999. *Watershed Management (Guidelines for Indian Conditions)*. Omega Scientific Publishers, New Delhi.
2. Dhruvanarayana VV, Sastry G and Patnaik US. *Watershed Management*. Publ. and Inf. Div., ICAR, Krishi Anusandhan Bhavan, New Delhi.
3. Singh RV 2000. *Watershed Planning and Management* .Second Edition Yash Publishing House, Bikaner.
4. Dhaliwal GS Hansra BS and Ladhar SS1993. *Wetlands, their Conservation and Management.* Punjab Agricultural University, Ludhiana.
5. Suresh R2017. *Watershed Planning and Management*. Standard Publication and Distribution, Delhi
6. Integrated Watershed Management, Principles and Practices by Isobel W. Heathcoate