CE/BOS/CE E64/0210

K L UNIVERSITY

WATERSHED MANAGEMENT (09 - CE E64)

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SYLLABUS:

UNIT – 1 Introduction

Concept of watershed development, objectives of watershed development, need for watershed development in India, Integrated and multidisciplinary approach for watershed management, watershed management programme, classification of watershed management practices.

Characteristics of Watershed:

Size, shape , physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socioeconomic, types of watersheds, drainage basin characteristics, basin order and channel order, basin area, basin shape, basin slope, centroid, basin length, number of channel and their order, channel length, channel slope, channel profile, drainage density.

UNIT-II Sustainable Watershed Approach & Watershed Management Practices:

Sustainable integrated watershed management, natural resources management, land management, water management, biomass management, agricultural practices, integrated farming, project implementation and evaluation for watersheds, watershed management planning.

Socioeconomical Aspects & Application of PRA tools for participatory watershed planning:

People's awareness, participation and response, state and intregrated approach, sustainable society for economical upliftment, economics, PRA, application of PRA, principle of PRA, preparation of action plan, steps for participatory watershed development.

UNIT-III Storm Water and Flood Management:

Selection of stream gauging sites, stream gauging network, measurement of stage of river, measurement of velocity, current meter, calibration of current meter, velocity measurement by floats, Methods of discharge measurement, area-velocity method, discharge measurement by hydraulic structures, slope-area method, stage-discharge relationship, SCS-CN method of estimating runoff volume from watershed. Estimation of flood peak, rational method, flood frequency studies, Gumbel's method for extreme value distribution, regional flood frequency analysis, Design flood, Risk, Reliabilty and Safety Factor, Flood control.

UNIT-IV Soil erosion and soil conservation:

Types of soil erosion, factors affecting erosion, mechanic of movement of soil particles by wind, wind erosion control, water erosion and its control, estimation of sheet erosion- universal soil loss equation (USLE), channel erosion, sediment movement in channel, sediment sampling method, grab sampling, depth-integrating sampling, point integrating sampling, continuous sampling, bed load sampling, Movement of sediment and sediment yield from watersheds, Estimation of watershed erosion and sediment delivery ratio, trap efficiency, Sediment yield model- modified universal soil loss equation MUSLE.

UNIT-V Droughts and Drought Management:

Definition and classification, drought analysis techniques, drought mitigation planning. Water harvesting methods for water harvesting in catchments, common water harvesting techniques systems design; design of farm pond

Watershed Modeling:

Standard modeling approaches and classifications, system concept for watershed modeling, overall description of different hydrologic processes, modeling protocol, hydrological models and classification, case studies

Use of modern techniques in watershed management:

Applications of Geographical Information System and Remote Sensing in Watershed Management;

Case studies

TEXT BOOKS:

1. Watershed Management in India, By JVS Murthy, - Wiley Eastern Limeted
2. Hydrology and Soil Conservation Engineering, By Ghanshyam Das, PHI Publishers, New Delhi.

REFERENCE BOOK:

1. Engineering hydrology By K. Subramanyam, Tata McGraw Hill ,New Delhi.
2. Elementary Hydrology, By V. P. Singh, PHI Publishers, New Delhi.
3. Watershed Models, By V.P. Singh & Donald K. Frevert , Taylor & Francis.
4. Watershed & Planning Management, By Dr. Rajvir Singh, Yash Publication