

**Unit I Drainage Basin Assessment**

Watershed divide – stream networks – Delineation and codification of watersheds – basin morphometric analysis – linear, aerial, relief aspects – Rainfall - runoff modelling – urban hydrology – flood forecasting, risk mapping, damage assessment - soil moisture area – drought forecasting and damage assessment – mitigation - Mapping of snow covered area – snow melt runoff - case studies.

**Unit II Watershed Management**

Mapping and monitoring the catchment and command area – conjunctive use of surface and ground water – artificial recharge of groundwater – water harvesting structures – erosivity and erodability - Universal Soil Loss Equation – sediment yield – modelling of reservoir siltation – prioritization of watershed – modelling of sustainable development – information system for Natural resource management – case studies.

**Unit II Water, Air and Noise Quality Management**

Classification of water quality - Sampling procedure - Quality analysis and GIS modelling Pipe Network Design using GIS - Spectral responses of clear and contaminated water – Aquifer Vulnerability: Intrinsic and specific vulnerability - DRASTIC, SINTACS – Ground Water Quality Modelling: MODFLOW, MT3D – Sea water Intrusion Modelling – pollution diffusion model in river - Case studies. Air Quality Standards – Chemical and Physical Components - Sampling – Mapping of atmospheric pollution - Air pollution due to industrial activity - Plume behaviours - Dispersion model: Gaussian Plume model - Remote Sensing to monitor atmosphere constituents - Case Studies. Noise pollution: Standards - Measurement of noise and its intensity - Sources - Effects – noise modelling.

**Unit III Solid Waste Management**

Definition – sources – identification of storage and collection location – Geospatial analysis of collection route - Site selection: Transfer station, Disposal site – case studies.

**Unit IV Geospatial Applications for Agriculture and Forestry**

Spectral properties of crops in optical & TIR region, Microwave backscattering behaviour of crop canopy – crops identification and crop inventory – crop acreage estimation – vegetation indices and biophysical model – Yield modelling – crop condition assessment – command area monitoring and management – Microwave RS for crop inventory Detection of pest & diseases – Flood mapping and Assessments of crop loss – drought assessment – Land degradation – Soil erosion & sedimentation – Soil loss assessment – Soil conservation – Agriculture damage prediction modelling.

**Unit V Coastal Zone Applications**

Use of Microwave data – CZCS studies – chlorophyll production index – various sensors used for coastal application – physical oceanographic parameter estimation – sea surface temperature – significant wave height – wind speed and direction – Oceanic circulation – Tidal variation –

sea level rise - coastal Bathymetry Coastal Regulation zone – Coastal aquifer modelling using GIS – Integrated coastal Zone Management

**TEXT BOOKS/ REFERENCES:**

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3. Wilfried Brutsaert, Hydrology: An Introduction Cambridge University Press, 2005.
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5. U.M. Shamsi, GIS Applications for Water, Wastewater, and Storm water Systems, CRC; first edition 2005.
6. Hoalst-Pullen, Nancy; Patterson, Mark W; Geospatial Technologies in Environmental Management, 2010, Springer.
7. Ian L. Pepper, Charles P. Gerbaud and Mark L. Brusseau, Environmental and Pollution science, Academic Press, 2nd Edition, 2006. ISBN : 978-0125515030
8. David N. Milsen, Environmental Site Characterization and Ground water Monitoring, 2nd edition, CRC Press, 2005, ISBN: 978-1566705899
9. Roger D. Griffin, Principles of Air Quality Management, Second edition, 2006, CRC Press
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11. Tchobanoglous George, Hilary Theisen, Samuel Vigi, Integrated Solid Waste Management, Mc Graw – Hill Inc, Singapore. 1993.
12. Sisi Zlatanova & Andrea Fabbri Jonathanli, Geometrics solutions for Disaster management, Springer Verlag, 2007.
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