

V Semester

Hydrology and Water Resource Engineering			
Course Code	21CV51	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3+0+0+0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	3	Exam Hours	3
<p>Course objectives: Make the students to learn</p> <ol style="list-style-type: none"> 1. Concept of hydrology, components of hydrologic cycle, hydrologic processes such as precipitation, infiltration, evaporation and transpiration. 2. Estimation of runoff and use the concept of unit hydrograph. 3. Systems and methods of irrigation, crop water requirement. 4. Canals, canal alignment, design methods of canals. Computation of reservoir capacity. 5. Concepts of floods and droughts, importance of water conservation and water management. 			
<p>Teaching-Learning Process (General Instructions) These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.</p> <ol style="list-style-type: none"> 1. Power point Presentation 2. Video tube, NPTEL materials 3. Quiz/Assignments/Open book test to develop skills 4. Adopt problem based learning (PBL)to develop analytical and thinking skills 5. Encourage collaborative learning, site visits related to subject and impart practical knowledge 6. Mini projects 			
Module-1			
<p>Hydrology: Introduction, Global distribution of water and Indian water availability. Hydrologic cycle (Horton's) qualitative and engineering representation. Precipitation: Forms and types, measurement of rain fall using Syphon type of rain gauges, optimum number of rain gauge stations, consistency of rainfall data (double mass curve method), computation of mean rainfall, estimation of missing data, presentation of precipitation data, moving average curve, mass curve, rainfall hyetographs. Losses from Precipitation: Evaporation process, factors affecting evaporation, measurement using IS class-A Pan, reservoir evaporation and control. Factors affecting Evapo-transpiration. Infiltration, Factors affecting infiltration capacity, measurement by double ring infiltrometer, Horton's infiltration equation, infiltration indices.</p>			8 hours
Teaching-Learning Process	Chalk and talk, Power Point Presentation& PBL		
Module-2			
<p>Runoff: Definition, concept of catchment, factors affecting runoff, rainfall - runoff relationship using regression analysis. Hydrographs: Definition, components of hydrograph, base flow separation, unit hydrograph, assumption, application and limitations, derivation from simple storm hydrographs, S curve and its computations, Conversion of UH of different durations.</p>			8 hours
Teaching-Learning Process	Chalk and talk, Power Point Presentation & PBL		
Module-3			
<p>Irrigation: System of irrigation: surface and ground water, flow irrigation, lift irrigation. Methods of irrigation: surface, sprinkler and drip/micro irrigation. Water Requirements of Crops: Duty, delta and base period, relationship between them, factors affecting duty of water crops and crop seasons in India, irrigation efficiency, frequency of irrigation.</p>			8 hours
Teaching-Learning Process	Chalk and talk, PowerPoint Presentation and Model preparation		
Module-4			

<p>Canals: Types of canals. Alignment of canals. Definition of gross command area, cultural command area, intensity of irrigation, time factor, crop factor. Unlined and lined canals. Standard sections. Regime channels, Design of canals by Lacey's and Kennedy's method (No numerical examples).</p> <p>Reservoirs: Definition, investigation for reservoir site, storage zones determination of storage capacity using mass curves, economical height of dam.</p>	8 hours
Teaching-Learning Process	Chalk and talk, Power Point Presentation and Field visits.
Module-5	
<p>Flood Management: Indian rivers and floods, Causes of floods, Alleviation, Levees and floodwalls, Flood ways, Channel improvement, Flood damage analysis.</p> <p>Drought Management: Definition of drought, Causes of drought, measures for water conservation and augmentation, drought contingency planning.</p> <p>Water harvesting: rainwater collection, small dams, runoff enhancement, runoff collection, Restoration and rejuvenation of water bodies (ponds and lakes)</p>	8 hours
Teaching-Learning Process	Chalk and talk, Power Point Presentation and Mini-projects
<p>Course outcome (Course Skill Set)</p> <p>At the end of the course the student will be able to :</p> <ol style="list-style-type: none"> 1. Provide a background in the theory of hydrological processes and their measurement 2. Estimate runoff and develop unit hydrographs. 3. Find the water requirement and frequency of irrigation for various crops. 4. Find the canal capacity and compute the reservoir capacity. 5. Analyse floods and droughts. Emphasise on the importance of conservation of water and water bodies. 	