

|| Jai Sri Gurudev ||  
**Sri Adichunchanagiri Shikshana Trust (R)**  
**ADICHUNCHANAGIRI UNIVERSITY**  
**BGS Institute of Technology**

**B. E. CIVIL ENGINEERING**  
**Choice Based Credit System (CBCS) and Outcome Based Education (OBE)**

<b>18CV63</b>	<b>Course Code</b>	<b>HYDROLOGY AND IRRIGATION ENGINEERING</b>	<b>Course Title</b>	<b>VI</b>	<b>Semester</b>
<b>4</b>	<b>Credits</b>	<b>3 – 1 – 0 – 4</b>	<b>L – T – P – TL*</b>	<b>50 Hours</b>	<b>Teaching Period</b>
<b>100 Marks</b>	<b>Total</b>	<b>60 Marks</b>	<b>SEE*</b>	<b>40 Marks</b>	<b>CIE*</b>
*NOTE: L – Lecture; T – Tutorial; P – Practical; TL – Total; CIE – Continuous Internal Evaluation; SEE – Semester End Examination					

<p><b>Course Learning Objectives:</b>  This course will enable students to</p> <ol style="list-style-type: none"> <li>1. Understand the concept of hydrology and components of hydrologic cycle such as precipitation, infiltration, evaporation and transpiration.</li> <li>2. Quantify runoff and use concept of unit hydrograph.</li> <li>3. Demonstrate different methods of irrigation, methods of application of water and irrigation procedure.</li> <li>4. Design canals and canal network based on the water requirement of various crops.</li> <li>5. Determine the reservoir capacity.</li> </ol>	<b>Teaching Hours</b>
<p><b>Module-1</b>  <b>Hydrology:</b> Introduction, Importance of hydrology, Global and Indian water availability, Practical application of hydrology, Hydrologic cycle (Horton's) qualitative and engineering representation.  <b>Precipitation:</b> Definition, Forms and types of precipitation, measurement of rain fall using Symon's and 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.</p>	<b>10Hours</b>
<p><b>Module-2</b>  <b>Losses:</b> Evaporation: Introduction, Process, factors affecting evaporation, measurement using IS class-A Pan, estimation using empirical formulae (Meyer's and Rohwer's equations) Reservoir evaporation and control  <b>Evapo-transpiration:</b> Introduction, Consumptive use, AET, PET, Factors affecting, Measurement, Estimation by Blaney-Criddle equation,  <b>Infiltration:</b> Introduction, factors affecting infiltration capacity, measurement by double ring infiltrometer, Horton's infiltration equation, infiltration indices.</p>	<b>10Hours</b>
<p><b>Module-3</b>  <b>Runoff:</b> Definition, concept of catchment, factors affecting runoff, rainfall – runoff relationship using regression analysis.  <b>Hydrographs:</b> Definition, components of hydrograph, base flow separation, unit</p>	<b>10Hours</b>

hydrograph, assumption, application and limitations, derivation from simple storm hydrographs, S curve and its computations, Conversion of UH of different durations	
<p><b>Module-4</b>  <b>Irrigation:</b> Definition. Benefits and ill effects of irrigation. System of irrigation: surface and ground water, flow irrigation, lift irrigation, Bandhara 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>	<b>10Hours</b>
<p><b>Module-5</b>  <b>Canals:</b> 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. Design of canals by Lacey's and Kennedy's method.  <b>Reservoirs:</b> Definition, investigation for reservoir site, storage zones determination of storage capacity using mass curves, economical height of dam.</p>	<b>10Hours</b>
<p><b>Course outcomes:</b>  After studying this course, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Understand the importance of hydrology and its components. 2</li> <li>2. Measure precipitation and analyze the data and analyze the losses in precipitation.</li> <li>3. Estimate runoff and develop unit hydrographs.</li> <li>4. Find the benefits and ill-effects of irrigation.</li> <li>5. Find the quantity of irrigation water and frequency of irrigation for various crops.</li> <li>6. Find the canal capacity, design the canal and compute the reservoir capacity.</li> </ol>	
<p><b>Question paper pattern:</b></p> <ul style="list-style-type: none"> <li>• The question paper will have ten full questions carrying equalmarks.</li> <li>• Each full question will be for 20marks.</li> <li>• There will be two full questions (with a maximum of four sub- questions) from eachmodule.</li> <li>• Each full question will have sub- question covering all the topics under amodule.</li> <li>• Thestudentswillhavetoanswerfivefullquestions,selectingonefullquestionfromeachmodule.</li> </ul>	
<p><b>Textbooks:</b></p> <ol style="list-style-type: none"> <li>1. K. Subramanya, "Engineering Hydrology", Tata McGraw Hill Publishers, New Delhi.</li> <li>2. Jayarami Reddy, "A Text Book of Hydrology", Lakshmi Publications, New Delhi.</li> <li>3. Punmia and LalPandey, "Irrigation and Water Power Engineering" Lakshmi Publications, New Delhi</li> </ol> <p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. H.M. Raghunath, "Hydrology", Wiley Eastern Publication, New Delhi.</li> <li>2. Sharma R.K., "Irrigation Engineering and Hydraulics", Oxford &amp; IBH Publishing Co., New Delhi.</li> <li>3. VenTe Chow, "Applied Hydrology", Tata McGraw Hill Publishers, New Delhi.</li> <li>4. Modi P.N "Water Resources and Water Power Engineering"- Standard book house, Delhi.</li> <li>5. Garg S.K, "Irrigation Engineering and Hydraulic Structures" Khanna publications, New Delhi</li> </ol>	