Devi Ahilya Vishwavidhyalaya, Indore, India Institute of Engineering & Technology					III Year B.Tech. (Civil Engineering)	
Course Code & Name	**Instructions Hours per Semester and Credits**					
5RVOE1 **Water Resources Engineering**	**Classroom Instruction (CI)**		**Lab Instruction (LI)**	**Term Work (TW) and Self Learning (SL)**	**Total no. of Hours Per semester**	**Total Credits (Total Hours/30)**
	L	**T**	**P**	**TW+SL**	**90**	**3**
	20	**10**	**00**	**60**		

Course Learning Objectives:

1. Understand irrigation water requirement and soil–water–crop relationship
2. Learn about different methods of irrigation
3. Study hydrological systems
4. Examine hydraulic structures
5. Explore flood control measures and economics of flood management

Prerequisites: Physics, Chemistry, Fluid Mechanics , Hydrology

COURSE CONTENTS

Unit–I

Irrigation Water Requirement and Soil-Water-Crop Relationship: Irrigation, definition, necessity, advantages and disadvantages, types and methods, Irrigation development.

Soils - Types and their occurrence, suitability for irrigation purposes, wilting coefficient and field capacity, optimum water supply, consumptive use and determination. Irrigation method surface and subsurface, sprinkler and drip irrigation.

Duty of water, factors affecting duty and methods to improve duty, suitability of water for irrigation, crops and crop seasons, principal crops and their water requirement, crop ratio and crop rotation, intensity of irrigation.

Unit–II

Ground Water and Well Irrigation: Confined and unconfined aquifers, aquifer properties, hydraulics of wells under steady flow conditions, infiltration galleries. Ground water recharge, necessity and methods of improving ground water storage.

Waterlogging causes, effects and its prevention. Salt efflorescence causes and effects. Reclamation of waterlogged and salt affected lands. Type of wells, well construction, yield tests, specific capacity and specific yield, advantages and disadvantages of well irrigation

Unit-III

Hydrology: Hydrological cycle, precipitation and its measurement, recording and non-recording rain gauges, estimating missing rain fall data, rain gauge networks, mean depth of precipitation over a drainage area, mass rainfall curves, intensity-duration curves, depth-area duration curves, Infiltration and infiltration indices, evaporation stream gauging, run off and

its estimation, hydrograph analysis, unit hydrograph and its derivation from isolated and complex storms, Curve hydrograph, synthetic unit hydrograph.

Unit– IV

Canals and Structures: Types of canals, alignment, design of unlined and lined canals, Kennedy's and Lacey's silt theories, typical canal sections, canal losses, lining-objectives, materials used, economics. Introductions to Hydraulic Structures viz. Dams, Spillways, Weirs, Barrages, Canal Regulation Structures.

Unit-V

Floods: Types of floods and their estimation by different methods, probability and frequency analysis, flood routing through reservoirs and channels, flood control measures, economics of flood control,

Course Outcome:

CO. No.	CO	PO
CO1	Analyze water requirement and soil-water-crop relationship	PO-2
CO2	Apply method & infrastructure for imparting irrigation water to Crop development	PO-1
CO3	Develop rainfall-run off models	PO-3
CO4	Design irrigation canal structures	PO-3
CO5	Formulate and solve hydrologic flood routing models	PO-2

Books recommended:

1. Irrigation &Water Power Engg. By Punmia &Pandey B. B Lal
2. Engg Hydrology by K. Subramanya-Tata McGraw Hills Publ. Co.
3. Engg. Hydrology-J.NEMEC-Prentice Hall
4. Hydrology for Engineers Linsley, Kohler, Paulnus – Tata Mc.Graw Hill.
5. Hydrology& Flood Control by Santosh Kumar-Khanna Publishers
6. Engg. Hydrology by H. M. Raghunath G

CO-PO Relationship

CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	
5RVOE1. CO1		3										
5RVOE1. CO2	3											
5RVOE1. CO3			3									
5RVOE1. CO4			3									
5RVOE1. CO5		2										