

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme	Bachelor of Technology				Branch/Spec.	Civil Engineering			
Semester	V				Version	2.0.0.0			
Effective from Academic Year	2024-25				Effective for the Batch admitted in	July 2022			
Course Code	2CI5202		Course Name		Surface & Subsurface Hydrology				
Teaching Scheme					Examination Scheme (Marks)				
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	03	00	01	00	04	Theory	40	60	100
Hours	03	00	02	00	05	Practical	30	20	50
Pre-requisites									

Course Outcomes									
On successful completion of the course, the students will be able to:									
CO1	Learn the principles of hydrology and the significance of water resources in the Indian environment.								
CO2	Understand relations between various processes/events of the hydrologic cycle, interpret them, and create models to simulate hydrologic processes using open source software.								
CO3	Apply the knowledge of hydrological process to establish rainfall-runoff relationships, compute runoff, estimate the peak flood, and perform channel flow analysis and flood plain determination through simulation.								
CO4	Analyze the observed flood events of a river basin and derive hydrographs for mitigation measures.								
CO5	Identify groundwater sources by evaluating saturated formations for groundwater recharge.								
Theory Syllabus									
Unit	Content								Hrs.
1	Introduction to Hydrology with Indian Potentials: Hydrologic cycle, Water availability on Earth, scope and application of hydrology, importance of water resources.								4
2	Precipitation: Precipitation, Types and Forms, Rain Gauges and Its Types, Optimum Rain-Gauge Network Design, Estimation of Missing Rainfall & Mean Rainfall Data. Graphical Representation of Precipitation, DAD & IDF Curves.								7
3	Abstraction from Precipitation: Evaporation losses, factors affecting and its measurement, Infiltration losses: Measurement & factors affecting, Horton's equation of I.C. Curves, Infiltration Indices and their computations from rainfall records.								6
4	Runoff and Flood: Runoff definition and classification, factors affecting, characteristics of drainage basin, Runoff computation methods, Gauging of streams. Floods: Definitions, Design floods (DF): Spillway DF, SPF, PMF, Estimations of peak floods, Risk Reliability and safety factors, methods of flood control, flood forecasting and warning.								10
5	Hydrographs: Components of the hydrograph, factors affecting, Separation of base flow, Calculation of DRH from ERH, Unit Hydrograph, Derivations of unit hydrographs for different durations: S- curve and methods of Superposition.								7
6	Groundwater Hydrology: Occurrence & movement of groundwater, saturated formations, Darcy's law, Well Hydraulics: Dupit's and Theims's theory for confined and unconfined aquifer, groundwater recharge.								7
7	Modelling: Definition, types, Fundamentals of Hydraulic & Hydrologic modelling in rivers using open source software-HEC-RAS, HEC-HMS, Hands on practice sessions.								4
Practical Content									

Practical Assignments and tutorials are based on the above syllabus.	
Text Books	
1	Hydrology and Water Resources Engineering by S. K. Garg ,Khanna Publisher.
2	Engineering Hydrology - K. Subramanya, Tata Mc GrawHill Publication.
Reference Books	
1	Watershed Hydrology by Peter E. Black, Hewis Publisher
2	H. M. Raghunath, Hydrology: Design, Principles and Analysis, New Age International Publishers.
3	R.K. Sharma and T.K. Sharma, Hydrology and Water Resources Engineering, Dhanpat Rai Publications, New Delhi.
4	Ven Te Chow, D.R. Maidment and L.W Mays, Applied Hydrology, McGraw Hill International Edition, New York.
ICT/MOOCs Reference	
1	https://archive.nptel.ac.in/courses/105/104/105104103/

Mapping of CO with PO and PSO:															
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	2	2	1	2	1	2	1	1	2	1	2	3	2	1
CO2	2	3	2	2	3	2	2	1	1	2	2	3	3	3	2
CO3	2	2	3	2	3	2	2	1	2	2	2	2	3	3	3
CO4	2	2	2	3	2	2	2	1	2	2	2	2	2	2	3
CO5	2	2	2	1	2	1	2	1	2	2	2	2	2	2	2