

Subject Code: 1RI3000102	Subject Title: Essentials of Disciplinary Research Subject-1 Subject Sub-Title: WATER RESOURCES ENGINEERING
Pre-requisite Subject	Water Characteristics and Utility

Objectives of course: To learn about Water Resources and its application

Learning outcomes: After learning the course, the students should be able to understand the basic concept of Runoff, Hydrograph, Flood and Groundwater Hydrology.

Teaching Scheme (Credit Distribution)				Assessment Scheme (Weightage)	
Lecture	Tutorial	Practical	Credit	Hall Exam	Continuous Evaluation
4	--	--	4	60%	40%

Continuous evaluation is based on assignments/quiz/presentation/small projects as per the supervisor instructions.

Subject Content					
Unit	Topic	No. of Lecture	Weightage %		
1	Runoff : Runoff process; relation of storm period and rainfall, factors affecting runoff methods of computation; gauging runoff of stream; stage discharge relationships interpretation of stream flow records	4	26		
2	Hydrograph Analysis: Components of the hydrograph; Separation of base flow, components unit hydrographs, S-hydrographs	3	22		
3	Floods: Causes of floods, methods of estimation of floods. Design floods, damages, flood routing through reservoirs, methods of flood control, flood forecasting and warning	4	26		
4	Groundwater Hydrology: Occurrence and movement of groundwater, surface and subsurface investigation of groundwater, flow through saturated porous medium	4	26		

List of References:

1. Hydrology and Water Resources Engineering by S. K. Garg
2. Watershed Hydrology by Peter E. Black
3. Engineering Hydrology - K. Subramanya
4. Hydrology by H. M. Raghunath
5. Hydrology and Water Resources Engineering by James & Lee

Subject Code: 1RI3000103	Subject Title: Essentials of Disciplinary Research Subject-2 Subject Sub-Title: SOIL AND WATER CONSERVATION ENGINEERING
Pre-requisite Subject	Basics of Soil and Water Engineering

Objectives of course: To acquaint and equip students with the process of degradation soil and water conservation and their remedial measures including design of structures.

Learning outcomes: Student will be able to understand the basics characteristics of Soil and Water Resources

Teaching Scheme (Credit Distribution)				Assessment Scheme (Weightage)	
Lecture	Tutorial	Practical	Credit	Hall Exam	Continuous Evaluation
2	--	--	2	60%	40%

Continuous evaluation is based on assignments/quiz/presentation/small projects as per the supervisor instructions.

Subject Contents			
Unit	Topic	No. of Lecture	Weightage %
1	Layout and planning of soil and water conservation measures; Design principles of soil and water structures including contour bunds and terraces; Gully control measures.	4	28
2	Hydraulic jump and energy dissipaters for soil conservation structures; Hydrologic, hydraulic and structural design of drop structures.	4	28
3	Sediment deposition process. Estimation of sediment load, earthen dams, seepage through dams and stability analysis.	4	28
4	Rainwater harvesting, Flood control and stream bank protection measures	2	16

List of References:

1. Garde RJ & Ranga Raju KG. 1977. Mechanics of Sediment Transport and Alluvial Stream Problems. Willey Eastern.
2. Gurmel Singh et al. 1994. Manual of Soil and Water Conservation Practices. Oxford & IBH
3. Hudson N.1971. Soil Conservation. B.T. Batsford Ltd.
4. Murthy VVN. 1998. Land and Water Management Engineering. Kalyani.
5. USDA 1969. A Manual on Conservation of Soil and Water.
6. Ghildyal BP & Tripathy RP. 1987. Fundamental of Soil Physics. Wiley Eastern