

Maulana Abul Kalam Azad University of Technology, West Bengal
(Formerly West Bengal University of Technology)

Syllabus for B. Tech in Civil Engineering

(Applicable from the academic session 20182019)

CE(PC)502	Engineering Hydrology	3L + 0T	3 Credits
Course Outcome	On completion of the course, the students will be able to: <ol style="list-style-type: none"> 1. study the source, occurrence, movement and distribution of water which is a prime resource for development of a nation. 2. learn about the functioning of reservoirs and estimation of storage capacities. 3. learn about flood hazards, estimation of design floods for various structures and methods of estimating effects of passage of floods through rivers and reservoirs. 4. know the basic principles of measurement of flow in rivers. 		
Prerequisite	Introduction to Civil Engineering CE(HS)302, CE(ES)401_Fluid Mechanics, Chemistry BS-CH101, Physics BS-PH101.		
Module 1	Hydrology: Hydrologic Cycle, Global Water Budget, India's Water Budget.		1L

Module 2	Catchment: Definition & Descriptions, Various Types of Catchment, Factors Characterizing a Catchment, Delineation of Catchment Boundary.			2L
Module 3:	Measurement of Precipitation: Precipitation, Description and Functioning of Various Types of Rain gauges, Rain gauge Network- Codal Provisions, Optimum Number of Raingauge Stations.			2L
Module 4:	Processing of Rainfall Data: Normal Rainfall, Estimation of Missing Rainfall Data, Test for Consistency of Record; Mass Curve of Rainfall, Hyetograph, Point Rainfall; Mean Precipitation over an Area– Arithmetic Mean, Thiessen Polygon and Isohyetal Method.			4L
Module 5:	Losses from Precipitation: Evaporation – Evaporation Process, Factors affecting Evaporation, Measurement of Evaporation– Description and Functioning of Pan Evaporimeter, Pan Coefficient, Evapotranspiration: AET, PET, Measurement of ET, Estimation of ET–Blaney Criddle Formulae; Infiltration– Process, Factors Affecting Infiltration, Infiltration Rate and Infiltration Capacity, Measurement of Infiltration, Infiltration Equations, Infiltration Indices.			6L
Module 6	Streamflow Measurement: Importance, Direct and Indirect Methods, Measurement of Stage– Various Gauges and Recorders, Measurement of Velocity–Current Meters, their Functioning and Calibration; Velocity Distribution, Floats; Streamflow Computation– Area-Velocity Method, Moving Boat Method, Dilution Technique, Electromagnetic Method, Ultrasonic Method; Indirect Methods– Flow Measuring Structures, Slope Area Method; Stage-Discharge Relation, Permanent Control, Stage for Zero Discharge, Shifting Control– Backwater Effect, Unsteady Flow Effect, Extension of the Rating Curve.			12L
Module 7	Runoff: Description of the Process, Components of Runoff, Factors Affecting Runoff, Characteristics of Streams, Rainfall Runoff Relationships. Hydrographs: Types, Base Flow Separation, Effective Rainfall.			2L
Module 8	Unit Hydrograph– Definition, Assumptions, Applications– Derivation of Unit Hydrograph, Distribution Graph, Unit Hydrograph of Different Durations– Method of Superposition and S-Curve.			4L
Module 9	Floods: Concept of flood as a natural hazard; Estimation of flood discharge in a river – rational method, empirical formulae, unit hydrograph method; flood frequency studies – return period.			2L
Module 10	Flood Routing: Concept of flood routing in channels and through a reservoir, basic routing equations; reservoir routing – Modified Pul’s method; channel routing – Muskingum method.			5L
Reference	Sl.	Book Name	Author	Publishing House
	1	Engineering Hydrology (4th Ed.	K. Subramanya	McGraw Hill Education (India) Private Limited, New Delhi, 2013.
	2	Engineering Hydrology	R. Srivastava and A. Jain	McGraw Hill Education (India) Private Limited, New Delhi, 2017.
	3	Applied Hydrology	V. T. Chow, D. Maidment, L. Mays	Tata McGraw Hill Edition, New Delhi, 2010.
	4	Hydrology	M. M. Das, M. Das Saikia	PHI Learning Private Limited, New Delhi, 2009.