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| Image result for nit meghalaya logo | | | | **National Institute of Technology Meghalaya**  An Institute of National Importance | | | | | | | | | | | | | | | | | | | | | | | **CURRICULUM** | | | | | | |
| Programme | | | | **Bachelor of Technology** | | | | | | | | | | | | | Year of Regulation | | | | | | | | | | **2019-20** | | | | | | |
| Department | | | | **Civil Engineering** | | | | | | | | | | | | | Semester | | | | | | | | | | **V** | | | | | | |
| Course  Code | | Course Name | | | | | | | | **Pre requisite** | | | | Credit Structure | | | | | | | | Marks Distribution | | | | | | | | | | | |
| L | | T | | | P | C | | INT | | | MID | | | END | | | | Total | |
| **CE305** | | **Hydrology and Water Resources Engineering** | | | | | | | | **CE 204** | | | | **3** | | **1** | | | **0** | **4** | | **50** | | | **50** | | | **100** | | | | **200** | |
| Course  Objectives | | To develop the student’s knowledge on various processes ofhydrologic cycle with detail understanding of its components. | | | | | | | | | | Course Outcomes | | | | CO1 | | | Student will be able to understand the various components ofhydrologic cycle that affect the movement of water in the earth. | | | | | | | | | | | | | | |
| To provide some knowledge about various forms of precipitationsand representation of hydrological data. | | | | | | | | | | CO2 | | | Student will demonstrate the ability to perform analysis andrepresentation of hydrological data. | | | | | | | | | | | | | | |
| To develop understanding of surface yield and rainfall-runoffmodel. | | | | | | | | | | CO3 | | | Student will be able to understand various techniques for measurementof precipitation and estimate abstractions from precipitation. | | | | | | | | | | | | | | |
| To make the student understand hydrologic flood routing. | | | | | | | | | | CO4 | | | Student will be able to compute yield from a catchment anddevelop rainfall-runoff model. | | | | | | | | | | | | | | |
| To provide knowledge about ground water flow and ground waterstorage. | | | | | | | | | | CO5 | | | Student will be able to formulate and solve hydrologic floodrouting model. | | | | | | | | | | | | | | |
|  | | | | | | | | | | CO6 | | | Student will be able to understand the concept of occurrence ofground water, and its movement and storage beneath the earth | | | | | | | | | | | | | | |
| No. | COs | | Mapping with Program Outcomes (POs) | | | | | | | | | | | | | | | | | | | | | | | Mapping with PSOs | | | | | | | |
| PO1 | | PO2 | PO3 | PO4 | PO5 | PO6 | | PO7 | | PO8 | | PO9 | | | PO10 | | | PO11 | | PO12 | | | PSO1 | | | PSO2 | | | | PSO3 |
| 1 | CO1 | | **3** | | **3** | **0** | **0** | **0** | **0** | | **0** | | **0** | | **0** | | | **0** | | | **0** | | **0** | | | **0** | | | **0** | | | | **3** |
| 2 | CO2 | | **3** | | **3** | **0** | **0** | **0** | **0** | | **0** | | **0** | | **0** | | | **0** | | | **0** | | **0** | | | **0** | | | **0** | | | | **3** |
| 3 | CO3 | | **3** | | **3** | **0** | **0** | **0** | **0** | | **0** | | **0** | | **0** | | | **0** | | | **0** | | **0** | | | **0** | | | **0** | | | | **3** |
| 4 | CO4 | | **3** | | **3** | **0** | **0** | **0** | **0** | | **0** | | **0** | | **0** | | | **0** | | | **0** | | **0** | | | **0** | | | **0** | | | | **3** |
| 5 | CO5 | | **3** | | **3** | **0** | **0** | **0** | **0** | | **3** | | **0** | | **0** | | | **0** | | | **0** | | **0** | | | **0** | | | **0** | | | | **3** |
| 6 | CO6 | | **3** | | **3** | **0** | **0** | **0** | **0** | | **3** | | **0** | | **0** | | | **0** | | | **0** | | **0** | | | **0** | | | **0** | | | | **3** |
| SYLLABUS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No. | Content | | | | | | | | | | | | | | | | | | | | | | | Hours | | | | | | | COs | | |
| I | **Introduction**  Hydrology - definition & scope, Hydrologic cycle and its components, Hydrologic data variability, Hydrologic data analysis. | | | | | | | | | | | | | | | | | | | | | | | **04** | | | | | | | **CO1** | | |
| II | **Precipitation**  Formation and types, Forms, Measurement, Estimating missing precipitation data, Average precipitation over area, Depth-area-duration analysis, Abstractions from precipitation, Evapotranspiration and its measurement, Infiltration and its measurement, Interception process. | | | | | | | | | | | | | | | | | | | | | | | **10** | | | | | | | **CO2** | | |
| **CO3** | | |
| III | **Runoff and Hydrograph**  Runoff components, Drainage basin characteristics, Factor effecting runoff, Hydrograph and its components, Base flow separation, Unit hydrograph– concept, derivation, limitations and use, S-hydrograph, Synthetic unit hydrograph, Instantaneous unit hydrograph. | | | | | | | | | | | | | | | | | | | | | | | **14** | | | | | | | **CO3** | | |
| **CO4** | | |
| IV | **Floods**  Definition, Flood estimation, Rational method and unit hydrograph method, Flood routing: reservoir routing and channel routing, Flood frequency analysis. | | | | | | | | | | | | | | | | | | | | | | | **10** | | | | | | | **CO4** | | |
| **CO5** | | |
| V | **Ground water hydrology**  Occurrence of ground water, Aquifers, Movement of ground water, Darcy’s law, Porosity, specific yield and specific retention, Yield from wells for confined and unconfined aquifers, Yield of an open well. | | | | | | | | | | | | | | | | | | | | | | | **10** | | | | | | | **CO6** | | |
| Total Hours | | | | | | | | | | | | | | | | | | | | | | | | **48** | | | | | |  | | | |
| **Essential Readings** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. V. T. Chow, D. R. Maidment and L. W. Mays, “Applied Hydrology”, McGraw Hill, 1st Edition, 1988. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. K. Subramanya, “Engineering hydrology”, McGraw Hill, 2nd Edition, 1994. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. S K Jain, P K Agarwal and V P Singh, “Springer Hydrology and Water resources of India”, 1st edition, 2007 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Supplementary Readings** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. V. P. Singh, “Elementary Hydrology”, Englewood Cliffs, NJ : Prentice Hall, 1stEdition, 1992. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. D. K. Tood and L. W. Mays, “Ground Water Hydrology”, Wiley India Pvt. Ltd, 3rdEdition, 2004. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. T Davie, Taylor and Francis,Fundamentals of Hydrology 2nd edition, 2008 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |