|  |  |  |
| --- | --- | --- |
| 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 | **VII** |
| CourseCode | Course Name | **Pre requisite** | Credit Structure | Marks Distribution |
| L | T | P | C | INT | MID | END | Total |
| **CE421** | **River Engineering** | **Nil** | **3** | **0** | **0** | **3** | **50** | **50** | **100** | **200** |
| CourseObjectives | To develop the student’s knowledge on basics of River engineering. | Course Outcomes | CO1 | Student will be able to understand the basics of River engineering. |
| To provide some knowledge about behaviour of Rivers. | CO2 | Student will be able to understand the concepts of River behaviour. |
| To develop understanding of River morphology. | CO3 | Student will be able to computeriver morphology. |
| To make the student understand about unsteady flow in Rivers. | CO4 | Student will be able to understand the unsteady flow process in River. |
| To provide knowledge about River training works. | CO5 | Student will be able to understand about different types of River training works. |
|  | CO6 |  |
| 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** | **0** |
| 2 | CO2 | **3** | **3** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** |
| 3 | CO3 | **3** | **3** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **0** | **3** |
| 4 | CO4 | **3** | **3** | **3** | **0** | **0** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** |
| 5 | CO5 | **3** | **3** | **3** | **0** | **3** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **3** | **3** |
| 6 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SYLLABUS |
| No. | Content | Hours | COs |
| I | **Introduction** Classification of Rivers, channel and flood plain features, sediment budgets, river morphology. | 06 | CO1 |
| II | **Behavior of Rivers**River channel patterns, causes, characteristics and prevention of meanders, cutoff characteristics, bed forms, delta form and control. | 06 | CO2 |
| III | **River morphology**Bed level variation in alluvial streams, continuity equation for sediment, equilibrium depth of scour in long channel contractions, silting of reservoirs, local scour, secondary currents, flow in rigid boundary open channel bends, scour and deposition at alluvial bends. | 08 | CO3 |
| IV | **Unsteady Flow**Governing equations for one dimensional flow, hydrograph routing, kinematic routing, diffusion routing, Muskingum–Cunge routing. | 08 | CO4 |
| V | **River training works**Introduction to river training, types of river training works, working of different river training structures, protection bridge, guide bund, embankment and spurs. | 08 | CO5 |
| Total Hours | **36** |  |
| **Essential Readings** |
| 1. H. H. Chang, “Fluvial Processes in River Engineering”, Krieger Publishing Company, 1stEdition, 2008.
 |
| 1. W. Wu, “Computational River Dynamics”, Taylor & Francis, 1stEdition, 2007.
 |
| 1. P Y Julien River Mechanics, Cambridge university press, 2nd edition, 2018
 |
| **Supplementary Readings** |
| 1. M. H. Chaudhry, “Open channel flow”, Springer, 2ndEdition, 2008.
 |
| 1. M. B. N. Al-BaghdadiK, “Progress in River Engineering & Hydraulic Structures”, CreateSpace Independent Publishing Platform, 1stEdition, 2018.
 |
| 1. M M Das Open channel flow, PHI, 3rd edition, 2011
 |