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Registration Seminar

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Seminar Title	: ENERGY LOSS AT THE BIFURCATIONS OF THE RIVER MAHANADI
Speaker	: Hemanta Kumar Mishra ( Rollno : 523ce8003)
Supervisor	: Kishanjit Kumar Khatua
Venue	: CE Department Seminar Hall
Date and Time	: 05 May 2025 (11.00)
Abstract	: This study investigates the influence of flow loss on the geomorphic evolution of the river reach of the Mahanadi River junction at Naraj, Cuttack, a deltaic system with unmanaged distributary channels characterized by frequent overbank spillage and crevasse formation. Field data are being collected from the channel networks at the junction of the river Mahanadi system, measuring channel geometry, water surface elevation, and discharge. These data are being used to validate a 1-D hydraulic model of unsteady flow, which simulates the influence of flow loss on channel hydraulics. The hydraulic model is coupled with a sediment transport model to analyze the impacts of flow loss on sediment transport capacity along the reach. The study focuses on the cumulative effects of flow losses, which collectively account for a significant fraction of discharge along the channel. The result will show that flow loss substantially modulates velocity and sediment transport trends along the diverted Mahanadi River's reach and the river Kathjodi. Shallower channels are found to be particularly sensitive to flow loss, with greater reductions in velocity and sediment transport capacity observed in these areas compared to deeper channels. This dynamic contributes to sediment deposition in upstream reaches and enhanced scour near distributary mouths. Furthermore, the study highlights that flow loss plays a critical role in shaping channel morphology and the distribution of sediment within deltaic environments in the Mahanadi River at its bifurcated junction. Comparisons with the other reaches of river illustrate how the absence of flow loss due to flood protection systems influences river hydraulics. It is also observed that due to loss in flow at the junction of the river Mahanadi, huge siltation is occurred which not only obstructs the flow into the river Kathjodi but also inundates the banks during monsoon. The research at the river Mahanadi bifurcation at Naraj will suggest the effects of channel diversion angle, roughness, slope, Reynold's number, sediment deposition and scour formation to the main and distributary channels. With the help of field data, numerical modelling, mathematical modelling and proto type laboratory experiment a modified mathematical modelling shall be developed to calculate actual discharge at the distributary channels of the River Mahanadi at Naraj, Cuttack and then other bifurcations of the Mahanadi river for which Water Resources Dept can easily utilise the precious water for the beneficiation to the people of Odisha, India.