Course syllabus

Department of Civil Engineering, Indian Institute of Technology Madras

CE6013 - River Engineering

Credit Distribution: C:9 L:0 T:0 P:0 E:0 O:6 TH:9

Course Type: Theory

Description: Rivers have been and are integral part of existence of the mankind. The knowledge about river behavior is essential for practicing hydraulic and water resources engineers. Hence, the main objective of this course is to provide sufficient scientific knowledge to the students about various aspects of river engineering such as river morphology, sediment transport mechanics, flow and sediment measurement, physical and mathematical modeling and design of river protection and training works.

Course Content: :Introduction: River Morphology: Bars; Bends and Meanders, Thalweg; Braiding; Bifurcations and Confluences; Flood Plains; River Channel Migration; River system evolution; Urban rivers and streams Sediment Transport Mechanics: Sediment properties, Bed forms, Bed Load transport, Transport of suspended sediment, Critical Shear stress, Flocculation, Settling, Consolidation, Sediment Transport Equations; Aggradation and Degradation; Local Scour at Bridge Piers and other Hydraulic Structures Measurement: Stage measurements, Channel geometry, Discharge, Stage-Discharge Relationship; Sediment samplers and suspended load measurement; Bed load measurement River Models: Physical Models: Basic Scaling Laws, fixed and movable bed models; Sectional Models, Distorted Models; Mathematical models: 1D and 2D models for aggradations and degradation; 3D Models for turbulence and local scour River Protection and Training Works: Design of Revetments, Dikes, Gabions, Spurs, Bank Protective measures and Bed control structures; Design of river training and flood protection structures, material specifications; Diversion and Cofferdams; River regulations systems; Dredging and Disposal, River restoration

Text Books

- River Engineering by Margaret S. Petersen, Prentice Hall, 1986.

Reference Books

- River Training Techniques: Fundamentals, Design and Applications by B. Przedwojski and R. Blazejewski and K. W. Pilarczyk, A.A.Balkema, Rotterdam, Netherlands, 1995.
- Loose Boundary Hydraulics by Arved J Raudkivi, A.A. Balkema, Rotterdam, Netherlands, 1998.
- Sediment and Contaminant Transport in Surface Waters by Wilbert Lick, CRC Press, Taylor and Francis Group, 2009
- Fluvial Hydraulics by Walter H. Graf, John Wiley and Sons, 1998

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Prerequisite: NIL

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