

Course Contents:

Basics: Introduction to computer programming and computation with Matlab. Open channel flow : Estimation of normal and critical depth; uniform flow computations; computation of water surface profile (WSP) gradually varied flow estimation using standard step and direct step methods, WSP in presence of hydraulic structures; unsteady flow Saint Venant equation, kinematic wave routing, diffusion routing, overland flow; steady and unsteady modeling using HECRAS. Closed conduit flow: Steady and unsteady state modeling; pipe network analysis; introduction to EPANET/WaterCAD. Surface water hydrology: Estimation of Unit hydrographs; lumped and distributed flow routing; hydrologic statistics parameter estimation, time series analysis, frequency analysis, geo-statistics; hydrologic modeling using HECHMS. Groundwater hydrology: Solving groundwater flow equation saturated and unsaturated flow, Richards' equation, Green Ampt infiltration model; introduction to MODFLOW; Application of soft computing methods and GIS in Hydraulic and Hydrologic modeling. Laboratory: Programming exercises for the related topics.