

Course syllabus

Department of Civil Engineering, Indian Institute of Technology Madras

CE6031 - GIAN 161003C01: Hydroinformatics for Integrated Water Resources Management

Credit Distribution: C:2 L:1 T:0 P:0 E:0 O:0 TH:0

Course Type: Others

Description: 1. Provide a theoretical framework for hydrological modelling 2. Provide an overview of Hydro informatics tools and techniques needed to develop hydrologic model 3. Design and develop an integrated hydrologic model for a river basin using SWAT 4. Perform a comprehensive uncertainty analysis to understand the uncertainty in model predictions 5. Apply the hydrologic model to evaluate different management alternatives for informed decision making.

Course Content: Lectures: Theoretical overview of hydrology, Theoretical overview to Soil and Water Assessment Tool (SWAT), Data models, projection, datum and coordinate system, Geo-referencing / Digitizing, GIS overlay operations, DEM/DTM, Watershed delineation, Soil mapping; soil properties; pedo-transfer functions, Interpretation of the SWAT model output, Development of alternate management scenarios, Model calibration, validation, Sensitivity analysis and uncertainty principles, Theoretical Overview of uncertainty methods in SWAT-CUP, Climate change impact assessment. Laboratory Introduction to Quantum GIS, Data models, Projections, Geo-referencing / Digitizing, GIS overlay operations, DEM/DTM, Watershed delineation, D8 model and Dinf model for watershed delineation, SWAT model set-up - Watershed delineation, HRU delineation, weather database SWAT model set-up: reading/interpreting outputs, Management practices; calibration and Validation (Manual procedure) ; Sensitivity and Uncertainty analysis using SWAT CUP

Text Books

- Nil

Reference Books

- Anita Graser. 2016. Learning QGIS (3rd edition). PACKT publishing. 210 pages. ISBN 139781785880339.
- S. L. Neitsch, J. G. Arnold, J. R. Kiniry, and J. R. Williams. 2009. Soil and Water Assessment Tool Theoretical Documentation. Texas Water Resources Institute Technical Report no: 406.
- Abbaspour, K. C. 2015. SWAT-CUP: SWAT calibration and Uncertainty Programs.

Prerequisite: NIL