With growing population, the Urban sector with its domestic and industrial demands is increasingly competing for water resources with the agricultural sector. Due to the diversified climatic and topographic conditions, some regions are drought prone and some are flood prone, which demand an efficient integrated water resources management including reservoir operations to optimize the use of water. River basin models offer integrated solution for simulating water balances and allocations of water to various sectors at varying scales. Water resources planning involves evaluation of a set of scenarios that capture possible future states of the basin. The overall river basin management requires a host of inter-related information to be generated and studied in relation to each other. Remote Sensing provides an up-to-date spatial information on land-use and land-cover as well as physical terrain parameters, whereas GIS provide an ideal platform for integrating and analysing diverse sets of data and information. Remote Sensing and GIS, commonly referred as Geoinformatics, can be further integrated with hydrology for Geo-Hydroinformatics Modelling in order to provide an ideal platform for integrated river basin modelling, planning and management.

**Objective**

The objective of the course is to apprise the participants about the integrated river basin management by modeling and understanding current and future scenarios using latest Geo-Hydroinformatics tools and techniques.

**Course Modules**

**Module I : Introduction to Remote Sensing and GIS**
- Remote sensing and GIS concepts
- Freely available remote sensing data sources
- Handling of remote sensing data
- Raster and vector GIS
- Introduction to QGIS (Open-source GIS)
- Handling and manipulation of GIS data

**Module II : Remote Sensing and GIS Applications**
- Normalized Difference Vegetation Index (NDVI)
- Landuse and landcover mapping using NDVI
- Change detection
- Digital Elevation Model (DEM)
- Analysis of DEM for catchment delineation and analysis
- Flood mapping
- Drought monitoring

**Module III : River Basin Modeling**
- Basics of Modeling
  - Hydrological modeling
  - Hydrodynamic modeling
  - Time series data and frequency analysis
- Rainfall-Runoff Modeling
  - Introduction to NAM Model
  - Model setup, calibration and validation
- River Basin Modeling using MIKE HYDRO
  - Introduction to MIKE HYDRO
  - Data requirements
  - Model setup, calibration and validation
  - Modeling examples

**Module IV : River Basin Management**
- Integrated reservoir operation
- Seasonal planning of surface and ground water
- Demand-supply and surplus-deficit analysis
- Conjunctive use of water
- Hydropower operations
- Irrigation planning

**Software**

Software to be used:
- Remote Sensing - MultiSpec
- GIS - ArcGIS/QGIS
- River Basin Management - NAM, MIKE HYDRO
Benefits
Participants will accomplish the following from the training:
- Basic concepts of Remote Sensing and GIS
- Application of Remote Sensing and GIS in landuse/landcover mapping, DEM analysis catchment delineation etc.
- Hands-on practical on Remote Sensing and GIS as well as river basin modeling
- River basin modeling and management

Participants
This course is aimed for professionals working in public and private-sector organizations, academic institutions and universities. Professionals engaged in river basin management, command area development, dam operation etc. will find the course useful and it will help them in informed decision making.

Course Fee
The course fee is US $ 1,800 per participant, which covers the cost of resource inputs, training materials, refreshments during the training sessions, transportation for study visits (if any), social and cultural visits during the weekends and minor medical expenses if necessary. The tuition fee does NOT include accommodation (US$ 45-60/night), daily living expenses (DSA), air-fare and other transportations.

Medium of Instruction
The medium of instruction of the courses is English.

Assessment and Certification
Participants will receive a certificate upon completion of the course.

Resource Person
The course will be conducted in cooperation with DHI Group. The professionals from AIT will take care of remote sensing and GIS modules and professionals from DHI will teach the modules related to river basin modeling and management.

Geoinformatics Center — Asian Institute of Technology
The Geoinformatics Center was established at the Asian Institute of Technology (AIT) as a non-profit entity for imparting training and project services in information technology, especially in applications of geo-information technology and tools. The Center has carried out more than 150 training courses in South, Southeast and Central Asia , drawing participants from more than 30 countries and, till date, more than 3000 persons have been participated in various training courses. The training courses in the center are now expanded from core spatial information systems and technologies to other diverse areas such as application of information technologies in disaster risk assessment and management, environment and natural resource management, project management, poverty mapping etc.

The Center has the state-of-the-art training and research facilities. These facilities provide an enabling environment for quality research and training programs. The training rooms are well equipped with high-end personal computers, modern audio-visual equipment and high-speed internet.

DHI Group
DHI is an independent, international consulting and research organization. It is designated as a non-profit organization. DHI advances technological development, governance and competence in the fields of water, environment and health. It offers a wide range of consulting and policy services as well as leading edge technologies. DHI works with governmental agencies and authorities, contractors, consulting companies and a wide range of industries. It represents 50 years of dedicated research and real life experience from more than 140 countries. DHI has been setting the trend as the leader in the development and application of water related technologies and methodologies.

DHI offers a wide range of consulting services and leading edge technologies, software tools, environmental laboratories and physical test facilities. DHI has been working for the capacity building and training activities through skilled experts through comprehensive training and support programmes for various products of Mike by DHI as MIKE11, MIKE 21, MIKE URBAN, MIKE HYDRO etc and customized Mike products etc