CC304 - GIS for Water Resource Management Course

Course Duration: 10 Days
Training Fee: KSH 80,000 | USD 800
Course Registration: **Register Here>>**

1.0. Introduction

The aim of this course is to provide both a solid theoretical understanding as well as the comprehensive practical introduction to the use of geographical information systems and remote sensing technologies for the analysis of water related data and provision of solutions to various water and environmental problems. As well, GIS saves time and money in developing water distribution system hydraulic models for simulating flows and pressures in the system. GIS also helps in presenting the model results to non-technical audiences.

1.1. Course Overview

This course focuses on the application of GIS and remote sensing technologies in the water distribution systems modeling, flood plain management, hydrological modeling, spatial interpolation, watershed delineation, water quality assessment and planning, constructing a ground water simulation model and connecting the spatially referenced time series data. The Digital Elevation/Terrain Models (DEMs and DTMs) shall also be utilized in analyzing water flow and watershed analysis among others.

1.2. Course Content/Outline

i. **Overview of GIS and Remote Sensing:** GIS components; Sources of GIS and remote sensing data; types of satellite images; use of drones; application of GIS and RS in water resource management.
ii. **GIS Technology in Water Resource Management:** The GIS tools for water resource management; use of aerial photos, drone and satellite images; Digital Elevation Models (DEMs); the GIS databases; GIS spatial analysis.
iii. **Spatial Interpolation:** Spatial and spatio-temporal models of land surfaces, climatic phenomena (e.g., precipitation and temperature), soil properties, and water quality from measured data; ANUDEM and TOPOGRID elevation gridding procedures.
iv. **GIS in Watershed Delineation:** Use of satellite data and GIS technology to map water bodies and resources such as rivers, lakes, dams and reservoirs in 3D GIS environment; GIS algorithms for the delineation of watershed and extraction of stream networks from DEMs.
v. **Floodplain Management:** Use of GIS models in hydrological analyses by aiding in the determination of water surface profiles associated with different flow conditions etc.; Use of HEC-RAS hydraulic model and GIS.
vi. **Closed Basin Hydrology:** Geospatial data e.g. satellite images to manage water basins; integration of groundwater simulation models with GIS model builder.

vii. **Time-Series Satellite Data:** Connecting spatially referenced time-series satellite data with GIS; Analyzing hydrological changes with time-series data among others.

1.3. Expected Learning Outcomes

On completion of this course, the participants are expected to:

i. Apply the geo-information and earth observation techniques in support of sound and effective water resources management in a given locality.
ii. Acquire knowledge and skills needed for the collection, interpretation, and management of spatial information, using remote sensing and geographic information systems, to support planning and decision-making processes in water resources management.
iii. Acquire skills in Geospatial tools that help in maintaining sustainability of water resources, environment management among other resources.
iv. Obtain the insights on Modern day geo-technologies e.g. GIS for Water Management thus helping in understanding the effects on the environment from an inter-disciplinary aspect.
v. Get acquainted with GIS and other techniques to provide project specific solutions in the field of watershed management, catchment and biodiversity management, environmental monitoring among others.

1.4. Training Tools (Hardware and Software)

1. Handheld GPS;
2. A Laptop;
3. Satellite images;
4. Drone images;
5. ENVI Software;
6. ArcGIS & Q-GIS;

1.5. Training Style and Approach

1. On-site instructor-led training;
2. On-line self-paced training (optional);
3. Use of PowerPoint Slides;
4. Fieldwork Project;
5. Use of Case Study Videos.