

Short Course: GIS APPLICATION IN WATER RESOURCES/ HYDROLOGY

Location: Ardhi University

Duration: 5 Days From 13th to 17th of March, 2023

Instructor: Dr. Frank J. Wambura (0757 67 53 22)

Course Fee: TZS 700,000

Course Contents:

Module A: GIS Application in Water Resources/ Hydrology

1. Introduction to GIS software and data (**3 hours**)
 - 1.1. ArcGIS software
 - 1.2. Data frames
 - 1.3. Vector data
 - 1.4. Raster data
2. Coordinate System in GIS (**3 hours**)
 - 2.1. Geographic Coordinate System
 - 2.2. Projection Coordinate System
3. Mapping, Georeferencing and digitization in GIS (**3 hours**)
 - 3.1. Mapping point mass
 - 3.2. Scanning and georeferencing
 - 3.3. Digitization and sketching
4. Overlay analysis for vector data (**2 hours**)
 - 4.1. Clip, Union, Intersection, Update, Buffer, Difference
5. Spatial analysis for raster data (**3 hours**)
 - 5.1. Slope, Contour, and Raster manipulation
6. Cartography and map making (**3 hours**)
 - 6.1. View layout, Graticule, Legend, Scale
7. GIS Applications in Hydrology (**10 hours**)
 - 7.1. Catchment delineation by Spatial Analysis
 - 7.2. Catchment delineation by ArcHydro
 - 7.3. Catchment delineation by ArcSWAT
 - 7.4. Creating Thiessen polygons
 - 7.5. Erosion estimation by USLE
8. Global Data Preprocessing [Python scripts] (**3 hours**)
 - 8.1. Data types (reanalysis, gridded, sensed, etc.)
 - 8.2. Data formats (txt, csv, dbf, hdf, nc, dat, grib, etc.)
 - 8.3. Data downloading
 - 8.4. Data extraction
 - 8.5. Data preprocessing

Days: Monday to Friday

Session 1: 0930 - 1230 = 3 hours

Lunchbreak: 1230 - 1330 = 1 hour

Session 2: 1330 - 1630 = 3 hours