

1.3.6 Geographic Information Systems (GIS) for water and natural resources applications (Cologne University of Applied Sciences)

Name of Module/Course		Geographic Information Systems (GIS) for natural water resources applications		
Short description		<ul style="list-style-type: none"> • The GIS is a powerful and widely used as a tool for spatial analysis of natural resources, city planning, and environmental hazards representation and mapping. Also, it can be a useful tool for preparing inputs of models and other tools. • This course is meant for students and professionals in the field of water and natural resources with very basic information about GIS and it is functionalities. • After completing the course, the participant will be able to use the QGIS tool for their professional work and know where to find and download different data sources. • The exercises will be done using QGIS software. Thus, it is recommended to install the required software on your computer before the first session. 		
Name of Programme				
Name of University		TH-Köln, University of Applied Sciences		
Name of Lecturer		Eng. Zryab Babker		
Responsible University lecturer		Eng. Zryab Babker		
Credit Points	SWS	Attendance (h)	Self-study (h)	Total workload (h)
-		16	8	24
Start & end dates, WS		timeslot:		
4 sessions on Saturdays morning: 4.6., 11.6., 18.6., 25.6.2022				
Registration until		Number of possible AGEF participants		
20. 5.2022		15-20 participants		
Content and goals of qualification		<p>Content:</p> <p>Lecture1:</p> <ul style="list-style-type: none"> • Introduction to QGIS software (main features and tools). • Establish appropriate databases. 		

- Difference between raster, vectors (features), tables, and other data formats.
- Download, organize and visualize spatial data from different open sources (e.g. population, country boundaries, Digital Elevation Models (DEM), climatic data...etc.).
- Import and export data to and from QGIS and how to save and share data.
- Perform some vector and raster analysis (Buffering, projecting, clipping, merging, mosaic to a new raster...etc.).

Lecture 2:

- DEM download, analysis, and manipulation.
- Catchment and stream delineation.

Lecture 3:

- Understand advanced geo-processing tools in the field of Natural and water resources planning and management- i.e. using map algebra and other tools to:
- Perform Simple water balance using geo-processing tools.
- Extracting values from a raster (i.e. land cover type at specific location).

Lecture 4:

- Introduction to open source data and tools.
- Automating processing using a model builder.
- Styling and professional map design.
- Q &A and Feedback.

Learning outcomes:

The participants will be able to:

- Use QGIS in its main functionalities.
- Download, organize, and visualize spatial data from different open sources.

	<ul style="list-style-type: none"> • Import and export data to and from QGIS. • Do some vector and raster analysis (converting, projecting, clipping, merging, mosaic to a new raster...etc.). • Create their own spatial data and present / visualize it. • Analyse spatial data, and create their own maps out of this analysis. • Understand advanced geoprocessing tools in the field of Natural and water resources planning and management- i.e. using map algebra and other tools. • DEM analysis and manipulation. • Perform catchment and stream delineation. • Knowledge about the state of the art regarding open-source data and tools. In addition to and how to download different data. • Designing and producing a publication ready map in QGIS.
Preconditions for participation	Basic knowledge about GIS and its functionalities
Teaching Methods	Online lectures and partially self-study
lesson format (online/face-to-face)	Online
Assessment method	Attendance and submitting the given exercises
language	English
Inscription external student	