

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

<b>Name of Module/Course</b>		<b>Geographic Information Systems (GIS) for natural water resources applications</b>		
<b>Short description</b>		<ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> <li>• The exercises will be done using QGIS software. Thus, it is recommended to install the required software on your computer before the first session.</li> </ul>		
<b>Name of Programme</b>				
<b>Name of University</b>		TH-Köln, University of Applied Sciences		
<b>Name of Lecturer</b>		Eng. Zryab Babker		
<b>Responsible University lecturer</b>		Eng. Zryab Babker		
<b>Credit Points</b>	<b>SWS</b>	<b>Attendance (h)</b>	<b>Self-study (h)</b>	<b>Total workload (h)</b>
-		16	8	24
<b>Start &amp; end dates, WS</b>		<b>timeslot:</b>		
4 sessions on Saturdays morning: 1.5., 8.5., 15.5., 22.5.2021		From 9:00 to 13:00		
<b>Registration until</b>		<b>Number of possible AGEF participants</b>		
3. 4.2021		15-20 participants		
<b>Content and goals of qualification</b>		<p><b>Content:</b></p> <p><b>Lecture1:</b></p> <ul style="list-style-type: none"> <li>• Introduction to QGIS software (main features and tools).</li> </ul>		

- Get to know how to deal with raster, 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.).

**Lecture 2:**

- Establish appropriate databases.
- Perform some vector and raster analysis (converting, projecting, clipping, merging, mosaic to a new raster...etc.).
- Import and export data to and from QGIS and how to save and share data.
- Participants will create their own vector layers and do some basic analysis.

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

**Lecture 4:**

- Introduction to open source data and tools.
- Download different related data: Land use and land cover, soil, precipitation, evapotranspiration, demographic data...etc., and prepare them for your region.
- Styling and professional map design.
- Q &A and Feedback.

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**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"> <li>• Import and export data to and from QGIS.</li> <li>• Do some vector and raster analysis (converting, projecting, clipping, merging, mosaic to a new raster...etc.).</li> <li>• Create their own spatial data and present / visualize it.</li> <li>• Analyse spatial data, and create their own maps out of this analysis.</li> <li>• Understand advanced geoprocessing tools in the field of Natural and water resources planning and management- i.e. using map algebra and other tools.</li> <li>• DEM analysis and manipulation.</li> <li>• Perform catchment and stream delineation.</li> <li>• Knowledge about the state of the art regarding open-source data and tools. In addition to and how to download different data.</li> </ul>
<b>Preconditions for participation</b>	Basic knowledge about GIS and its functionalities
<b>Teaching Methods</b>	Online lectures and partially self-study
<b>lesson format (online/face-to-face)</b>	Online
<b>Assessment method</b>	Attendance and submitting the given exercises
<b>language</b>	English
<b>Inscription external student</b>	