

11 HYDROGEOINFORMATICS

<u>Teachers:</u>	Maris F.,	Professor
	Iliadis L.,	Professor
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The course covers the following topics:

1. Introductory Concepts of Water Resource Management.
2. Water management software and systems.
3. Geospatial data for hydrology, spatial detail and map scale, coordinate reference systems (datum), data representation, metadata, digital terrain model.
4. Format hydrological data, check homogeneity, fill in, and extend data time series.
5. Surface formation, geospatial data production from point measurements, surface creation methods. Spatial variability.
6. Modeling of evaporation. Modeling of filtration. Hydraulic roughness and hydraulic drainage.
7. modeling hydrological processes.
8. Modeling of the unit hydrograph.
9. Development of reliable NON-linear estimation models of dependent hydrological variables
10. Development of N-dimensional non-linear ranking models (N dimensional classification) in water resource management using Computer Intelligence-Machine Learning
11. Artificial Neural Networks (NTN)
12. Support Vector Machines (MDY)
13. Fuzzy Logic (AL).

Software: Torrential-MIK, Esri ArcGis, Arc Hydro, Hec-Hms, Hec-Ras, Iric, Telemac, Erdas Imagine, Trimble eCognition, MATLAB 2016, WEKA (free open source), Neuralworks Professional II PLUS.

After successful completion of the course the participants are able to:

- Generate the primary input data of the models using Geographic Information Systems and remote sensing techniques.
- Model hydrological processes.
- To shape and solve water resource problems as optimization problems.
- Create and optimize water resource models that will act as decision support systems.
- Be able to develop non-linear models for estimating dependent hydrological variables.
- Assess the suitability for use of Computational Intelligence-Machine Learning techniques
- Propose and implement appropriate decision-making tools related to water problems.

Teaching Mode: 3 Hours Suggestion-Workshop / Week