

## 6 SPECIAL TOPICS IN RESEARCH AND MANAGEMENT OF GROUNDWATER AND GEOTHERMAL ENERGY

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The course includes the following sections:

1. Elements of Hydrology, Groundwater Plumbing and Applied Hydrogeology
2. Marine penetration in coastal underground water bodies - 1 (hydraulic and hydrochemical elements, modern response trends and management parameters)
3. Marine penetration in coastal underground water systems - 2 (international and Greek experience) - Exercises
4. Management of groundwater enrichment - 1 (natural groundwater enrichment and climate change, methods, selection criteria, design and operation of artificial groundwater enrichment projects)
5. Management of groundwater enrichment - 2 (hydraulic, hydrogeological, technical and managerial elements of modern approaches, scientific activities)
6. Management of groundwater enrichment - 3 (surveys and applications in the international field and in Greece) - Exercises
7. Simulation of groundwater and computational codes - 1 (hydrogeological dummy, classification of simulation models of groundwater)
8. Simulation of groundwater and computational codes - 2 (computational codes, general principles of evaluation of simulation models of groundwater, cases of application in Greek space) - Exercises
9. Geothermal systems - Geothermal fields
10. Geothermal field survey methods
11. Geothermal Energy Applications: Direct Uses
12. Geothermal Energy Applications: Electricity Generation - Shallow Geothermal Energy
13. Problems: Environment - Economy - Management

After completing the course, the participants are able to:

- Identify hydraulic characteristics, elements and properties of groundwater bodies
- Combine, compose and adapt data, data and results of hydrological and hydraulic surveys and studies of groundwater
- Compare, assess the options for implementing actions and decide on the design and construction of technical projects, relating to the development and management of groundwater bodies, in particular: (i) the management of groundwater enrichment, (ii) the exploration and treatment of marine intrusion in coastal aquifers.
- To select and apply appropriate computational codes in the context of the simulation of groundwater.
- To analyze and evaluate data, data and research results related to the utilization of geothermal energy and to solve problems of use and exploitation of geothermal energy in relation to the various relevant energy needs and environment.

Teaching Mode: 3 hours suggestion-exercises / week