

12 WATER RESOURCES PROTECTION AND NATURAL DISASTER PREVENTION METHODS

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The course covers the following topics:

1. Water Resources: Pollution and protection, vulnerability and risk of groundwater systems to external pollution – Natural Hazards and Disasters: Key concepts and definitions, natural disaster management, system vulnerability to natural hazards and risk assessment.
2. Analysis of the concepts of vulnerability, risk, hazard, susceptibility, and exposure.
3. Methods for assessing vulnerability in granular/porous aquifers.
4. Methods for assessing vulnerability in fractured aquifers.
5. Methods for assessing vulnerability in karst aquifers.
6. Floods and the geophysical environment, methods of flood risk assessment.
7. Causes and impacts of floods – Projects, actions, and preventive and preparedness measures for addressing flood events.
8. Drought – Part 1: Basic concepts and definitions – Recent global events – Types, causes, characteristics, and impacts of drought.
9. Drought – Part 2: Quantification of drought – SPI Index – Use of software for SPI calculation.
10. Drought – Part 3: Drought risk assessment.
11. Geohazards – Part 1: Main types, causes, and impacts.
12. Geohazards – Part 2: Mitigation and protection measures.
13. Geohazards – Part 3: Hazard assessment methods.

At the end of the course the students will be able:

- To understand the concepts of groundwater vulnerability and risk, as well as the concept of hazard resulting from natural phenomena.
- To evaluate methods for the protection of water resources and prevention against natural disasters.
- To identify various types of aquifers and apply appropriate methods for assessing their vulnerability to external pollution.
- To analyze the causes of flood events, assess their impacts, and propose measures for reducing flood risk and mitigating their consequences.
- To recognize the main types of droughts, analyze the factors that cause them, examine the impacts of drought in various sectors, and utilize methods and tools to quantify drought.
- To comprehend the process and parameters required for assessing the risk associated with both floods and droughts.
- To identify major geological hazards and their dependence on water, understand their impacts, and be familiar with protection and mitigation measures.
- To evaluate methods for assessing geohazard risk.
- To develop and present a topic related to the protection of water resources and/or the prevention from natural disasters.

Teaching Mode: 3 Hours Suggestion-Workshop / Week