



Online short course

Sanitation-related urban groundwater pollution

3 March – 21 June 2008 (part-time)

Objectives of the course

Many urban planners in developing countries are turning to their (urban) groundwater resources as a water supply source because the available surface water is very polluted, and groundwater is seen as a reliable and easily accessible substitute. However, whilst groundwater sources are being tapped for water supply, the soil is at the same time used as a filtering medium for excreta and greywater disposal, without a thorough understanding of the relevant soil-groundwater interactions.



Especially in the case of civil or sanitary engineers, little is being taught about groundwater pollution aspects in their university degree, despite the fact that on-site wastewater disposal is extremely common in developing countries. Other causes for urban groundwater pollution are also being neglected in many cases.

If a town planner, water supply engineer or sanitary engineer wants to know more about groundwater or hydrogeology, one option would be to take a university degree in that subject. What this online course offers instead is the basic hydrogeology knowledge tailor-made to the needs of those involved in providing water supply or sanitation in urban areas in developing countries.

Upon completion of this course, the participants will:

- Appreciate the dangers associated with unsustainable groundwater exploitation and urban groundwater pollution;
- Have fundamental knowledge on urban groundwater pollution from conventional sanitation, contaminant transport and interactions between surface and groundwater;
- Be able to apply technical and managerial solutions for groundwater quality (and quantity) protection, and carry out sustainable groundwater management (e.g. by adopting an ecological sanitation approach).

Why take this online course?

- You can follow the course from your home or office, with ample opportunities for interactions with teachers and fellow participants;
- You will connect with international professionals and get access to up-to-date knowledge and expertise;
- UNESCO-IHE has 50 years experience with education of professionals and three years experience with delivering online courses (we have 13,000 alumni worldwide).

Target group

The course is designed for mid-career professionals who work in developing countries or countries in transition, and deal with planning, policy development, design, and management of urban water supply, groundwater exploitations schemes and sanitation provision. Participants are typically employed by municipalities, government departments, consulting firms, NGOs, universities or aid agencies.

Course content and time schedule

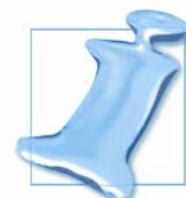
Participants complete the course in part-time, distance learning mode over a period of 16 weeks with a total workload of 140 hours (equivalent to 3 weeks full-time). They spend about 8 hours per week on this course by reading, listening to voice recordings, watching video clips, participating in asynchronous discussions, obtaining advice or guidance from the teacher and working on assignments. After successful completion, participants will receive a certificate issued by UNESCO-IHE.

Course schedule (total of 16 weeks)

Subject	Units	Duration
1. Introduction to urban groundwater pollution	Introduction to the course; Overview and scale of urban groundwater pollution; Urban groundwater use; Historical developments of the science; Challenges for urban groundwater; Basic definitions and the hydrological cycle.	2 weeks
2. Introduction to hydrogeology	Rocks and groundwater; Groundwater movement; Water balance concept; Groundwater recharge.	4 weeks
3. Urban groundwater pollution processes	Sources and types of pollution; Transport of pollutants; Anorganic hydrochemistry related to urban groundwater pollution; Emerging organic micropollutants; Microbiological groundwater pollution.	4 weeks
4. Case studies	Sanaa (Yemen); Kampala (Uganda).	2 weeks
5. Approaches to urban groundwater protection	Urban groundwater management and protection; Aquifer vulnerability and water quality monitoring networks; Ecological sanitation for excreta management; Ecological sanitation for greywater management; Urban water demand management measures.	4 weeks

Benefits of e-learning:

- You can follow the course at any location with an internet connection;
- The I-Learning Environment provides you with training material and a communication platform with trainers and fellow participants;
- The course allows you to directly apply your new knowledge and skills in the workplace.



Fee

The online course fee is 550 Euro, which includes access to the I-Learning Environment and its training materials (hard copy and soft copy) and full training support during the four months of the course. Group discounts are possible. A limited number of scholarships for people from developing countries is available.

Innovative Learning

Entry requirements

The maximum number of participants is 25, and the deadline for registration is 1 February 2008. The course language is English. A reliable and reasonably fast (ideally 512 kbps) internet connection is necessary. The material is also provided on a DVD.

More information and registration

For more information or to request a scholarship application form, please contact:

Dr. Jan-Willem Foppen (j.foppen@unesco-ihe.org)

or see UNESCO-IHE's website (http://www.unesco-ihe.org/education/short_courses/online_courses)