AL241U Drinking Water Engineering - from source to healthy tap water 7.5 credits

Dricksvattenteknik - från källa till hälsosamt kranvatten

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

On 04/12/2019, the Dean of the ITM School has decided to establish this official course syllabus to apply from spring term 2020 (registration number M-2019-2232). A-2019-2435.

Grading scale

P, F

Education cycle

Second cycle

Main field of study

Environmental Engineering, The Built Environment

Specific prerequisites

Completed candidate or Degree of Bachelor of Science in Engineering that includes at least 180 higher education credits in Environmental Emgineering and Built Environment or the equivalent.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The importance of in-depth knowledge in drinking water and health has become more and more relevant in today's society, where groundwater as drinking water source is becoming increasingly attractive combined with other water solutions such as desalinization and recirculation of wastewater. The course should provide knowledge of natural and physical processes which are vital in ensuring healthy drinking water and also avoiding threats against the water quality which can occur now and in the future.

On completion of the course, the student should:

1. Be able to give an account of the importance of groundwater for general and individual water supply and be able to describe the formation of the groundwater, occurrence and chemical processes in different geological environments
2. Be able to state important quality requirements in different water directives (SLV, EU, WHO)
3. Be able to assess the quality of a drinking water regarding mineral content and toxicity, in addition to content of radioactive and pathogenic substances
4. Be able to describe raw water treatment methods commonly used in municipal water supplies
5. Be able to describe natural and engineered treatment processes in natural and artificial aquifers
6. Be able to describe quality problems found individual water supplies, treatment techniques and health risks
7. Be able to describe different threats to water quality and methods for assessing groundwater impact and factors
8. Be able to describe the effect of different water treatment strategies on the mineral balances of water
9. Be able to describe changes in water quality which can arise in the municipal water distribution network and the resulting health impacts which can occur
10. Be able to describe what determines the economic, social and technical development with regards to drinking water issues, both nationally and internationally
11. Be able to use projects as a working method to structure and solve water related problems problems in the student's own field/interest area.

Course contents

The course is mainly directed towards groundwater as raw material for drinking water supplies and treatment processes for creation of a potable and mineral-balanced drinking water.

The following main fields of study will be highlighted in the course:

- Groundwater recharge, soil and chemical processes, groundwater occurrence and the importance of groundwater for the drinking water supplies
- Rules, directives and recommendations that control the water supply management for large-scale aquifers and smaller reservoirs (SLV, EU, WHO)
- Desirable and undesirable components in drinking water including toxic, radioactive and pathogenic substances in raw and drinking water and resulting mineral balances.
- Common treatment methods of different raw water sources for large- or small-scale water supplies. Alternative treatment methods e.g. membrane filtration and its importance for water quality and health
- Chemical properties of drinking water such as corrosion and corrosive processes in the distribution network.
- Threats against the water quality today and in a future climate, risk assessments and measures to increase water security
- Individual and general water supply in areas of water scarcity e.g. coastal areas, salt water intrusion, threat from individual waste water outlets and bases of assessment.
- Study visits.
- Own project related to the own interest field of the course participant.

Examination

- TEN1 - Written exam, 3.0 credits, grading scale: P, F
- ÖVN1 - Exercises, 1.5 credits, grading scale: P, F
- PRO1 - Project, 3.0 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.