AE2610 Applied Hydrology 7.5 credits

Tillämpad hydrologi

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

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

Establishment

Course syllabus for AE2610 valid from Spring 2014

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Built Environment

Language of instruction

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

Intended learning outcomes

The overall aim of the course is to give applied knowledge of rural and urban hydrological systems. After the course the student should be able to:

Describe the process in the hydrologic cycle in rural and urban environments and solve problems dealing with water balance, evapotranspiration, hydrographs, infiltration, frequency analysis, hydrologic risk analysis and more.

Describe lumped and distributed flow routing and solve problems with analytical and numerical methods.

Derive a conceptual model diagram representing a comprtment model of an urban hydrological system.

Apply uncertainty based modelling techniques.

Describe the main features of important climate variability phenomena and discuss the curent climate change scenarios for the next 100 years and the possible effects on hydrological systems in different regions of the world.

Descibe the layout and perform a hydraulic design of municipal water supply and waste water systems.

Course contents

The main components of the climate system: radiation balance, atmospheric circulation, land-atmospheric interaction.

Hydrologic processes: precipitation, evaporation, infiltration, unsaturated flow, overland flow.

Surface water: open channel flow, hydrographs, the unit hydrograph, synthetic hydrographs, the SCS method.

Lumped and distributed flow routing: the Muskingum method, SaintVenants equations, the kinematic wave.

The linear reservoir: analytical solution and modelling of a system of linear reservoirs.

Hydrologic design: hydrologic statistics, frequency analysis, hydroeconomic analysis, uncertainty based modelling techniques.

Urban hydrological processes: quantifying runoff and groundwater recharge in urban areas, quantitative impact on surface and groundwater due to human activity.

Municipal water supply systems: hydraulic analysis and design of pipe networks and distribution reservoirs.

Waste water collection systems: hydraulic analysis and design of storm and sanitary sewer systems and treatment plants.

Specific prerequisites

Proficiency in English (English B or equivalent). Bachelor's degree in the field of civil engineering, environmental engineering, or another subject with clear relevance to the course, of at least 180 higher education credits, which includes the following: Basic knowledge in mathematics for at least 20 higher education credits; Basic knowledge in numerical analysis, programming, or equivalent, for at least 6 higher education credits; Fluid mechanics for at least 5 credits, Hydrology for at least 7.5 credits; Environmental Dynamics / Physical Process (course AE2201), 7.5 credits.

Course literature

Chow, V.T. et al. (1988) Applied hydrology. McGraw-Hill. ISBN 0-07-010810-2

Foster et al. (1998) Groundwater in Urban Development. World Bank Technical Paper No. 390

Examination

- TEN1 - Examination, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- ÖVN1 - Assignment, 4.5 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.

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.