# AE2609 Hydraulic Engineering Systems 7.5 credits

## Hydraulic Engineering Systems

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 AE2609 valid from Autumn 2007

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

## Specific prerequisites

AE2608 Engineering Hydrology and Climate

## Language of instruction

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

## Intended learning outcomes

After the course you should be able to:

-Define the physical and index properties of soil

- Solve elementary problems including Mohr´s circle, stability of slopes and lateral earth pressure

-Describe and explain the design principles of embankment and concrete dams and perform stability computations for some of these dam types

- -Perform hydraulic design of spillways and energy dissipators, channels and
- tubes and technical-economical optimization of pipes and channels
- -Make computations for different types of unsteady flow, such as water - hammer, mass oscillations in pipe systems and surge and flood waves
- - Describe the erosion process and design erosion protection for a channel
- -Describe and explain the design and hydraulic function of a hydroelectric power plant and compute energy production in hydropower plants
- -Make computations for river regulation for for hydropower, water supply and flood mitigation

-Describe the mechanics of wind generated waves and make wave height computations

## Course contents

Fundamentals of soil mechanics: Physical properties of soils. Compressibility and deformation, shear strength of soils, Mohr´s theory of failure. Stability of slopes. Active and passive earth pressure.

Embankment and concrete dams: loads, design, function, stability

Spillways: design and hydraulic computations of overflow weirs, bottom outlets and energy dissipators

Transport of water: technical and economical design of tubes and channels, pump- pipeline analysis and design

Hydraulics: unsteady flow, water hammer, surge waves, mass oscillation and pressure transients in pipes – surge shafts

Erosion: Shields diagram, critical shear stress, design of erosion protection

Hydropower plants: design, hydraulic computation, energy production

River regulation for hydropower, water supply and flood mitigation

Wind generated waves: wave mechanics, computation of wave height

## Course literature

Presented on the course home page three months before the course start

## Examination

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.

## Other requirements for final grade

Written examination (TEN1; 4hp), assignments (ÖVN1;3,5 hp)

## 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.