LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

Vatten
Water

VVRA05, 9 credits, G1 (First Cycle)

Valid for: 2023/24
Faculty: Faculty of Engineering, LTH
Decided by: PLED W
Date of Decision: 2023-03-27

General Information

Main field: Technology.
Compulsory for: V2
Language of instruction: The course will be given in Swedish

Aim

This course will give the students a basic knowledge of water related problems. The students will be able to use their knowledge to solve various engineering problems related to water resources management, urban hydrology and the design of hydraulic structures.

Learning outcomes

Knowledge and understanding
For a passing grade the student must

- explain and use fundamental hydrological processes and their interaction within the hydrological cycle
- know the order of magnitude for different hydrological processes and determine plausability of different values for Swedish conditions,
- describe fundamental hydraulic concepts like continuity, energy equation, and the momentum equation.

Competences and skills
For a passing grade the student must

- solve an urban hydrology problem in an efficient and structured way
- be able to calculate groundwater flow using Darcy's law.
- calculate dimensions of pipes, pumps, and turbines

- calculate the magnitude of forces using the momentum equations

Judgement and approach
For a passing grade the student must

- present a solution to a water related problem in a technical report.

Contents

- *descriptive and quantitative hydrology:* The hydrological cycle, hydrological processes, precipitation, evapotranspiration, infiltration, soil moisture, groundwater, runoff, and hydrograph analysis.
- *fluid mechanics:* Fluid properties, fluid statics, continuity equation, momentum equation and energy equation.
- *applications:* Pipe flow, sanitary engineering, urban hydrology.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)
Assessment: The course contains both individual and group examination. Two written exams and three assignments will be completed within the course. The assignments are made in groups of two students. The grade will be based on the results of the written exams and the assignments.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Admission

Assumed prior knowledge: VTGA01 Engineering Geology, FMAA05 Calculus in One Variable and VSM010 Mechanics, Basic Course.
The number of participants is limited to: No
The course overlaps following course/s: VVR120, VVR145

Reading list

- Hamill, L.: Understanding hydraulics. 3rd ed., Palgrave.
- Persson, M., Larsson, R., Malm, J.: Examples, Water.
- Some complementary material.

Contact and other information

Course coordinator: Professor Magnus Persson, magnus.persson@tvrl.lth.se
Course coordinator: Erik Nilsson, erik.nilsson@tvrl.lth.se
Course homepage: http://www.tvrl.lth.se/utbildning/courses/