

Course syllabus

Kusthydraulik Coastal Hydraulics

VVRN30, 7,5 credits, A (Second Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED W

Date of Decision: 2023-03-27

General Information

Main field: Water Resources Engineering.

Elective for: MWLU2, V5-vr, W5-vr

Language of instruction: The course will be given in English

Aim

The course aims at conveying knowledge within the areas of coastal engineering, coastal sediment transport, and coastal management. The emphasis in coastal engineering is directed towards wind generated waves and the forces these waves impose on the coastal zone. In coastal sediment transport focus is on transport processes under the influence of waves and currents. Coastal management discusses coastal protection methods as well as strategies for managing the coast in a wider societal perspective. The course aims at conveying basic knowledge about the governing physical processes as well as overall management strategies where the coastal processes are regarded as a part of society.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- be able to explain and use basic principles and processes within coastal engineering, coastal sediment transport, and coastal management.
- be able to describe the process of generation of wind waves and the forces these waves impose on the coastal zone.
- be able to calculate effects of wave impact, sediment transport and water level and predict their impact on constructions and natural formations in the coastal zone, both short term and long term.

- be able to relate problems with coastal erosion and flooding to the coastal planning process.
- be able to integrate an engineering coastal problem into a wider societal perspective.

Competences and skills

For a passing grade the student must

- be able to carry out technical investigations and evaluations on topics concerning wave mechanics, sediment transport, coastal erosion and floddings.
- be able to put technical questions on coastal hydraulics problems in a wider context about management of the coastal zone.
- be able to determine and present orally and in writing coastal hydraulic material for technicians as well as economists, social scientists, lawyers and politicians.
- be able to independently seek and value relevant information and data relating to coastal problems.

Judgement and approach

For a passing grade the student must

- be able to have a holistic view where the solution of coastal hydraulic problems is a part of an integrated societal process together with a number of questions with regard to economy, law, politics and social conditions.
- be able to give an oral and written description of possible solutions of a typical coastal engineering problem to different interest groups and audiences.

Contents

- coastal Hydraulics: Wave theory including phenomena such as shoaling, refraction, diffraction, reflection, and wave breaking. Statistical wave theory and estimation of waves generated by wind. Nearshore currents and water level variations together with their causes. Forces on structures due to breaking and non-breaking waves. Planning and design of nearshore structures.
- coastal Sediment Transport: Basic sediment transport processes, morphologic response, alongshore transport, cross-shore transport, modelling of coastal evolution.
- coastal Management: Integrated coastal zone management issues, GIS, coastal classification, coastal protection strategies, design aspects of coastal protection, coastal protection measures.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)

Assessment: Written assignments and written examination.

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: VVR090/VVRN35 Hydromechanics (may be studied in parallel).

The number of participants is limited to: 35

Selection: Credits remaining for the degree. Priority is given to students enrolled on programmes that include the course in their curriculum.

The course overlaps following course/s: VVR040

Reading list

- US Army Corps of Engineers: Shore Protection Manual.
- Hanson, H.: Coastal Engineering Issues in Coastal Zone Management.
- Hanson, H.: Sediment Transport and Coastal Protection.
- Hanson, H.: Sample problems in coastal engineering.

Contact and other information

Course coordinator: Professor Hans Hanson, Hans.Hanson@tvrl.lth.se

Course coordinator: Caroline Hallin, caroline.hallin@tvrl.lth.se

Course coordinator: Björn Almström, bjorn.almstrom@tvrl.lth.se

Course homepage: <http://www.tvrl.lth.se/utbildning/courses/>