

## Minor

### Qualification awarded

-

### Length of the programme

6 months

### ECTS credits

30

### Level of qualification

Bachelor

### Mode

Full-time

### Language

English

### School

School of Architecture & Built Environment

### Locations

Groningen

## Minor Delta Engineering

### Profile of the programme

This minor aims to explain the complex dynamics in a delta with a growing port and city, in connection with the global challenge created by economic growth and the rise in sea level: growing ports and cities in vulnerable deltas.

The programme focuses on the technological implementation of possible solutions. There are four theoretical main subjects: Port & City Development, Delta Engineering, Water Systems Engineering and Dredging Technology. The theoretical part of the course is interspersed by external projects where experience is gained through 'learning by doing', comprising brief (two-weekly) assignments at a port, contractor, engineering firm or water authority. The assignments may involve analysing a certain problem or using supplementary theory to conduct a 'serious game'.

### Learning outcomes

- Students are able to design a port (greenfield or extension) based on given throughput figures, local constraints and port-city interaction.
- Students are able to understand how climate change influences port-city developments and have knowledge of sustainable design approaches.
- Students are able to apply spatial analysis techniques to assess the feasibility and environmental impact of their port-city design.
- Students are able to understand the basic hydraulic concepts for water transport for both gravity and pumped flow.
- Students have knowledge of the materials and equipment used within the civil engineering sector for water transport and distribution.
- Students are able to apply hydraulic concepts to designing a water pumping system.
- Students are able to analyse a water distribution network in order to ensure that suitable flows and pressures are achieved under different scenarios.
- Students are able to evaluate a soil investigation report, determine the soil characteristics for dredging and evaluate the limitations for dredging.
- Students are able to design a dredging strategy, and calculate the production and costs of dredging.
- Students are able to analyse and evaluate bathymetric surveys, distract volumes and determine accuracies.
- Students are able to calculate and evaluate the transport of slurries by evaluating the pump-drive-pipeline interaction.
- Students are able to design a breakwater, river training works and coastal protections.

## Programme

### Minor Delta Engineering

### credits

Delta Engineering	30
▫ BVVH19DERIV - River Engineering	3
▫ BVVH19DECOAST - Coastal Engineering	3
▫ BVVH19DEPORT - DE Portfolio	3
▫ BVVH19DEEXP1 - Experience learning 1	6
▫ BVVH19DEPD - Port Development	3
▫ BVVH19DEHE1 - Harbour Engineering 1	3
▫ BVVH19DEHE2 - Harbour Engineering 2	3
▫ BVVH19DEEXP2 - Experience learning 2	6