

OFFSHORE RENEWABLE ENERGY



UNIVERSITY
OF APPLIED SCIENCES



The minor Offshore Renewable Energy focusses on all aspects of the life cycle of offshore windfarms: Design, Installation, Logistics, Operation & Maintenance and Decommissioning. Every week there will be guest lectures from experts in leading companies in the offshore energy industry who will offer you an exclusive inside view in the industry and the innovations they are working on! You will work on real project where experts from the field will give you assignments and be your mentor! This will help you to become an expert in the offshore renewable energy industry yourself! You will receive many offers for (graduation) internships and jobs!

See this film series about innovations in the Offshore Windfarm industry by Van Oord that was made in cooperation with our students!

<https://www.vanoord.com/sustainability/energy/borssele-wind-farm-site-v-turning-innovations-reality>

The main partners of this minor are:

- Boskalis (lectures and projects)
- Van Oord (lectures and excursions)
- SiemensGamesa (lectures and projects)
- Orsted (lectures and projects)
- SIF (lectures and excursions)
- World Class Maintenance Fieldlab Zephyros
- Center of Expertise Water & Energy
- Scalda
- DRTC (drtc.nl)

Guest lectures are given by Mammoet, IV-Group Nevesbu, DEME GeoSea, Deutsche Windtechnik, Stork, Dutch Drone Company, IHC Iqip, SIF, Jumbo Heavy Lift, Seaway Heavy Lifting, Rijkswaterstaat, BOW Terminal, 24SEA, Royal Haskoning DHV, Vestas, Enapsys, Vuyck Engineering, Antea Group, Technotron and many more.

As part of this minor, you are able to get the following certificates that are registered in the WINDA database of the Global Wind Organization (GWO) <https://www.globalwindsafety.org/>:

- Basic Elements of Safety Certificate (VCA)
- Basic Safety Training (BST) at Scalda (student fee EUR 600,-), see <https://www.scalda.nl/werken-in-de-wind>.
- Basic Technical Training (BTT) at Scalda (student fee EUR 600,-), see <https://www.scalda.nl/werken-in-de-wind>. This training teaches you the basics of how the nacelle and all electrical, hydraulic, mechanical systems are designed, operated and maintained. The training teaches you the basics of how wind energy is converted to mechanical energy and electrical energy.

Some excursions are restricted by Covid-19 but some are still possible! During this minor you will go on excursions to visit staging ports, installation vessels and visit international conferences. For excursions to ports, substations and installation vessels you need Personal Protective Equipment (PPE).

Some examples of excursions from previous editions of the minor:

- Excursion by ship to the Belgium Norther Windfarm!
- Van Oord Installation Vessel Aeolus and Svanen
- Jan de Nul installation Vessel Vole au Vent
- SIF Monopiles factory at Maasvlakte 2
- Damen Shipyards, Borsele HVAC substation Alpha
- BOW Terminals, Vestas staging port
- Wereld Haven Dagen Rotterdam, <https://wereldhavendagen.nl/>
- Offshore Energy Conference Amsterdam, <https://www.offshore-energy.biz/>
- Navigo Career Event (<https://www.navigocareerevent.com/en/home>)
- Belgian Offshore Days (<https://www.belgianoffshoredays.be/>)
- Future of the North Sea Symposium by KIVI, <https://new.kivi.nl/afdelingen/offshore-techniek/activiteiten/activiteit/future-of-the-north-sea>
- Boskalis inhouse day: <https://careers.boskalis.com/events/boskalis-innovation-inhouseday/>
- Many more...

Studying at HZ University of Applied Sciences and living in Zeeland!

All students that are registered at HZ can get student housing in Vlissingen or Middelburg. You can get to know the beautiful province of Zeeland! Would you like to live by the sea for a semester and combine studying with surfing, fishing or going to the beach?

LEARNING OBJECTIVES

To reduce climate change and global warming, many countries signed the Paris Climate Agreement promising to reduce CO2 emissions. The contribution of Offshore Renewable Energy to the energy market is essential for a better environment and for our future. The human use of energy is still increasing and we are running out of fossil fuels. In the future, we can solve this by generating renewable offshore energy from wind, currents, waves and other sources. Currently, many new offshore wind farms are planned and built in the Netherlands. The ports of "North Sea Port" in the province of Zeeland are a major contributor to the construction of offshore wind farms, both nationally and internationally. This will result in many future-proof jobs for young engineers. The minor prepares students for a career in this emerging market and allows you to make your own contribution to a better environment.

Related U.N. Sustainable Development Goals are 7, 9, 13, 14, 17

see <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>



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CU19380 Design & Installation 1 (2,5 ECTS) and CU19385 Design & Installation 2 (2,5 ECTS)

Learning goal: Students are able to explain how the North Sea is used as source for renewable energy and are able to bring out a tender for an offshore wind farm. Some elements of DESIGN 1: Monopile design and installation, Seabed mobility and scour protection, Floating wind-turbine design, Calculations on theoretical wind power, Energy storage possibilities, The influence of offshore wind power on grid stability.

CU19381 Logistics & Operations 1 (2,5 ECTS) and CU19386 Logistics & Operations 2 (2,5 ECTS)

Learning goal: Comprehending all the components and processes in the logistics of the installation, operation and maintenance of an offshore wind farm. Gaining awareness of all the challenges and possible weak links in the logistics chain. Gaining insight into the optimization of the installation and operation and maintenance process from a logistical point of view for a typical offshore wind farm.

CU19382 Project Tender Boskalis 1 (5 ECTS) and CU19387 Project Tender Boskalis 2 (5 ECTS)

Learning goal: You are working for the sales and planning department in a project team based organisation like Boskalis or Van Oord, see figure 4.1 of the book. You are going to create the Scope of Work (SOW) for the project and bring out a tender to install the Balance of Plant (BOP) for an offshore wind farm called Immer Wind. To create the tender, you have to set up the project specifications. You are going to create a bid for a T&I contract to install the foundations and turbines an offshore wind farm and bring out a Tender. The project execution plan is the script of how the wind farm project is to be orchestrated from the delivery of the single component to the staging port, to the final handover of the entire wind farm. This project is supported by Boskalis!

CU19383 Elective Project 1 (2,5 ECTS) and CU19388 Elective Project 2 (2,5 ECTS)

Learning goal: You will choose one of the following projects: SiemensGamesa spareparts management, Orsted operations & maintenance plan, hydrogen projects within the research group Delta Power of HZ. You will get weekly supervision.

CU19384 Elective Activities 1 (2,5 ECTS) and CU19389 Elective Activities 2 (2,5 ECTS)

Learning goal: You will do elective activities such as conferences, webinars and excursions to complete your registration card.

ADMISSION REQUIREMENTS

Mechanical Engineering, Engineering, Civil Engineering, Water Management, Logistics Engineering, ICT, Maritime Officer, Service Management, Industrial Management, International Business or a related (technical) study programme.

All lectures and teaching materials are in English, you will work with international students and professionals to prepare you for the offshore renewable sector.

LITERATURE

The learning material consist of:

- The book "Offshore Wind" by Thomsen (<https://www.elsevier.com/books/offshore-wind/thomsen/978-0-12-410422-8>)
- The book "Empowering the Great Energy Transition" by Valentine, Brown & Sovacool (<http://cup.columbia.edu/book/empowering-the-great-energy-transition/9780231185967>)
- Open Online Course Offshore Windfarm Design by TUDelft <https://ocw.tudelft.nl/courses/offshore-wind-farm-design/>
- Duurzame Energietechniek by Joop Ouwehand, <https://www.studystore.nl/p/9789058755551/duurzame-energietechniek>
- Presentations and materials from guest lectures by experts from the field.
- Learning materials on the HZ Learn page online environment.

SCHEDULE

The minor Offshore Renewable Energy comprises of 2 blocks of 10 weeks each. Forty percent of the minor consists of theory classes taught by professionals from the business sector, research departments or universities. The other sixty percent of your time you will work on 2 practical projects that you select at the start of the minor.

The minor is built using four learning lines that represent phases in the life cycle of an offshore wind farm: Design, Logistics, Installation, Maintenance. Each learning line consist of theory lectures, guest lectures and a project teaching you the basics for Engineers of offshore wind farms. Projects in the Offshore Wind sector are multidisciplinary so you will have to work together with students from other study programs such as Mechanical Engineering, Civil Engineering, Water Management, Logistic Engineering, Maritime Officer, Industrial Engineering, etc. At the start of the minor, you will select 2 projects on which you will work the whole minor.

ASSESSMENT

Block 1: 2 Exams, 1 main project and 1 elective project

Block 2: 2 Exams, 1 main project and 1 elective project

Min. grade: 5,5