

**Energy Transition for
Engineers**

Course guide 2026-2027

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|-------------------------|----------------|
| Semester | 2 |
| Inholland location(s) | Alkmaar |
| Inholland faculty | N&T |
| Language of instruction | English |
| Cycle | Bachelor level |
| Number of ECTS | 30 |

Subjects

| Subject title | ECTS | Course code |
|---|------|-------------|
| Project Wind Turbine | 10 | 1625ENERGZ |
| Energy Transition: theory and applications | 10 | 1624WARGOZ |
| Built Environment: Installation and Heating | 5 | 1624WARGOZ |
| Future Energy Systems | 5 | 1624WATECZ |

Content subjects

The energy transition is one of the key challenges of our time. In this minor, you will actively contribute to solutions for a more sustainable energy system by designing and realising engineering applications.

You will work on **hands-on projects**, such as the development of a small wind turbine, and apply your knowledge in a practical and multidisciplinary context. The minor combines theory with real-world application and offers a strong connection to industry and current developments in the energy domain.

Students can choose a focus that aligns with their background and interests, such as **mechanical engineering** or **electrical engineering**.

The core of the minor consists of a project-based learning approach, in which you work in a team on a realistic engineering challenge related to the energy transition.

Typical activities include:

- designing and developing sustainable energy systems
- building and testing prototypes (e.g. wind turbine systems)
- analysing system performance and efficiency
- applying engineering principles to real-world energy challenges
- participating in an international competition

In addition, the programme includes:

- lectures and workshops on energy technologies
- excursions to companies and research facilities
- interaction with professionals from industry

Topics may include:

- wind energy
- solar energy
- hydrogen technology
- electrical systems and smart grids
- system integration and control

Learning outcomes

After completion of the minor, the student is able to:

- design and develop engineering solutions within the context of the energy transition
- apply theoretical knowledge of energy systems in practical applications
- analyse and evaluate the performance of energy systems
- collaborate effectively in a multidisciplinary engineering team
- communicate results and design choices professionally to stakeholders

Mode of delivery, planned activities and teaching methods

The minor is organised around a **project-based learning approach**. Students work in multidisciplinary teams on a practical engineering assignment related to the energy transition.

Teaching and learning activities include:

- project work (design, build and test)
- lectures and interactive workshops
- practical assignments and prototyping
- excursions to companies and research facilities
- guest lectures by industry professionals
- coaching and feedback sessions

The programme combines theoretical knowledge with hands-on application and encourages active participation and collaboration.

Prerequisites and co-requisites

For engineering students (mechanical engineering, electrical engineering, informatics or equivalent), completion of the propaedeutic phase is required.

For students from related disciplines, one of the following is required:

- basic knowledge of thermodynamics, fluid mechanics and materials, combined with design skills
- basic knowledge of electrical engineering, digital systems and programming, combined with design skills

Recommended or required reading and/or other learning recourses/tools

Recommended literature includes:

- *Sustainable Energy Technology* (Entrop et al.)
- *Applied Energy Technology* (Ouwehand et al.) - mechanical engineering focus
- *Heat Transfer for Technicians* (Van Kimmenaede) - mechanical engineering focus
- *Transients in Power Systems* (Van der Sluis) - electrical engineering focus
- *Power System Essentials* (Schavemaker & Van der Sluis) - electrical engineering focus
- *Phase to Phase* (online resource) - electrical engineering focus

Additional materials:

- institution-developed teaching materials
- access to a laptop suitable for engineering software (minimum 40 GB free storage)
- software tools for design, simulation and analysis

Assessment methods and criteria

Assessment is based on a combination of **project work and individual performance**.

Assessment methods include:

- portfolio assignments demonstrating knowledge and skills within the chosen focus area
- group project deliverables (design, prototype and supporting documentation)

- written examinations for theoretical components
- presentations and demonstrations of the developed application

Students are assessed on their ability to apply their expertise within a multidisciplinary team, substantiate design decisions and demonstrate the validity of the developed solution through calculations and analyses.

Lecturer(s)

The minor is delivered by lecturers from the Engineering programmes at Inholland Alkmaar, supported by guest lecturers and professionals from companies and organisations active in the field of the energy transition. Students interact with industry partners through projects, excursions and guest lectures.