

Minor Smart Energy Management & Design

General objectives

In the day-to-day practice of designing, renovating and managing sustainable buildings there currently is a great demand for higher professional education graduates with Smart Energy skills, who also understand the thought processes of other actors in the chain (from design to management). Innovative designs in the field of sustainability and smart energy in buildings are largely – and will increasingly be – integrated designs that take account of every link in the organization chain. The objective of this minor is to give students from various study programmes the tools they need to fulfil their future role, which is to realise a sustainable and energy-neutral built environment.

Summary of contents

The main focus from day one is a multidisciplinary design project, based on a current case and involving a genuine commissioning party from the industry. The project involves creating a professional product (consultancy/design report with recommendations) related to energy-efficient, zero-energy and green buildings, in collaboration with all actors in the chain. Throughout the project, the students must use their own expertise to create an integrated design. Students are coached on content and process, and expand on their knowledge by conducting research.

Next to the project, introductory modules are given on the important ways of thinking and designing in the various energy related disciplines (architecture/building physics/comfort, maintenance and building management/energy management, energy concepts for heating, cooling and electricity) so that students from one programme are able to communicate with students from other programmes, a skill required in professional practice. In addition, every study programme provides a specialist module for its own students in support of the project (given by a mixture of teaching staff from The Hague University of Applied Sciences and guest lecturers). Special attention is also devoted to research methods and integrated design in multidisciplinary teams.

Target group

Students from the programmes architecture, civil engineering, building construction, mechanical engineering, electrical engineering, technical business management, climate management and facility management, who are interested in a deepening study of energy requirements for the built environment (energy-efficient and energy-neutral buildings, green buildings, sustainable energy, energy

management), and wish to play an active role in real situations ('living labs') and learn to design and give professional advice within multidisciplinary teams

Entry requirements

- *Students:* Students must follow a program (higher professional education), in architecture, civil engineering, building construction, mechanical engineering, electrical engineering, technical business management, climate management, facility management or equivalent, and must have passed their foundation course (propedeuse) and have obtained at least 90 credits in their major.
- *External:* Demonstrable work experience in one of the relevant fields as well as the academic level of a third-year student in higher professional education. Admission following a preliminary interview.

Competency levels

The main competency acquired by students during the minor is the ability to apply the knowledge and insight gained through their own study programmes within a multidisciplinary team, as required in the construction and construction management industry for creating energy-efficient, zero-energy, or even energy-producing sustainable buildings. The following competencies are acquired:

- Knowledge of energy issues from the perspectives of: architecture, indoor climate, building management, energy management, and installation technology and energy generation.
- The students' ability to convert a complex problem from professional practice into a clear overview of requirements for their own discipline, taking the needs/prerequisites of other disciplines into consideration.
- The students' ability to solve a problem within their own discipline for use in an integrated solution using methods such as research, systems thinking and modelling.
- Being able to justify and explain the principles and results to other members of the design team.
- The ability to combine knowledge and understanding from various disciplines into an integrated design that creates added value.

Description of tests and minimum pass rate

- 50% of credits for the group assignment, the end products of which are an advisory report (40%) and a presentation (10%). If the report is found insufficient, the group has one second chance to improve it within one week. Performance within the team and individual contributions are assessed separately, meaning that each student gets an own grade varying between the group's grade ± 2 points.
- 50% of credits based on 5 individual written tests (10% per test, 1 test per discipline). Each student gets 4 written test on the introductory modules and one specialist test relevant to the student's own discipline. The student's own discipline will be determined at the start of the minor. These 5 tests can be done over separately with a maximum of two times per test.

The student passes for the minor if the weighted average of his grade for the group assignment and the five individual tests is higher than 5.5.

Teaching methods + study load

The project begins with a specialist module in the student's own discipline. There is a commissioning party from outside the university (a client), and students play their own role (consultant in their own discipline). Students are coached on the process (1 coach per team) and on subject content (one contact person per discipline).

- Systems engineering and multidisciplinary design methods are common themes that run throughout all subjects.
- Five modules are given (four introductory modules, and one specialist module that will depend on the student's study programme):
 - Building Physics/Comfort & Indoor Climate (Architecture)
 - Building Management/maintenance/financial analysis (Facility Management)
 - Heating, Ventilating and Air Conditioning systems/Sustainable energy generation/Energy management (Mechanical/Electrical Engineering)
 - Sustainability (regulations & policy)/building process (Climate & Management/Technical business Management)

- Multidisciplinary design/Systems engineering (for all students as introductory module)

Contact hours

- Lectures/tutorials:14 hours a week (12 hours for introductory modules, 2 hours for deepening module)
- Project workshops, incl. excursions: 8 hours a week
- Coaching: 3 hours a week

Contact person

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