Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences
Graduation Plan: All tracks

**Personal information**

<table>
<thead>
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<th>Ruben Wessels</th>
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**Studio**

<table>
<thead>
<tr>
<th>Name / Theme</th>
<th>Architectural Engineering</th>
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<tr>
<td>Teachers / tutors</td>
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<tr>
<td>Design tutor:</td>
<td>Monique Smit</td>
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<td>Building technology tutor:</td>
<td>Maarten Meijs</td>
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<td>Research tutor:</td>
<td>Siebe Broersma</td>
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**Argumentation of choice of the studio**

The technical aspects of architecture has always interested me. One of the things that attracted me to study architecture in the first place was the mixture between design and technique. Furthermore has sustainability in architecture in its whole been of an interest to me and especially the performance of a building during its period of use. After I learnt that the graduation studio of Architectural Engineering offered me the freedom to fully define my graduation project myself, so that I could define a project with a technical focus on sustainable building performance while also maintaining all the other aspects of architectural design and even incorporate other personal fascinations such as the implementation of old existing buildings or structures in a new architectural designs, my choice for the studio was easily made.

**Graduation project**

<table>
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<tr>
<th>Title of the graduation project</th>
<th>Fix-up the Walk-up: The renovation of 1960’s walk-up flats into social and energy-efficient fix-up dwellings / De renovatie van Jaren ‘60 portiekflats tot sociale en energiezuinige kluswoningen</th>
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<tr>
<td>Goal</td>
<td>IBA Parkstad, Limburg (Hoensbroek)</td>
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**The posed problem,**

The IBA Parkstad area is a region with a rich and vibrant history. It once was the ‘energy centre’ of the Netherlands and known for its coal mining. However, things have changed. The mines have since been closed and the area has lost its identity. Also, the area has to deal with problems as population ageing, population decline, an outdated building stock and a large scale building vacancy. In most cases these vacant buildings have a bad energetic performance due to for instance bad insulation, insufficient building quality, bad solar orientation, lack of...
solar shading and energy spilling ventilation systems. This creates a large ecological footprint and results in high energy costs. The large scale building vacancy, together with a high unemployment percentage and the loss of a regional identity due to the closing of the coal mines also has a decline of the social cohesion in the area as a consequence.

### research questions

**Overall research question:**
How can existing walk-up flats in the IBA Parkstad area be redesigned into attractive and comfortable energy neutral dwellings, while also improving the social cohesion in the neighborhood?

**Thematic research question** (for research paper):
In what ways can an existing walk-up flat, dating from 1960’s, be made energy neutral, and which ways are more suitable?

### design assignment in which these result.

The goal of this graduation project is to create a redesign for an existing walk-up flat in the IBA Parkstad area. Besides a sufficient design in all common fields of architecture, the objective focuses on a realization of an energy neutral design and on the social improvement of the neighborhood, while staying both comfortable and attractive.

### Process

#### Method description

The to be used methodologies during the research and design process are:

**Literature studies on the topics:**
- Energy neutral buildings
- Energy labels
- Passive heating, cooling and ventilation
- Sustainable active heating, cooling and ventilation
- Renewable energy
- Renovating bad energetic buildings
- Social community architecture

**Case studies/reference study on the topics:**
- Energy neutral buildings
- Renovated bad energetic dwellings
- Redesigned walk-up flats
- Fix-up dwellings (kluswoningen)
- Materialization

**Discussion/consulting/brainstorming with:**
- Monique Smit, about overall design
- Siebe Broersma, about energy neutrality and building performance
- Maarten Meijs, about building technology

**Research by design, in the form of:**
- Overall design sketching
- 3D modelling
**Physical modelling**

**Literature and general practical preference**

**Literature:**

**Precedents/Case Studies:**
Reflection

Relevance

In current day society, where there is more and more awareness of the vital importance of sustainable building development which results in more and more sustainable architecture, the biggest part of our society still lives and works in energy wasting buildings. Due to for instance bad insulation, insufficient building quality, bad solar orientation, lack of solar shading and energy spilling ventilation systems these buildings have a bad energetic performance. The combination of this immense stock of bad energetic performing buildings and the growing demand for sustainable energy efficient buildings result in a pressing need to upgrade these buildings and its energetic performance so that its ecological footprint will shrink. The value of this graduation project lies in both its choice of building typology, the walk-up flat, and its answer to the pressing demand from society for sustainable buildings and dwellings. The choice of the building typology is of value, because of its generic nature. The typology is widespread throughout the Netherlands and therefor can its new sustainable energy neutral design philosophy be transferred to other walk-up flat, so that it can answer to the problem on a big scale.

Time planning