Building, Climate and Systems

Offered by: Built Environment
Language: English
Primarily interesting for: This package is recommended for students from Bachelor major Architecture, Urbanism and Building Sciences
Prerequisites: The following prerequisites are recommended:
3NAB0 Applied Physical Sciences conceptual
7S3X0 Introduction Building Physics and Material Science
7S4X0 Building Physics and Building Services engineering

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Content and composition
The coherent package Building Physics 1 is a preparation for the master track Building Physics and Services. The package covers the connection between people, building and HVAC systems and the integration of the systems in the building.

In the package, the emphasis is on the performance of buildings and systems, which is evaluated by simulation and modeling. In the package the Differential Equations and Matrices course is included, because the simulation programs use these techniques and understanding of them is required, also for the master track Building Physics and Services.

Within the specialization you will engage yourself with the relationship between the various building physics items such as heat, light, sound and moisture and technical systems.

Application of surface water with heat pump heat/cold storage:
System analysis, measurement and simulation Maastoren Rotterdam (Rik Molenaar 2011)
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<tr>
<th>Code</th>
<th>Course Name</th>
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<tr>
<td>2DBA0</td>
<td>Differential Equations and Matrices</td>
<td>2017-2018, Quartile 2, slot B</td>
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<td>7S8X0</td>
<td>Building Services</td>
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<td>7S9X0</td>
<td>Building Performance Evaluation</td>
<td>2017-2018, Quartile 4, slot A</td>
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There are no specific requirements regarding the order of the courses. The courses are programmed in the Bachelor in this sequence.

Course descriptions

Building Performance Evaluation
In this course students will work with the principle of discovery and problem based learning. For the content part this will be in the form of concept mapping, where students will work in pairs and describe and discuss important concepts and questions that are part of the course. This is called Track A. For Track B and C students will work individually on assignments. Every week maximum 4 hours will be reserved to provide an introductory lecture (2 hours) and for support on the concepts and the assignments and to discuss or answer questions. The remainder of the time for the course is available for the students to work on the concept maps and assignments.

Differential Equations and Matrices
Differential Equations and Matrices is a mathematics course that provides the necessary mathematical knowledge for the courses in the Master Building Physics and Services. The course has the following contents:

- Complex numbers
- Differential equations
- Linear algebra
- Solving Equations
- Eigenvalues, eigenvectors
- Linear systems of differential equations

Building Services
Integral design process, integrated design of building and building services, overview of building services installations, insight in performances of these systems within different applications, system selection.

The lectures focus on the design, dimensioning of building systems for climate control and building safety. An introduction to the control theory for building systems is treated and exercised. The systems for heating, ventilation and cooling are covered, including the design of the required control circuits. The designs are tested by means of compact design assignments. Some state of the art concepts for sustainable buildings are explained and their use and limitations are discussed. For the aspect of active building safety sprinklers are treated.