Contents and composition

Just as elective package ‘Urban Systems & Real Estate 1’, this elective package focuses on the built environment and the people living in it. However, the USRE2 elective package concentrates on modelling and predicting effects of trends, developments, and changes in the urban system, which includes the built environment and the behaviour of individuals, households, and institutions in this environment.

Predicting the urban future is complicated. It needs modelling the urban environment and how people behave in the urban environment. Modelling the urban environment is the main subject of the first course. It is about storing, analysing and mapping spatial data and about representing the urban environment in 3D.

The course in mobility and logistics introduces the students into the transportation of people and goods. It considers people and goods moving from origins to destinations. Due to modern information and communication technologies, activities performed by persons and institutions will change, including the location of these activities. Changes in logistics and transportation technology will affect the transportation system as well.

New technologies will not only affect the transportation system, but the entire urban environment. Life in cities will change substantially. Aging, climate change and other developments will cause buildings, infrastructure, and public spaces to be used differently. Increasing need for energy neutral buildings and cities will change the city as well. This offers real challenges for urban planners, developers, and managers. Effects of various developments will be investigated by means of simulation in the Smart Cities project.

The courses prepare the student for the core program of Urban Systems & Real Estate and for the Masters’ program Construction Management and Engineering.
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**Preferred order**

It is preferred to take Geographic Modeling of the Built Environment (7U8X0) before the Smart Cities project (7M6X0)

**Description of courses**

7U8X0 Geographic Modeling of the Built Environment

*The core of this course consists of Geographic Information Systems (GIS) and 3D city models. Geographic Information Systems are used to store and prepare location related data, to create thematic maps, and to perform spatial analyses, for example, concerning the accessibility of service locations. 3D city models are used to analyse energy consumption, urban climate and real estate value, and for example for the simulation of evacuation of buildings and public areas in case of emergencies. Furthermore, 3D city models are used in architectural and urban design and planning projects. Software for GIS and Computer Aided Design (CAD) will be applied at different spatial scales.*

7W3X0 Mobility & Logistics

*This course is an introduction to the field of mobility and logistics. Basic concepts and state-of-the-art techniques to understand and model personal mobility are taught. Activity-based models, supernetwork models and discrete choice models are introduced by which travel flows and resulting mobility patterns can be modeled and predicted. Related mobility concepts are discussed and analyzed. Basic principles of logistics and transportation will be taught, and associated models will be presented. Students gain insight in supply chain and logistics modeling and learn about the basic principles of operational planning of freight transportation. The course will be concluded by applying an activity-based model to analyze new mobility concepts in a city region.*

7M6X0 Project Smart Cities

*The project starts by exploring trends possibly affecting the urban system including the use, the functioning, the management and the manifestation of the city. Amongst others, demographic (aging), technological (smart grids, social networks, telecommunication, remote sensing, etc.), climatic and societal (public security) trends will be dealt with. Some of these trends and their possible effects on (life in) cities have to be described. These trends will be used to generate a number of scenarios which will be explored given an existing or fictive urban environment by means of simulation software (Netlogo). Conclusions regarding future (smart) urban development will be drawn.*