# Course Catalogue Engineering and ICT

## EXCHANGE PROGRAMME

Future Cities 2025-2026

+ Circular Housing / Water Management

University of Applied Sciences Windesheim

| Course summary<br>VOE Code: BT.FC.V25 ECTS credits: 15 Level: Bachelor's degree (full-time) | |
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| **Course Title** | Future Cities |
| **Type** | Compulsory |
| **Learning competences** | |
| **Learning outcomes** | After this module you can work in multidisciplinary, international teams on integral solutions for urban challenges in 2050 regarding climate change, circular economy and population growth. You studied and designed future solutions that enhance the quality of life, cut cities' carbon emissions and build resilience to extreme weather. Next to that you enhanced your professional and cooperation skills by working in intercultural teams (discipline and nationality), by interacting with external stakeholders and by reflecting on your personal development. |
| **Course content** | **Courses**<br><br>**Kick off Future Cities**<br>Getting to know each other and kick off for the projects and courses in the module. Lectures, excursions, workshops and a welcome party.<br><br>**Project Future Cities**<br>You will work in an interdisciplinary team of international students on an integral design research for a city district in 2050. You research and design future solutions that enhance the quality of life, cut cities' carbon emissions and build resilience to extreme weather.<br><br>**Lectures & Field Trip**<br>In this course you will gain knowledge for your studio project by attending presentations of keynote speakers of different expertise. You will stay in a European city outside the Netherlands for a few days to understand, feel and experience such a particular city. We will visit interesting projects, exhibitions, etc. You will participate in organizing and preparing the field trip.<br><br>**Personal Leadership**<br>In this course you will be working on your soft skills, which will be crucial for your success in the workplace. You will learn to take the lead in your own development and you will receive tools for fruitful cooperation and communication with others. This will take place via (mandatory) interactive workshops which will encourage you to get out of your comfort zone now and then. You will round off this course by means of an assessment in which you will reflect on your own development. |
| **Planned learning activities and teaching methods** | (Guest) lectures, projectgroups, workshops, seminars, excursions, presentations.<br><br>The future is challenging the way we build our cities. In this module you will work in interdisciplinary teams on an integral design research for a city district in 2050. You research and design future solutions that enhance the quality of life, cut cities' carbon emissions and build resilience to extreme weather. You research critical infrastructure services like mobility, energy, food, water and waste and its impact on the urban structure and public space.<br><br>Guest speakers from the industry of smart mobility, alternative energy, waste flows, water management, smart cities, etcetera will share their knowledge and experience to support you in your project work. You will visit and investigate interesting projects on field trips in the Netherlands and abroad.<br><br>In this module you will work in an inspiring and challenging international environment. You will develop your skills in cross-cultural communication and teamwork through the course Intercultural Awareness. |
| **Recommended or required reading and other learning resources / tools** | A laptop as used during the study with the software which is used during the study (to fulfil the curriculum from Architecture/Civil Engineering/Spatial Planning or their 'own' study in their home country). |

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| **Prerequisites and co-requisites** | | | |
| **Level** | Advanced | | |
| **Grading scale** | 1 up to 10, 1 dec. | | |
| **Assessment methods and criteria** | **Type of assessment** | **Grade weighting** | **Criteria** |
| | Kick off week individual | 0.01 | Higher or equal to 5.5 |
| | Kick off week group | 0.07 | Higher or equal to 5.5 |
| | Lectures & Field trips | 0.35 | Higher or equal to 5.5 |
| | Project Future Cities individual | 0.05 | Higher or equal to 5.5 |
| | Project Future Cities group | 0.35 | Higher or equal to 5.5 |
| | Personal Leadership | 0.17 | Higher or equal to 5.5 |
| **Language of Instruction** | English | | |
| **Name of lecturer** | For information about the lecturers you can contact Micha van Boheemen | | |
| **Mode of delivery** | Face to face | | |

## Course summary

VOE Code: BT.CH.V25 ECTS credits: 15 Level: Bachelor's degree (full-ime)

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| **Course Title** | Circular Housing |
| **Type** | Optional |
| **Learning competences** | 1. Initiate (BK.1INIT)<br>2. Design (BK.2ONTW)<br>3. Specify (BK.3SPEC)<br>4. Realize (BK.4REAL)<br>5. Manage (BK.5BEHE)<br>6. Manage (BK.6MANA)<br>7. Research (BK.7ONDZ)<br>8. Communicate (BK.8COMM)<br>9. 9. Professionalize (BK.9PROF) |
| **Learning outcomes** | **B:**<br>You are able to perform a complete analysis based on a design assignment and arrive at a final design. By means of the well-founded vision/design principles, create an integral structural design and preliminary design and specify a final design. You work as an independent professional within a team in a professional environment, under the supervision of an experienced professional. The fully substantiated analysis document and fully substantiated structure/preliminary and final design serve as input for a technical design file (TO)<br><br>**E:**<br>You are able to methodically set up an advice/research trajectory and to carry out advice/research on a given socially and/or professionally relevant assignment according to methods of research. You work as an independent professional within a team in a professional environment, under the supervision of an experienced professional, resulting in a complete, reliable and sound research/advice report.<br><br>You do this at an average to high level. |
| **Course content** | The course contains an multidisciplinary project where you work in an international team of students. Individual and group tasks are combined in the following 4 assignments:<br><br><u>Research project 10%</u><br>In the introduction you will make a research in the topics of circularity, sustainability and regenerative design. This will be the starting point for the assignment. |

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| | Research implementation 10%<br>In this course you will gain knowledge for your studio project by attending presentations of keynote speakers on circular building and housing concepts. This includes topics such as circular construction and installation principles, nature inclusive and regenerative design, the use of circular and biodegradable building materials, shadow costs and residual value.<br>You will visit interesting projects and organizations during excursions in the Netherlands and possibly abroad. You will participate in organizing and preparing these excursions.<br><br>Project Design 50%<br>You will work in a multidisciplinary team of international students on a circular housing design. Your client is a housing corporation called Delta Wonen. Delta Wonen plays a key role in building affordable housing in the city of Zwolle. Their purpose is to construct a circular city district. Your task is to come up with concepts and ideas for circular housing. Be aware that your ideas may be implemented in the actual plans!<br>This studio project is at the heart of this programme. It is supported by complementary courses in which you will develop your creative and technical skills and knowledge on circular building and housing.<br><br>Project Technical implementation 30%<br>This course provides more detailed knowledge on sustainable and circular materials, constructions and MEP-equipment. You will find out what selection criteria are and how to apply them in a building according to the regulations.<br>As an engineer, you will need to develop buildings with circular aspects. One of the assignments is therefore to create reusable construction.<br>To gain insight in the circular, sustainable and regenerative aspect of your design you will also make measurements on the ambition for your design. Does it meet the Paris agreements, what is the CO2 production, what score do you achieve of circularity? The latest measuring aspects will be taught in this course and you will gain knowledge how to correctly implement the aspects.<br><br>Learning goals<br>• Able to work together in international teams<br>• Thinking outside the box and being creative<br>• Acquiring an investigative attitude (context, program, reference projects, possibilities, solutions, etc.)<br>• Developing new spatial strategies/concepts<br>• Translating a spatial strategy/concept into a spatial design<br>• Research current sustanable solutions<br>• The technical development of the design in relation to vision and concept |
| Planned learning activities and teaching methods | (Guest) lectures, projectgroups, workshops, seminars, excursions, presentations.<br><br>You research the current demands for sustainability and formulate a design ambition for an integral solution for the housing demand.<br><br>You use scientific insight from recent research on aspect of circular, regenerative and sustainable design solutions for the building industry (architectural and technical) in your design.<br><br>The implemented design solutions are related to the latest researches and are measurable according to these solutions. You evaluate your design through measurable criteria in relation to your initial design ambition and draw conclusions.<br><br>In an international team of student and individually, you work under supervision of an experienced teacher. In a highly complex situation where you enrich your research with excursions to progressieve companies.<br><br>Your design, architectural and technical aspects, meets the required sustainable solutions and you have proven your ambition with measurable aspects regarding your research. |

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| **Recommended or required reading and other learning resources / tools** | • A laptop as used during the study with the software which is used during the study (to fulfil the curriculum from Architecture/Civil Engineering/Spatial Planning or their 'own' study in their home country).<br>• - E-Learning environment. | | |
| **Prerequisites and co-requisites** | You are required to have two years of Bachelor's study experience in Architecture/ Architectural Engineering, Civil Engineering, Spatial Planning & Traffic Engineering or a similar course and English-language skills at B2 level. | | |
| **Level** | Advanced | | |
| **Grading scale** | 1 up to 10, 1 dec. | | |
| **Assessment methods and criteria** | **Type of assessment** | **Grade weighting** | **Criteria** |
| | 1.Research project (individual) | 0.1 | Higher or equal to 5.5 |
| | 2.Research implementation (individual) | 0.0 | Higher or equal to 5.5 is sufficient **(sufficient/not sufficient)** |
| | 3.Design Project (group) | 0.55 | Higher or equal to 5.5 |
| | 4.Project Technical implementation (individual) | 0.35 | Higher or equal to 5.5 |
| **Language of Instruction** | English | | |
| **Name of lecturer** | For information about the lecturers you can contact Micha van Boheemen | | |
| **Mode of delivery** | Face to face | | |

## Course summary

VOE Code: BT.WM.V25 ECTS credits: 15 Level: Bachelor's degree (full-time)

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| **Course Title** | Water Management |
| **Type** | Optional |
| **Learning competences** | |
| **Learning outcomes** | You work on a water management project and translate complex challenges into a professional advisory or design report. You apply hydrological and geohydrological principles in modeling and analyzing water flows. You develop and implement hydraulic models for water management and integrate them into future-proof strategies. Additionally, you apply Nature-Based Solutions and adaptive design methods to create sustainable and resilient water management solutions. You reflect on your professional development and contribute to innovative, interdisciplinary water management approaches. |
| **Course content** | **Water management Project and Professional development**<br>This topic provides an overview of key water management challenges, including climate change, land use, and sustainable development goals (SDGs). Students work in teams on complex international projects addressing drought and/or flooding issues. Deliverables include a report and presentation, emphasizing collaboration and professional communication.<br><br>**Physical hydrology and modelling**<br>This topic consists of two components. Geohydrology & hydrology introduces the principles of physical hydrology, covering atmospheric, surface, soil, and groundwater dynamics. Students engage in numerous practical exercises, applying theoretical concepts to real-world scenarios. Advanced water management (modelling) focuses on computational modelling for surface- and groundwater systems. Participants learn 1D-flow modelling and basin runoff analysis, effectively integrating soil and surface water data for comprehensive assessments.<br><br>**Futureproof watermanagement**<br>This topic emphasizes sustainable and adaptive strategies for water management. Nature-based Solutions explores engineering approaches inspired by natural processes, addressing challenges like flood prevention, drought mitigation, and water quality improvement, while highlighting sustainability and ecosystem benefits. Scenarios and |

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| | adaptive design focuses on designing flexible strategies for uncertain future conditions, teaching students to account for climate change and evolving societal needs in their solutions. | | |
| **Planned learning activities and teaching methods** | Lectures, projectwork and project assistance | | |
| **Recommended or required reading and other learning resources / tools** | | | |
| **Prerequisites and co-requisites** | | | |
| **Level** | Advanced | | |
| **Grading scale** | 1 up to 10, 1 dec. | | |
| **Assessment methods and criteria** | **Type of assessment** | **Grade weighting** | **Criteria** |
| | WM-Project | 0.35 | Higher or equal to 5.5 |
| | WM-Nature based Solutions | 0.2 | Higher or equal to 5.5 |
| | WM-Advanced Watermanagement | 0.2 | Higher or equal to 5.5 |
| | WM-(Geo-)hydrology | 0.25 | Higher or equal to 5.5 |
| **Language of Instruction** | English | | |
| **Name of lecturer** | For information about the lecturers you can contact Micha van Boheemen | | |
| **Mode of delivery** | Face to face | | |