R4.2c U-CARE Teaching and training materials #3
Service management for construction and facilities

WP4 U-CARE Learning Modules and the Academic Implementation

Partners: UCY, Chalmers
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Executive Summary

This document presents the interim Result 4.2c, which includes the syllabus, didactic material and open educational resources for teaching pilot course 3b at the Chalmers University of Technology in the autumn semester of 2025.

The document is divided into three sections:

1. Introduction
2. Syllabus
3. Annex

The Introduction provides an overview of the document and its contents. The Syllabus lists the teaching sessions of the U-CARE Pilot Course 3b, hosted by Chalmers University of Technology as part of the Masters program Design and Construction Project Management. The annex contains all the one-page summaries of each lecture and the course bibliography.

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1. Introduction

This document provides a structured overview of Chalmers Pilot Course 3b. The U-CARE Pilot courses translate UrbanCare's core research topics and its five areas of application (developed as part of the project's WP2) into practical training modules. All of the relevant materials needed for delivering Pilot Course 3b are developed as part of the project's work package 4, activity 4.2. Starting from the knowledge acquired in WP2 (dedicated to the knowledge transfer of UrbanCare's Methodology to HEI partners and applying it to four real case studies in different European cities) the pilot courses aim to create evidence-based design research and practice learning modules that tackle 'real-world' impacts in the fight against the global climate and health crises effectively by equipping students with practical skills in urban health design, environmental assessment, and data management, bridging the gap between research and real-world impact in urban health and climate resilience.

Prior to the implementation of Pilot 3b, a 'testing ground' course (Pilot 3a) was established at Chalmers University of Technology in the fall of 2024. This initial iteration served as the interface between knowledge transfer and the pilot courses, tailoring the lectures on shared concepts for Pilots 1 and 2, and refining Pilot 3 for a second iteration, Pilot 3b, at the same institution, which emphasised financial aspects and the development of management skills.

Pilot Course 3b ran as part of an existing course: IBY015, under the name Service Management for Construction and Facilities, as part of the Masters program Design and Construction Project Management.

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2. Course Description

Pilot Course 3b, Service management for construction and facilities, provided an introduction to the principles of specifying and producing services, focusing on construction and facilities-related services, such as Facilities Management (FM). It approaches the built environment from a service perspective, considering buildings and urban spaces as resources that enable and support broader functions and services. This perspective is particularly relevant to the management and operation of the built environment, where the performance of buildings and spaces depends on the services and activities they enable, in addition to their physical characteristics.

The course further considers the built environment as an important prerequisite for sustainable development. Within this framework, an additional perspective on how the design and management of urban environments can contribute to public health and environmental sustainability is introduced. The course therefore combines an introduction to service-oriented approaches to the built environment with practical approaches to understanding urban environmental conditions. Students are encouraged to connect the production and management of built assets with the wider implications of these environments.

The course focused on four pillars of urban health: walkability and spatial equity, urban heat mitigation, stormwater management, and biotope preservation. Its approaches to each category respectively are summarised as:

- Enhance integrated active travel: how walkable environments influence health.
- Provide shade to save energy: understanding the urban heat island effect and its impacts on the health of vulnerable groups.
- Unseal to implement water-sensitive plans: the health risks associated with unmanaged stormwater, impacts on flooding and public health.
- Greenify for rich biodiversity: how the loss of natural habitats affects health.

As part of the course, students engaged in a learning module titled UrbanCare, consisting of four sessions outlining the UrbanCare approach, designed to teach data-driven processes and urban planning and design strategies that directly address health and climate outcomes. The module was structured as a combination of four input lectures along with practical tasks, ensuring that participants learn how to leverage data and research to inform their planning and design decisions. The input lectures guided the students in analyzing and interpreting data to develop effective strategies for improving public health and mitigating climate impacts in urban

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environments, developing a sustainable and social FM approach relevant for real estate owners, public as well as private, under the changing environmental conditions.

Students applied the information and data from the input lectures to the course's group assignment, which focused on creating guidelines to develop facilities that prioritize the spatial requirements for mobility needs of vulnerable groups. Through hands-on tasks focusing on real-world urban challenges such as walkability, urban heat, stormwater runoff, and biotope loss, key issues were addressed. The solutions developed by the students were a combination of data-driven insights and practical application.

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3. Syllabus

#	Title	Content	Date	Lecturers
1	Course Introduction	Welcome session. Introduction to the course. Introduction to UrbanCare framework	3 Nov	Göran Lindahl (Chalmers) Alavaro Valera Sosa (BHL)
2	Services and Real Estate	The lecture aims to introduce the students to a service perspective in order for them to start viewing assets as service not as a commodity. It furthermore brings in the servitization approach and how that affects private and public services. The key model is service logic.	4 Nov	Markus Fellesson (Karlstad University)
3	Value Creation, Service Systems and Servicescapes	To introduce and develop the understanding processes of value creation. Value creation is the process of turning basic inputs into products, services, or experiences that have a higher worth for customers and stakeholders and is based on core concepts and strategies.	6 Nov	Markus Fellesson (Karlstad University)
4	Servitization and Value Co-creation in Service Eco-systems	To introduce that the real estate industry is evolving, it integrates service offerings and investors and owners aims to differentiate their portfolios and increase asset value by adding value creating functions and aspects.	17 Nov	Markus Fellesson (Karlstad University)
5	Sustainable FM – the Example of Housing Properties in Sweden	Sustainable Facilities Management (SFM) is the practice of running, cleaning, and maintaining buildings to lower environmental harm, reduce waste, and save money over time. This also includes social FM, environmental FM. The definitions of eco-friendly, property and facility are core topics.	18 Nov	Daniella Troje (Chalmers)
6	Value from Walkability	Series of lectures introducing the U-CARE approach and platform.	24 Nov	Alvaro Valera Sosa (BHL)
7	Value from Reducing Urban Heat	Series of lectures introducing the U-CARE approach and platform.	14 Nov	Alvaro Valera Sosa (BHL)
8	Value from Cutting Stormwater Runoff	Series of lectures introducing the U-CARE approach and platform.	10 Nov	Alvaro Valera Sosa (BHL)

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#	Title	Content	Date	Lecturers
9	Value from Restoring Biotope Loss	Series of lectures introducing the U-CARE approach and platform.	21 Nov	Alvaro Valera Sosa (BHL)

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4. Assessment criteria

Chalmers' students were required to frame the U-Care approach in the context of real-estate development applying a multi method approach ranging from structured study visits to literature studies and application of studied models. The course included project work, presentations, reports, literature seminars, and a written exam.

Examination is based on the following:

- Active participation at lectures. Compulsory and graded fail/pass
- Project work/group assignment. Compulsory and graded fail/pass.
- Participation in a literature workshop. Compulsory and graded fail/pass.
- Written home exam, essay style, based on course literature and lectures. Out of 40p maximum, 20p is needed to pass, 30p equals grade 4 and 36p equals grade 5.

Grades for the course are: Fail (U), 3, 4 and 5.

The 25 students of Pilot 3b performed well, with an average of 3,88 on the 3-5 scale.

Expected Learning Outcomes

An extended repertoire of the student's capability to deal with urban planning challenges against a backdrop of a changing climate as described below:

- Understand the importance of climate effects on urban areas, utilising microclimate aspects and effects of these
- Describe and understand relationships between different drivers for the integration of climate and sustainability aspects with business drivers in real-estate.
- Learn to address drivers and develop them in projects and ecosystems
- Apply systems thinking to develop conceptual design for urban areas/districts

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5. ANNEX: Part 2
Lectures' Summaries

This section outlines the sessions included in the U-CARE Chalmers Pilot Course 3b. The lectures which include lecture summaries below are highlighted in bold; the remaining activities are practical or purely informational (e.g., course introduction).

1. Course Introduction
2. **Services and Real Estate**
3. **Value Creation, Service Systems and Servicescapes**
4. **Servitization and Value Co-creation in Service Eco-systems**
5. **Sustainable FM – the Example of Housing Properties in Sweden**
6. **Value from Walkability**
7. **Value from Reducing Urban Heat**
8. **Value from Cutting Stormwater Runoff**
9. **Value from Restoring Biotope Loss**

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Services and Real Estate

Lecturer: Markus Fellesson
Affiliation: Karlstad University

Objective

The lecture aims to introduce the students to a service perspective in order for them to start viewing assets as service not as a commodity. It furthermore brings in the servitization approach and how that affects private and public services. The key model is service logic.

Content

A service perspective views business and value creation through customer relationships, active interactions, and shared processes rather than just physical goods and this can be described applying a service logic. The lecture brings in perspectives like:
- Customer Perspective: Focuses on the customer as the central point, where value is co-created through active participation.
- Management and operations Perspective: Looks at organizations' systems, resource allocation, and service design to ensure reliable, high-quality delivery.
- Employee Perspective which highlights the frontline staff who shape the interaction patterns and drive customer satisfaction through building relationships.

The Service-Dominant Logic is introduced as a key to the Treats all economic exchange as service-oriented, meaning that physical products, real estate and urban environments in particular, can be seen as tools to deliver a service or benefit.

U-CARE relevance

Addressing real estate as being a part of the environmental challenges urban environments face.

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Value Creation, Service Systems and Servicescapes

Lecturer: Markus Fellesson
Affiliation: Karlstad University

Objective

To introduce and develop the understanding processes of value creation.

Content

Value creation is the process of turning basic inputs into products, services, or experiences that have a higher worth for customers and stakeholders and is based on core concepts and strategies.

Core Concepts introduced in the lecture are:
- Tangible and Intangible Value, the whats is in it for me/the customer approach. Value can be physical goods like cars or digital and service-based assets like software, patents, and brand reputation.
- The Value Stick, a business approach. Business success depends on the gap between customer willingness to pay (WTP) and a company's willingness to sell (WTS). You create competitive advantage by raising WTP or lowering WTS.

Strategies to achieve the service development are listed as:
- Innovation: Build new features or unique problem-solving methods to meet unmet client needs. Where the challenge is that the environment has a multi-user dimension.
- Operational Efficiency: Streamline internal workflows, reduce waste, and manage supply chains to cut costs. This concerns also our public realm.
- Customer Focus: Personalize experiences and improve customer journeys to build long-term brand loyalty, and how to apply this thinking on our urban environments.

Introduction of the concept of service-scape as he physical and digital environment where a service takes place and where customers and employees interact, more so in the urban environment where not always direct customer relationships exist. The concept was introduced in 1990 to explain how surroundings shape human behavior.

Key Dimensions of service-scape, the framework divides the environment into three main parts:
- Ambient conditions: The background traits like temperature, lighting, noise, music, and scent.

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- Spatial layout and functionality: How equipment and furniture are arranged and whether the space works well.
- Signs, symbols, and artifacts: The visual cues, logos, and decor that communicate messages to people.

How It Affects People

The environment creates three types of internal responses:

- Cognitive: What people think and believe about the service provided and its "sender"
- Emotional: How the space makes people feel, such as engaged, happy or relaxed
- Physiological: Physical comfort or discomfort in the space/room/environment

U-CARE relevance

The urban environment is a service scape, which is exposed to environmental challenges.

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Servitization and Value Co-creation in Service Eco-systems

Lecturer: Markus Fellesson
Affiliation: Karlstad University

Objective

To introduce that the real estate industry is evolving, it integrates service offerings and investors and owners aims to differentiate their portfolios and increase asset value by adding value creating functions and aspects.

Content

The focus is on economic value and how businesses move from delivering basic products, as “commodities” to packaging and branding goods, to providing services, and how this can increase perceived value and therefore, profitability. In the Real Estate sector, this shift could imply moving from simply selling square meters to offering branded buildings/communities/precincts and even further by extending value by selling services and experiences that align with buyers/residents' lifestyles. Studies in urban development highlight that well-integrated services—ranging from community amenities to concierge services—can increase a property’s valuation and make it more attractive as well as contributing to sustainable environmental development.

Well-integrated services also add functional value and enhance the overall perception of the property. Adding elements like social activities, stores, environmental settings and considerations and high-quality neighbours elevates the image of the property and can significantly boost demand. All such entities will contribute to the real estate “Eco System”.

Significant challenges when introducing services due to differences in operational structures and team purposes and mindsets needs to be addressed which brings the lecture into organizational issues and cooperation with the surroundings, practically and administratively.

U-CARE relevance

The lecture brings in the environmental context in real estate development and businesses.

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Sustainable FM – the Example of Housing Properties in Sweden

Lecturer: Daniella Troje
Affiliation: Chalmers University of Technology

Objective

To highlight the long term perspective on real estate not only as a financial asset.

Content

Sustainable Facilities Management (SFM) is the practice of running, cleaning, and maintaining buildings to lower environmental harm, reduce waste, and save money over time. This also includes social FM, environmental FM. The definitions opf eco-friendly, property and facility are core topics.

The lecture also aims to connect strategic FM with tactical and operational FM and how decisions on one level affect the others. With an eco-systems perspective also the environmental impact aspects are highlighted.

U-CARE relevance

To include the long-term planning for and running of facilities as a key topic in long term environmental consideration and mitigation.

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Value from Walkability

Lecturer: Alvaro Valera Sosa
Affiliation: Building Health Lab

Objective

To introduce the U-Care approach and platform.

Content

Walkability

Scientific problem assessment

- Quantitative research methods and tools: Metrics for measuring walkability and its effects.
- Qualitative methods and tools: Understanding user experiences and behavioral aspects of walkability.

Evidence-based solution approach

- Public Health Perspective: The role of walkability in reducing accidents, contagious and non-contagious diseases and promoting active lifestyles.
- Climate Perspective: How walkable environments contribute to reducing carbon emissions.
- Economic Perspective: The economic benefits of promoting walkability.

U-CARE relevance

Directly relevant to U-CARE project approach and methods.

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Value from Reducing Urban Heat

Lecturer: Alvaro Valera Sosa
Affiliation: Building Health Lab

Objective

To introduce the U-Care approach and platform.

Content

Urban Heat

Scientific problem assessment

- Quantitative research methods and tools: Thermographic surveys and Data-driven analysis of temperature variations and heat exposure.
- Qualitative research methods and tools: Assessing community experiences and perceptions of urban heat.

Evidence-based solution approach

- Public Health Perspective: Mitigating heat-related health issues like heat strokes and respiratory problems.
- Climate Perspective: Addressing urban heat as part of climate resilience strategies.
- Economic Perspective: Cost savings reducing the burden on healthcare systems.

U-CARE relevance

Directly relevant to U-CARE project approach and methods.

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Value from Cutting Stormwater Runoff

Lecturer: Alvaro Valera Sosa
Affiliation: Building Health Lab

Objective

To introduce the U-Care approach and platform.

Content

Stormwater Runoff

Scientific problem assessment

- Quantitative research methods and tools: Characterizing and analyzing water flow patterns, runoff volumes, and drought severity, as well as the permeability and material properties of urban surfaces. These analyses help in understanding water management challenges, including stormwater infiltration, drainage efficiency, and the role of urban materials in mitigating flooding and drought in urban environments.
- Qualitative research methods and tools: Gathering insights on how communities experience and cope with issues such as flooding, drought, and access to clean water. Understanding social and behavioral responses to water management policies.

Evidence-based solution approach

- Public Health Perspective: Reducing waterborne diseases and safeguarding drinking water supplies.
- Climate Perspective: Addressing stormwater as part of broader water-sensitive urban design.
- Economic Perspective: The financial benefits of sustainable water management and reduced infrastructure damage.

U-CARE relevance

Directly relevant to U-CARE project approach and methods.

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U-Care

Value from Restoring Biotope Loss

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Affiliation: Building Health Lab

Objective

To introduce the U-Care approach and platform.

Content

Biotope Loss

Scientific problem assessment

- Quantitative research methods and tools: Measuring biotope area factors in urban areas. Structures to assess biodiversity levels and habitat quality.
- Qualitative research methods and tools: Community perceptions of biotope conservation and health.

Evidence-based solution approach

- Public Health Perspective: The connection between biodiversity, mental health, and ecosystem services.
- Climate Perspective: Decarbonization vs. Carbon Sequestration—balancing climate mitigation strategies with biodiversity conservation.
- Economic Perspective: The economic benefits of biodiversity, including ecosystem services, energy optimization with passive cooling, and increased property values.

U-CARE relevance

Directly relevant to U-CARE project approach and methods.

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