CDE4501A Topics in Challenges of Cities: Water and Greenery – Important Game Changers for Climate Resilience and Liveable Cities

Course Overview:

How can cities become healthier, more liveable and more climate resilient? This course aims to explore and develop innovative nature-based solutions, such as multifunctional green spaces and better integrated water management to tackle urban environmental and climate challenges.

Urban regions are under increasing pressure from climate crisis, population growth, traffic congestion, sea level rise, limited green spaces and lack of beauty. In this course, we will use real-world examples from Singapore to develop solutions and learn how to implement them sustainably in both policy and practice.

The site is located in the context of Sembawang/Simpang, a northern region of Singapore known for its unique urban landscape, waterways, park connectors, industrial development, shipyard, beaches and remaining green spaces with rich biodiversity. For a long time, this northern area was somewhat off the beaten track. However, this is changing as the region is becoming increasingly attractive and is now seen as having significant future potential for new developments and activities.

Change is already in full swing, but significant groundwork can be established for ecologically and economically sustainable concepts, socially acceptable and liveable projects for a contemporary –future-oriented city in nature.

Therefore, it serves as an ideal example and field of experimentation for students interested in exploring and experimenting with new and fresh ideas. The learning impact, particularly in urban redevelopment, occurring in numerous urban regions and cities, is substantial, allowing students to later apply the models and methods they have learned in other regions/places.

This task requires interdisciplinary collaboration, involving individuals from various disciplines and professions working together to find new ideas. While this can be challenging, diversity presents the opportunity for innovation and the development of meaningful, effective, and practical solutions.

The project intentionally targets various disciplines. In addition to students specializing in urban planning, architecture, landscape architecture, and infrastructure technology, students from economics and political science are also encouraged to participate.

The challenges our cities face both now and in the future are vast, demanding creative and often unconventional ideas and solutions. In this module, we will therefore engage in artistic exercises and practical experiments with water flows to integrate innovative approaches to fluid thinking.

In addition to the classic planning tools such as schematic design and detailed design, exercises in this module will incorporate stakeholder involvement, interest groups, and citizen participation, including role-playing activities.

Specially curated lectures by professors and invited experts from the field, site excursions and group work will shed light on the various aspects. Ultimately, individual projects will be developed and presented within group settings. Participants will practice professional skills such as presenting their idea in the best possible way to their "future clients" and moderate planning processes during these activities.

In summary, students are equipped to effectively carry out development, planning, and decision-making processes aimed at fostering environmentally friendly and liveable urban development. They will delve deeply into urban sustainability, environmental resilience, and climate adaptation strategies through the lens of nature-based innovations.

Course Learning Objectives:

- Recognise the importance and influence of blue (water) and green (vegetation) in nature and urban spaces
- Understand the basic principles of urban environmental issues, the facts of the increasing climate crisis and its stressors on our society, economy and biodiversity
- Analyze the specific urban and ecological development in the context of Sembawang, Singapore, in their past, present and future
- Investigate nature-based solutions (NbS) and their application in the urban environment for the two designated areas (A & B)
- Develop innovative concepts and strategies within a given terrain that incorporate NbS to improve urban resilience and sustainability on a theoretical and practical level
- Promote and develop skills for interdisciplinary collaboration and critical thinking to tackle complex urban challenges
- Learn methods for policymaking and economic implementation involving active participation from key stakeholders in municipal organizations, the public and private sectors, and the community.
- Discernment of what is relevant in planning processes, identifying relevant arguments and necessary partners, and considering sustainability during implementation, operation, and maintenance phases.

Course Leaders:

Herbert Dreiseitl – Visiting Professor, NUS Cities; Founder and CEO of DREISEITLconsulting
Veera Sekaran – Professor, Office of the President, NUS; Founder of Greenology

Teaching Assistant

Lana Allen – Associate (Teaching Assistant), NUS Cities (lana.allen@nus.edu.sg)

Course Schedule

Lecture Venue: SDE1-LT427 | **Studio Venue:** SDE1-LT427

Time: Every Wednesday, 9:00am – 12:00pm

Date	Schedule
Week 1 14 August	**Course Introduction** Introduction to Future Nature-Based Innovation and Course
Week 2 21 August	• **Lecture 1** Water and Greenery - Important Game Changers for Climate Resilience and Liveable Cities, Part 1 | Status Quo
Week 3 28 August	**Lecture 2 and Panel Discussion** Basics on Challenges of Cities: Future Nature-based Urban Innovations – Part 2, What urbanism signifies today and in the future? Guest Lecture: Discovering Waterways and Planning for the Future
Week 4 4 September	**Field Trip** Walking tour with URA to visit Sembawang & Simpang
Week 5 11 September	**Studio** Field Trip Reflection Roundtable and Preliminary Proposal Development
Week 6 18 September	**Lecture 4 & Studio Work** Introduction to Urban Greening Guest Lecture on Sembawang Heritage Studio Work
Week 7 2 October	**Lecture 5 & Studio Work** Lecture on Urban Greening Guest Lecture on Sembawang Heritage Studio Work
Week 8 9 October	**Lecture 6 and Panel Discussion** Guest Lecture on past-present-future landscape planning for HDB Towns and if possible Sembawang/Simpang area
Week 9 16 October	**Lecture 6 & Demonstration** Water Experiment Demonstration Guest Lecture: Climate Adaptation, Sustainable Development and Water Resilience
Week 10 23 October	**Lecture 7 and Panel Discussion** Guest Lecture on forest ecology and conservation
Week 11 30 October	**Lecture 8 and Panel Discussion** Guest Lectures on Long Term Policymaking and Vision Plan Reflection Exercise
Week 12 6 November	**Studio** Studio Work & Consultations
Week 13 13 November	**Studio** Final Presentations

Last updated on 23 July 2024.

Studio Project

Sembawang – Simpang

Tucked away on Singapore's northeastern coast, Sembawang (12.34 km²) and Simpang (5.13 km²), are two distinct yet interconnected regions. Sembawang was once characterised by rubber plantations and a bustling, British naval base, later converted to a commercial dockyard. Today, it has transformed into a residential suburb as a New Town development, known for its rich historical heritage and tranquil suburban charm, offering a unique blend of residential, recreational, and industrial zones. Over the years, the waterways and parks have been transformed into recreational spaces with increasing connectivity to neighbourhoods and green spaces through networks such as public transport or Park Connector Network (PCN). Sembawang remains a bustling port steeped in deep marine history and with its lush greenery, waterfront parks, and heritage nodes, it provides a serene environment that contrasts with the bustling cityscape of Singapore.

Simpang, located adjacent to Sembawang, is envisioned as a future development area with plans for significant urban transformation, however, plans for Simpang still remain uncertain. However, it has been used as a military training ground since 1996 by the Singapore Armed Forces. This precious spot is one of the few remaining coastal habitats in Singapore, renowned for its rich tapestry of life. From fertile soils to diverse ecosystems like mangroves, shrublands, intertidal zones, and secondary forests, Simpang offers a haven for a variety of biodiversity ecosystems to thrive.

The site plays an important role in conjunction with Singapore's upcoming/ongoing North-South Corridor (NSC) and Recreational Master Plan as part of the state Draft Master Plan 2025. Change is already in full swing, but significant groundwork can be established for ecologically and economically sustainable concepts, socially acceptable and liveable projects for a contemporary–future-oriented city in nature.

Project Objectives

This project will delve into the current state and future potential of these areas, providing an opportunity for students to apply concepts, strategies and principles in a real-world context. They will explore how Sembawang's heritage and natural beauty could be preserved and enhanced, while also contributing to the forward-thinking development of Sembawang – Simpang.

This project aims to understand the collaborative processes needed to transform current or future urban infrastructure into regenerative systems. It emphasises the importance of considering diverse stakeholders, including citizens, residents, owners, designers, and developers, in the decision-making and planning processes.

Students will gain insights into the complexities of landscape architecture, regenerative urban planning and design, and develop innovative solutions that respect the current site while embracing the future.

We understand that not all students come from a design background, thus this project seeks to elucidate the value proposition of concepts and principles of the course in application to familiar sites.

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Transforming urban infrastructure into regenerative systems requires an integrated approach that involves coordinated action between various stakeholders of users, owners, designers and developers.

Feel free to incorporate these perspectives into the overall narrative of the presentation and proposals. The inclusion of the evaluation of in-depth techniques, strategies, economic analysis, etc. are not mandatory as we strive to understand teams' thought process, analysis, implementation, and ideas.

Course Assessment

- Tutorial Attendance – 10 %
- Personal Reflection – 10%
- Field Trip Reflection– 20%
- Project – 60%
    - Individual Presentations and Report - 30%
    - Group Presentations – 30%