Norman Foster Institute
on Sustainable Cities

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Programme on Sustainable Cities

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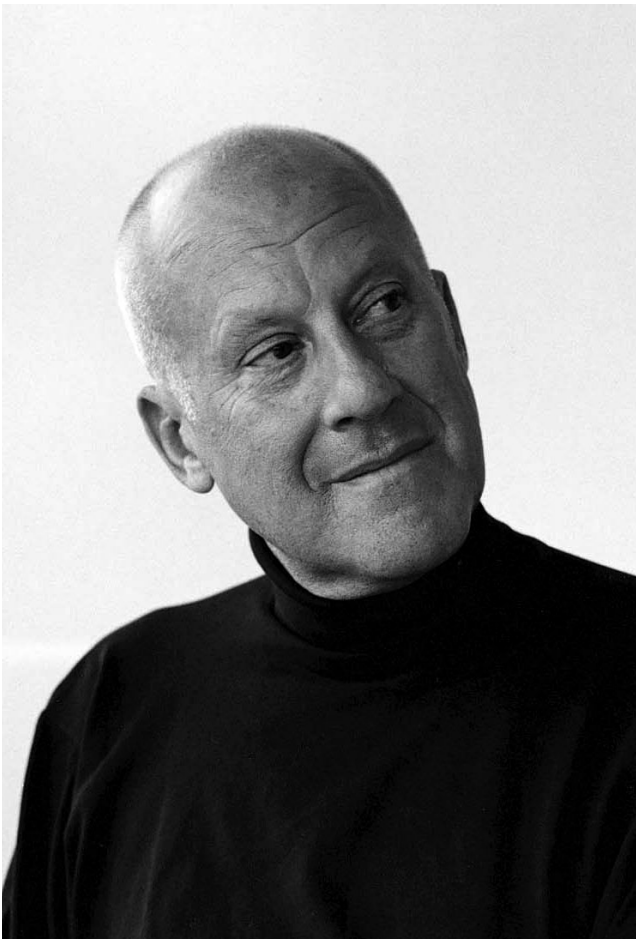
Norman Foster Institute (NFI)



Norman Foster
President of the Norman Foster Foundation

The recurring theme that those who have experienced the Master's course in Sustainable Cities mention is its unique fusion of academia and the experience of working in a city on live projects. Add to this the learning of digital tools to analyse and explore decision making in the civic realm and it explains why so many have described the course as 'life-changing'.

For 2026, our third year of the Master's Programme, we continue to offer the mainstream version, which is now described as the City Science Spesialisation and will be led by Dr. Gareth Simons and myself. We are, however, introducing two additional variants as specialities, namely Urban Design and Architecture. In both cases, the participants will share the core, which is the first two-thirds of the programme, although the two new disciplines will also be woven into this fundamental phase to the benefit of all.

The final third of the course will be fully devoted to the specialities of City Science, Urban Design or Architecture. Each group will engage with one of three cities.

Why Urban Design and Architecture? First, the success of the courses so far, co-directed by Kent Larson of the Massachusetts Institute of Technology (MIT) and myself, has encouraged us to expand the scope and offerings of the Master's programme. Secondly, we can see a need to address these disciplines in a different and more practical way than conventional academic courses.

Urban design has been a neglected discipline and is frequently confused with urban planning, which is completely different. It is the conscious creation of outdoor urban spaces ranging from piazzas and squares to streets and boulevards. As a part of civic infrastructure, these spaces are the urban glue which binds together the individual buildings of a village, town or city. They determine the identity or DNA of a place, whether it is beautiful or ugly, compact or sprawling, walkable or drivable, and whether it has a low or high carbon footprint.

The urban design part of the course will be led by Vishaan Chakrabarti and myself. I have known Vishaan for several decades and have admired and supported his work as an urbanist, including his most recent book *The Architecture of Urbanity*.

Architecture is conventionally taught as the art of individual buildings and rarely in the civic context. This course offers a rare opportunity to design as a response to the real-life needs of a city, to work with those who commission and, finally, to present to them directly. This course will be led by Frédéric Migayrou and myself. I have worked with Frédéric over the past years on the basis for this course as well as co-curating with him the show of my work at the Centre Pompidou in Paris, where he was responsible for the collections of architecture and design. He was also Chair and Professor of Architecture at the Bartlett School of Architecture at University College London (UCL).

We look forward to welcoming you.

Vision Statement

Norman Foster and Kent Larson
NFI Master's Programme on Sustainable Cities Co-Directors

What are the challenges?

The planet and human societies are undergoing seismic Diagnosis, fuelled by the escalating threats of global warming, pervasive inequity, dwindling resources and rapidly changing economic conditions. Meeting these challenges requires a new model for cities.

What are the responses?

Cities must be at the centre of solutions to the most urgent problems facing our society, they are responsible for 90% of global wealth creation, 90% of population growth and 70% of global CO_2 emissions. The most recent Intergovernmental Panel on Climate Change (IPCC) report makes clear that developing urban transformation is key to addressing global warming:

> *How cities and towns are designed, constructed, managed, and powered will lock-in behaviour, lifestyles, and future urban GHG emissions.*

Climate scientists have established 2.5 tons of CO_2 /person/year as the global limit to have an 80% chance of limiting global warming to 2°C. While many cities in the global south have much lower emissions, cities in the developed world typically emit between 4 and 10 times this amount. Creating a new model for cities that helps achieve this ambitious goal while improving social and economic performance is the grand challenge of our era. Current practices in urban design, technology implementation and policymaking are not responding to this challenge.

What are the challenges for students?

In this course, students begin by reviewing the current environmental, social and economic conditions of their case-study community. They are challenged to identify the design, technology and public policies that can improve this performance, including the reduction of CO_2 emissions per person, and the increase in the quality of urban life, innovation potential, public health and other key issues.

What are the goals and aspirations?

The Programme on Sustainable Cities is based on the premise that the planet is becoming a network of cities, and the most successful cities will evolve into more liveable, entrepreneurial and resource-efficient communities:

Urban Programming and Design

- **Dense Compact Cities**. Compact cities are the most sustainable model in terms of energy consumption and carbon footprint compared to the auto-centric sprawling metropolis. They are also consistently rated, in terms of quality of life, as the most desirable places to live, work and visit.

- **Civic Core**. Successful cities and their network of neighbourhoods have civic cores, establishing their identity in terms of unique places, experiences, enterprises and cultural opportunities. These and other features collectively determine each place's characteristic DNA, which can be preserved and enhanced through well-considered design and planning.

- **Public Transit**. High-quality public transit is essential to link the networks of neighbourhoods comprising future cities. There is a strategic opportunity to explore public and private transportation opportunities such as emerging mass transit technologies ranging from bus rapid transit systems to platooned autonomous shuttles.

- **Live–Work Proximity**. Urban housing should be matched to jobs and available within convenient walking, active transport or public transportation commutes. The potential for achieving a live-work land-use balance should be assessed, given local constraints and opportunities, to understand how decreased car dependency could improve public health, access to equitable opportunities and the 24/7 exchange of ideas.

- **Proximity to Amenities**. Ideally, all of the amenities needed to support daily life should be within a 5–15-minute walk from places of living such as daily shopping, schools, healthcare, eating establishments, entertainment venues and cultural endeavours. Access to key amenities should be considered in the local context with the aim of reducing the need for mechanised transportation.

- **Proximity to Nature**. Living and workplaces should have access to green spaces. Preserving local ecosystems reinforces biodiversity, bolsters urban resilience and contributes to crucial environmental processes such as air purification and temperature regulation. The benefits ripple outwards, enriching the city's vitality while fostering active lifestyles, well-being and sustainability. Strategic environmental policies oriented to the application of pocket parks, green corridors and tree canopies can provide access to greenery without undermining population density or access to amenities.

- **Hyper-efficient Housing**. Providing high-quality, affordable housing matched to the needs of young professionals, the workforce, families, and others not served by the market is a high priority in many cities. Reducing the area required for new urban housing may be one effective strategy to reduce housing costs. New housing strategies can be explored, including architectural robotics for the dynamic transformation of space (i.e., from living to sleeping to socialising to working to exercising), which may increase affordability and reduce embodied and operational energy per person while increasing liveability and functionality.

- **High-performance Buildings**. Buildings are a significant proportion of a city's total emissions due to the energy consumed for heating, cooling, lighting and other building operations. Deep retrofitting of existing buildings and high-performance new buildings can help to reduce emissions while taking embodied energy and operational energy into account.

- **Lightweight Community-Scale Mobility**. In compact, walkable communities with live-work harmony and proximity to amenities, there is less need for local use of conventional automobiles, which are already in a state of transition. The many possible urban mobility modes can be re-evaluated in the context of different types of trips, including the use of cycling and ultra-light autonomous mobility-on-demand systems to improve service levels while reducing emissions.

Utilities and Production

- **High-Density Distributed Energy**. Fossil fuels can be offset with locally-produced distributed alternatives such as solar, wind and nuclear batteries; options include community-scale microgrids, energy storage systems and 'fusion-ready' cities.

- **Water and Sanitation**. The transition from centralised infrastructure to distributed sanitation and local production of clean water can reduce emissions in future cities. Water governance and management are key to the sustainable development of cities. These solutions may be particularly impactful for informal settlements in the Global South.

- **Food Production Near Consumption.** Industrialised agriculture has been extraordinarily effective at feeding the 8 billion people on the planet but could be combined with local production of certain high-value perishable food in or near cities. This would reduce emissions and improve the resilience of food supplies.

- **Goods Produced Near Consumption.** The COVID-19 pandemic revealed the fragility of global supply chains. Clean just-in-time manufacturing, such as 3D printing, micro-pharmaceutical production and automated digital weaving, can be deployed in cities to produce selected goods, reducing emissions and creating local job opportunities.

- **Relationship to the countryside.** Before the Industrial Revolution, cities were more readily supplied by the adjacent countryside with necessary food, energy, construction materials and consumables. Today, however, most cities rely on increasingly fragile global supply chains while the countryside is diminished by low-density sprawl and the destruction of natural ecosystems.

- **Clean Industries Zones.** New technologies allow for emerging clean industries to coexist harmoniously within the fabric of cities. This may alter the perception of industry as a polluting and environmentally damaging activity which, in the past, led to industrial and science parks being disconnected from the cities by default.

Pro-social Policies and Community Engagement

- **Pro-social Zoning**. Zoning regulations, developed in the early twentieth century, typically separate land uses by functions and promote low-density auto-centric sprawl. They are difficult to update as social, economic and technological conditions change. Dynamic and responsive planning alternatives for land-use rules should incentivise place-making and pro-social goals.

- **Innovation Districts**. With the transformation of work, conventional central business districts and office parks are becoming obsolete. Re-imagining the urban places that support evolving live-work patterns may reduce emissions and increase affordability, equity, creativity levels and the innovation potential of a community.

- **Leadership**. Positive urban transformation is most effective with strong, clear and enlightened leadership. The framing of challenges and the manner in which a vision for the future is communicated is of great importance for effective civic leadership.

- **Consensus**. Traditional community engagement processes often empower the loudest voices and discourage constructive conversations about complex issues. Evidence-based approaches can help communities reach a shared vision for the future.

- **Public Health**. Studies have shown that environments that promote physical activity such as walking, cycling and stairs may be the most effective means of preventing behaviour-related illnesses such as obesity, type-2 diabetes and congestive heart failure. These same solutions often simultaneously improve mental health. Community and infrastructure design can therefore proactively contribute to public health.

- **Safety and Security**. Particularly in cities in the Global South, improving safety and security is often cited as the most critical requirement to increase quality of life. Community design can improve the safety and security of residents in urban environments.

How can the performance of future communities be evaluated?

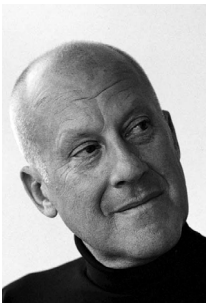
The process of evaluating the performance of future communities involves understanding current conditions, considering interventions that may improve these conditions and proposing scenarios to understand their impact on environmental, social and economic considerations. Factors of interest in modelling these considerations include:

- **Urban Infrastructure and Morphology**. This is the urban glue that binds together the individual structures in a city. It is the blocks of buildings, the boulevards, streets, public spaces, squares, parks, metros, terminals, bridges. The organisation of this physical infrastructure is linked to decisions on land use and determines the visual DNA of the city and its sense of identity. All of this is the outcome of conscious acts of planning. It can be the subject of modelling to create a digital twin to explore the dynamics of progressive change.

- **Human Dynamics.** Considering the flows of people and goods as well as economic activity and social interaction. This analysis can inform urban plans, infrastructure policy, land-use regulations, public services and economic initiatives.

- **Environmental Dynamics.** Modelling the distribution and access to energy, water and waste infrastructure, as well as implications for air pollution, noise levels and solar access. A focus on forms of intervention impacting embodied and operational CO_2 can contribute to local climate action plans and environmental preservation efforts.

Programme Co-Directors



Norman Foster
President, Norman Foster Foundation

Norman Foster is the founder and executive chairman of Foster + Partners. Over more than five decades the practice's output has encompassed urban masterplans, public infrastructure, airports, civic and cultural buildings, offices and workplaces, private houses and furniture design. Major projects include Beijing Airport, the Millau Viaduct in France, 30 St Mary Axe and the Great Court at the British Museum in London, the Hearst Headquarters tower in New York and the Museum of Fine Arts, in Boston. Recent projects include Apple Park in California, Bloomberg's European Headquarters in London and the Comcast Tower in Philadelphia. Some of his current projects include 425 Park Avenue in New York, the Narbo Via museum in Narbonne, the Magdi Yacoub Global Heart Center in Cairo, and the Headquarters Tower for JP Morgan Park Avenue in New York.

He is president of the Norman Foster Foundation, based in Madrid with a global reach, promoting interdisciplinary thinking and research to help new generations of architects, designers, and urbanists anticipate the future.

Lord Foster of Thames Bank was appointed by Queen Elizabeth II to the Order of Merit in 1997 and in 1999 was raised to the peerage in the Queen's Birthday Honours List. He is the President of the Royal Fine Art Commission Trust and leads the Forum of Mayors for the United Nations.

Kent Larson
Director, City Science Group, Massachusetts Institute of Technology (MIT) Media Lab

Kent Larson is Director of City Science at the MIT Media Lab, with research focused on compact transformable housing, ultralight autonomous mobility systems, sensing and algorithms to recognize and respond to complex human behavior, and advanced modeling, simulation, and tangible interfaces for urban design.

He has established an international network of affiliated City Science Labs in Shanghai, Taipei, Ho Chi Minh City, Toronto, Hamburg, Andorra, and Guadalajara. He received 10-Year Impact Awards from Ubicomp in 2017 and 2019 for recognition of work that, with the test of time, has had the greatest impact.

Larson's book, *Louis I. Kahn: Unbuilt Masterworks,* was selected as one of the Ten Best Books in Architecture 2000 by the New York Times Review of Books. He has founded or cofounded multiple MIT spinoff companies including ORI Living, an architectural robotics company creating systems for dynamically reconfigurable environments.

02

Master's Programme

Why Study this Master's?

The Norman Foster Institute (NFI) Master's Programme on Sustainable Cities is an impact-focused course that trains future city-makers. It engages directly with the urgent challenges shaping the cities of tomorrow. Grounded in real-world contexts and partnerships with global pilot cities, the course blends theory, fieldwork, and design-based inquiry to craft bold, actionable solutions. Through close collaboration with award-winning practitioners, civic leaders, and interdisciplinary experts—from architects and artists to policymakers and activists — students gain insights to design for equity, resilience, and impact.

Our exclusive, focused student cohort benefits from close faculty interaction, dedicated lab facilities, and intensive workshops. Teams work collaboratively on pilot city projects and benefit from cross-disciplinary specialisations to deliver interventions spanning across fields. A highly immersive experience, mentorship, preparing students to lead urban transformation at the scale of our future demands. The programme culminates in presentations to local authorities, positioning them as replicable case studies for global urban contexts.

During the programme, students will have the opportunity to focus their studies and contributions in one of the following streams:

City Science, Urban Design and Architecture.

Programme Essentials

Language
English

Mode of Study
Full time

Campus
Madrid, Spain

Format
In person

Length
1 year

Dates
Jan-Dec 2026

Location

Academic Hub
Monte Esquinza 48, 28010, Madrid, Spain

Academic and Cultural Hub
Orfila 5, 28010, Madrid, Spain

Centre for City Science
Zurbarán 15, 28010, Madrid, Spain

Events and Library
Calle de Almagro 42, 28010, Madrid, Spain

Conferences and Debates
General Martínez Campos 14, 28010, Madrid, Spain

Aimed at

This Master's is intended for those who seek a holistic approach to the design and management of cities.

It is open to all graduate and postgraduate students, as well as professionals in the fields of Anthropology, Architecture, Arts, Computer Science, Construction, Data Analytics, Design, Economics, Engineering, Environment, Geography, History, Law, Mathematics, Public Policy, Sociology, Transportation, Urban Planning, Urban Design and other related disciplines.

International Certification

This programme is established in partnership with the Universidad Autónoma de Madrid. Signed by the Co-Directors of the Programme on Sustainable Cities Norman Foster, President of the Norman Foster Foundation and Advocate of the United Nations Forum of Mayors, and Kent Larson, Director of the City Science Group at the Massachusetts Institute of Technology (MIT) Media Lab. Additionally, it is signed by the NFI Provost, Prof. Edgar Pieterse, Founding Director of the African Centre for Cities (ACC) at the University of Cape Town, Cape Town, South Africa, and the Provost of Universidad Autónoma de Madrid.

Scholarships

Merit-based scholarships are available for outstanding applicants in need of financial support.

Programme Specialisations

City Science

Led by Norman Foster and Prof. Gareth Simons

Students focusing on City Science explore how evidence and data-informed urban analysis can support vibrant, liveable and sustainable cities. Grounded in real-world data and contextual constraints from pilot cities, it integrates theory, technical training and applied analysis to address targeted urban challenges. With a focus on compact, walkable and inclusive urbanism, students learn to evaluate, design and communicate actionable interventions using advanced urban analytics. This specialisation teaches skills in GIS, Python, data science and spatial analysis, preparing students to support meaningful urban change through evidence-based design and policy.

Urban Design

Led by Norman Foster and Prof. Vishaan Chakrabarti

Students focusing on Urban Design explore the spatial, cultural and environmental principles that shape enduring and beloved public places. Emphasising the design of the civic realm, the curriculum bridges architecture, landscape and design to equip students with tools to create places that foster social connection, ecological resilience and cultural identity. Through a close study of urban form—from pedestrian-oriented street networks to human-scaled public spaces—students learn how physical design contributes to collective life and long-term sustainability. In the context of pressing global urbanisation and climate challenges, the course centres on design strategies that cultivate attachment, belonging and environmental stewardship.

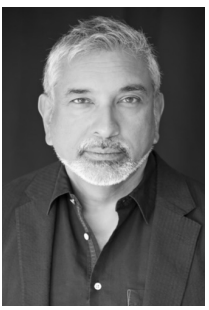
Architecture

Led by Norman Foster and Prof. Frédéric Migayrou

Students focusing on Architecture explore how the built environment can drive urban and social transformation through eco-responsible, future-focused projects. The course emphasises the development of innovative building types that respond to contemporary environmental and societal needs. Through workshops with leading experts, students are challenged to propose forward-thinking architectural programmes rooted in sustainable construction methods, biomaterials and digital design technologies such as generative tools and Artificial Intelligence (AI). With a strong emphasis on contextual relevance, innovation and ecological responsibility, the course equips students to design architecture that is both impactful and adaptable in an increasingly complex world.

Gareth Simons
Senior Research Fellow in Building Stock and Energy Modelling, Energy Institute; Research Fellow in Evidence Based Urban Design and Planning, Space Syntax, Bartlett School of Architecture, University College London (UCL)

Simons works at the intersection of urban design and computational methods, using data science and machine learning to inform analysis and design. He focuses on cities as complex systems, particularly street networks and land use evolution. He developed *cityseer,* a Python package for pedestrian-scale analysis, and led the latest version of the building stock model at UCL's Energy Institute to support UK energy analytics. In collaboration with the UCL Space Syntax Lab, he is developing scalable urban analysis tools for European cities through the EU Horizon TWIN2EXPAND project.

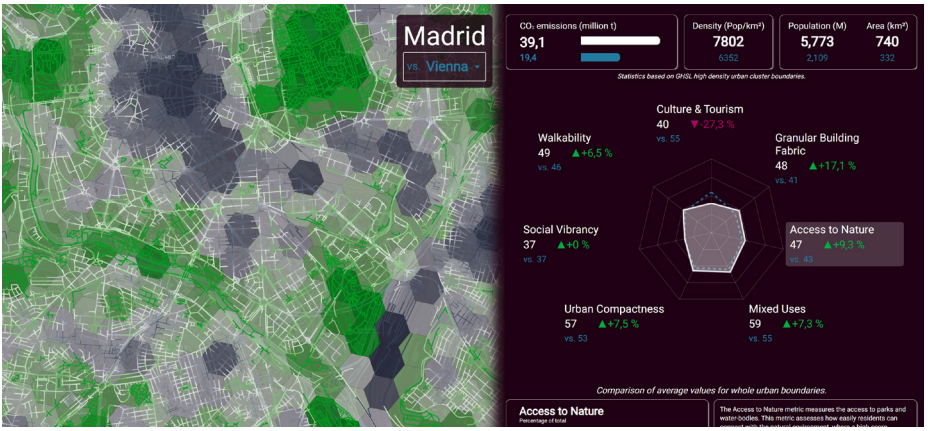


Vishaan Chakrabarti
Founder and Creative Director, Practice for Architecture and Urbanism (PAU)

Vishaan Chakrabarti, Founder and Creative Director of Practice for Architecture and Urbanism | PAU, has over 30 years of experience in visionary urban architecture. He leads a global portfolio of cultural, institutional, and public projects, including the redesign of New York's Penn Station, the FAA's sustainable air traffic control tower prototype, the expansion of the Rock and Roll Hall of Fame, Brooklyn's Domino Sugar Refinery, and Philadelphia's Schuylkill Yards. He is the author of *A Country of Cities* (2013) and *The Architecture of Urbanity* (2024). In 2025, he received the Edmund N. Bacon Urban Design Award for his innovative urbanism, and commitment to ecological and equitable design.

Frédéric Migayrou
Chair and Bartlett Professor of Architecture, The Bartlett School of Architecture; Deputy Director of the MNAM-CCI at the Centre Pompidou, Paris

Frédéric Migayrou is Chair and Bartlett Professor of Architecture at The Bartlett School of Architecture and Deputy Director of the MNAM-CCI at the Centre Pompidou, Paris. Founder of the Frac Centre Collection and ArchiLab, he has curated numerous landmark exhibitions, including *Naturalising Architecture* (2013), *Non Standard Architecture* (2003), *Coder le monde* (2018), and Neurones (2020), exploring architecture, digital technologies, and AI. At The Bartlett, he launched the B-Pro postgraduate and PhD programme focused on computation in architecture. His curatorial work includes major retrospectives on Tadao Ando, Frank Gehry, Bernard Tschumi, Le Corbusier, and Norman Foster, among others, across institutions in Paris, Tokyo, and beyond.



CityPulse Dashboard, NFI Centre for City Science, Norman Foster Foundation, 2024.

City Science

Lead by Norman Foster and Dr Gareth Simons

The intersecting patterns of streets and buildings, pedestrians and land uses, represent a confluence of the dynamic flows that animate our cities and the spatial forms through which we, in turn, engage with these. This constant stream of social, economic and material exchange underpins urban life. Yet, cities do more than contain these interactions; they actively intensify them. By drawing people and opportunities into closer proximity while multiplying the number of ways we can interact, cities generate ever more richly interconnected networks of potential. In this amplification lies the distinctive power of cities: broader access to services and opportunity, social and economic exchange, knowledge and discovery, innovation and adaptation.

When designed effectively, cities can magnify access to these potentials while simultaneously reducing per capita energy use and environmental impact. In this, we can learn from both historic and planned cities: particular arrangements of buildings and land uses in relation to streets and public spaces provide an efficient interface between people and the unfolding spatial dynamics of urban life. This reframes the city as a living network of relationships rather than a static collection of objects, and calls for an approach that emphasises access to these connections at the pedestrian scale. This spatial coupling relies on a specific type of urban form: compact and walkable, granular and mixed-use, public and inclusive. This form of urbanism is inherently resilient and adaptable, accommodating both routine patterns and the unplanned, spontaneous evolution of activities over time.

While urban theory has long emphasised these characteristics, an emerging evidence base increasingly validates the role of human-scaled urbanism. This evidence highlights the critical importance of pedestrian-scale connectivity—whether to jobs and schools or green spaces and services. It shows that cities can be designed to address urgent challenges: improving public health in the face of car dependency, advancing sustainability amidst climate change and enhancing liveability in an era of rapidly expanding cities. These findings not only confirm the need for compact, walkable, green and mixed-use cities, but also offer increasingly actionable ways to inform the design process and guide the creation of effective policy.

Importantly, these insights are now increasingly measurable. They can be used to evaluate different arrangements of urban form to better understand why some cities work well and others less so. When applied with spatial precision, they can help diagnose localised challenges and guide the strategic prioritisation of streets to address targeted issues and opportunities. These approaches support iterative design processes through measurement and real-world feedback mechanisms and enable comparative evaluation for scenario testing and stakeholder engagement.

In this course, these methods are actively applied through the collaboration with pilot cities, leveraging analytical tools and spatial data to generate place-specific insights that reflect real-world constraints and stakeholder priorities. The resulting framework empowers students to craft proposals merging ambition with context-sensitivity, ultimately towards measurable strategies designed to support the emergence of successful cities.

Urban Design

Lead by Norman Foster and Prof. Vishaan Chakrabarti

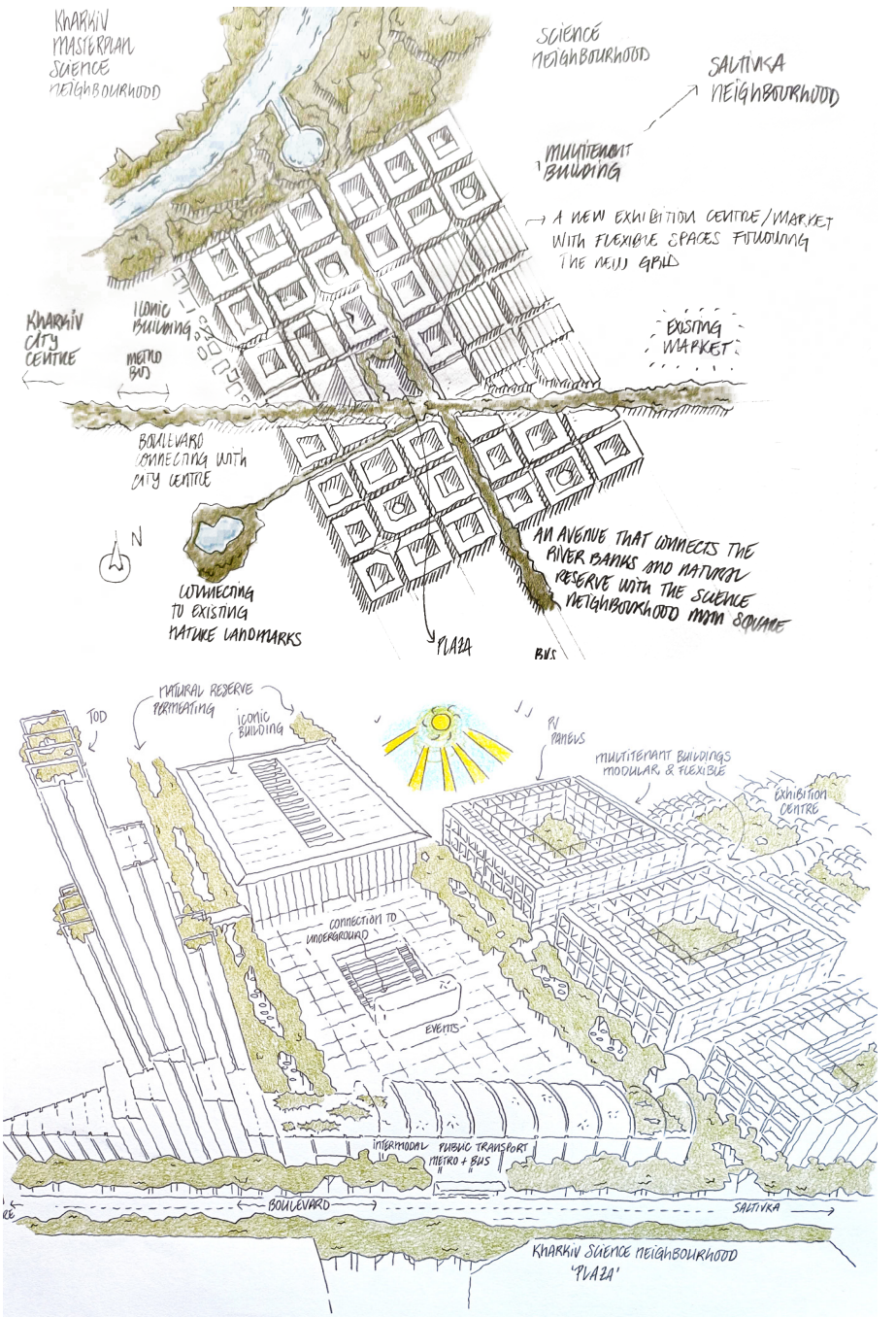
The most sustainable city is the beloved city. While technology will be crucial to developing more sustainable cities, such efforts will be fruitless if we do not simultaneously create community spaces that people cherish across time—this is why an environmentally sound but experientially repugnant city will never be sustainable. The stakes are clear: we must build beloved, sustainable cities that endure.

But what makes a place beloved? Why do we repeatedly return not just to certain communities but to their most cherished commons as places of gathering, celebration, romance, culture, tourism, protest, work and worship? Great cities around the world share certain physical characteristics: often they are bound together by a network of pedestrian-oriented streets of varying scale within which public spaces are typically found, whether they be large urban parks or smaller squares. These are usually defined by a sense of enclosure in which buildings or landscapes create a sense of outdoor 'rooms' that are open to the sky.

Such places are often composed of an urban fabric knitted together from background buildings that, like patches in a quilt, create streetscapes offering continuity with theme and variation in terms of colours, rooflines, fenestration or materials. Relief from this continuity is offered by foreground buildings, which are often cultural or institutional structures that tend to feature more exuberant architecture and an enhanced scale. These patterns reverberate equally in big cities as they do in rural villages, such as my father's ancestral birthplace in Bengal, where the community gathers at a small plaza beneath the shade of a banyan tree.

Urban Design is the study and practice of successfully crafting the civic public realm; it is a discipline that is related to but distinct from architecture, landscape architecture and urban planning. Students in this specialisation learn to generate responsive designs that not only integrate evidence-based insights but also resonate with and are beloved by the communities they serve. The curriculum places strong emphasis on the power of design—particularly placemaking—as a bridge between data and lived experience, enabling students to turn spatial patterns into actionable interventions that are contextually grounded, inclusive and aspirational.

At this critical moment in human history, with questions of ecology and technology pressing upon us at the same moment that we are so politically divided, the design and construction of communities that build social cohesion and love of the environment are as fundamental as questions of policy and urban equity. What principles might guide urban design at this moment beyond those established in eras past? The Urban Design specialisation engages directly with these complexities, equipping students to explore and apply the principles that should guide urban design today—crafting places that are not only functional and inclusive but also rich in meaning and deeply rooted in community.



Science Neighbourhood, Kharkiv Masterplan Concept, Norman Foster Foundation, 2022–ongoing.

Essential Homes Research Project, Norman Foster Foundation, 2023–ongoing.

Architecture

Lead by Norman Foster and Prof. Frédéric Migayrou

Architecture shapes the world we inhabit—physically, socially and ecologically. The Architecture specialisation course approaches design as both a critical and constructive tool for shaping sustainable urban futures. Students involved in this course work at the intersection of architecture, climate and social equity, exploring how built form can serve as a catalyst for transformation in cities across the globe.

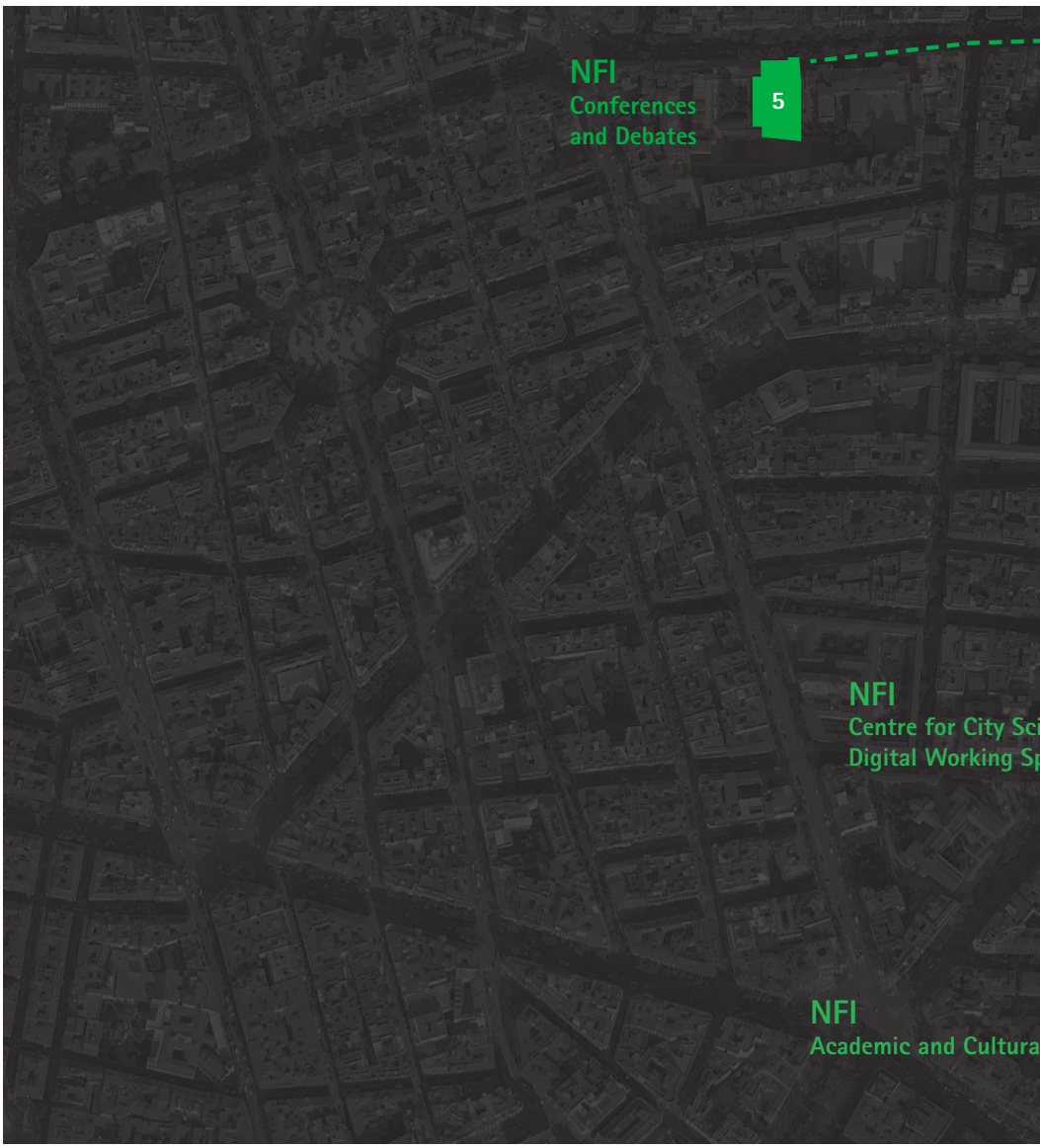
The course aims for an architectural response that is not abstract but rooted in data-informed analysis and dialogue with local agencies, community stakeholders and interdisciplinary experts. Students focus on identifying urban challenges and opportunities that align with the unique needs of each city, emphasising the importance of responsive design—an approach that adapts to evolving urban dynamics while addressing both immediate and long-term goals. They develop site-specific proposals that incorporate local knowledge and administrative insights, working closely with municipal planners and leaders to ensure that designs resonate with both the community and governing bodies.

The design process integrates advanced methods in digital design and fabrication, circular and passive strategies, and emerging materials and construction systems. Through a series of hands-on workshops and masterclasses, students build fluency in areas such as generative design, adaptive systems, biomaterials and structural resilience. They are taught to translate these techniques into real-world interventions that tackle urban challenges and harness the opportunities that arise from close collaboration with city administrations.

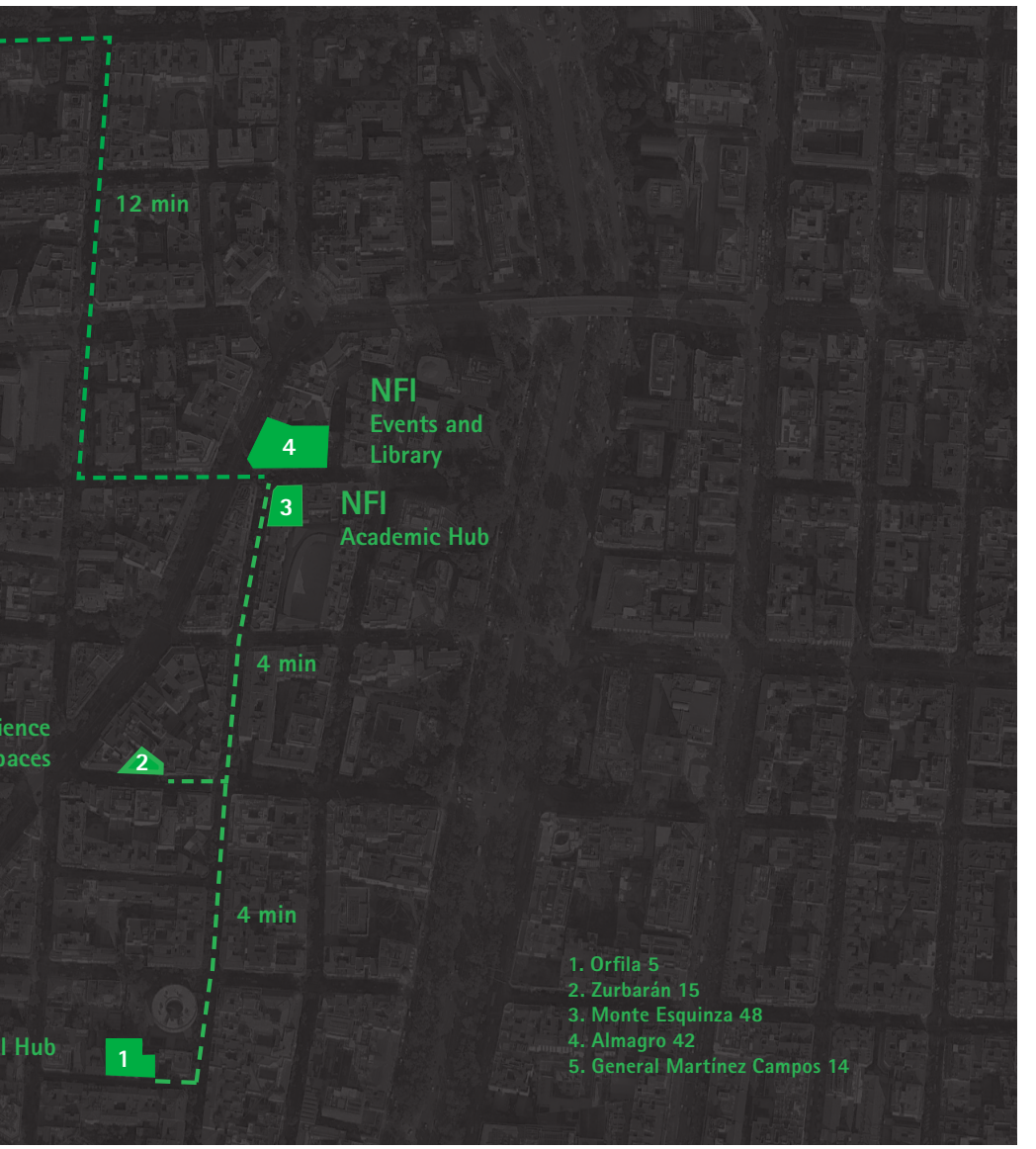
This specialisation champions architecture as both visionary and viable. Through ongoing consultations with local government bodies, students ensure that their designs align with urban policies and priorities, ultimately creating proposals that are innovative and, at the same time, implementable and scalable.

Work-based experimentation is balanced with a pragmatic emphasis on implementation, embedding research and design in real-world dynamics. Ultimately, students learn to translate responsive design into tangible urban solutions that are both effective in addressing identified issues and beloved by the communities they aim to serve. These projects are not just academic exercises; they are prototypes for a new architecture of responsibility, one that embraces innovation while responding directly to the urgent needs of cities and their communities.

The Norman Foster Institute Campus



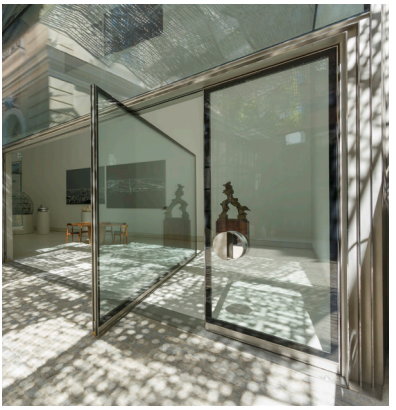
The Norman Foster Institute (NFI) Campus is located in an urban setting in the Madrid district of Chamberí. Its main activities take place across four iconic buildings, all within walking distance of one another. The campus includes two academic hubs and two dedicated spaces for public events, including conferences, symposiums, and presentations.

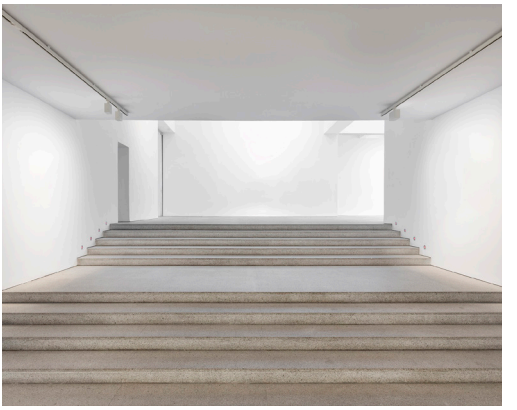


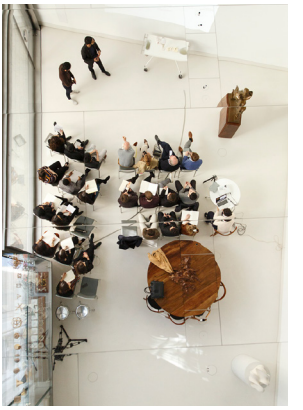
The NFI Centre for City Science features cutting-edge digital tools and collaborative working areas. In addition, students have access to the sports facilities and amenities of the Universidad Autónoma de Madrid, which has developed the NFI Master's in Sustainable Cities and provides its official certification.

NFI Academic and Cultural Hubs

Monte Esquinza 48, 28010, Madrid, Spain | Orfila 5, 28010, Madrid, Spain

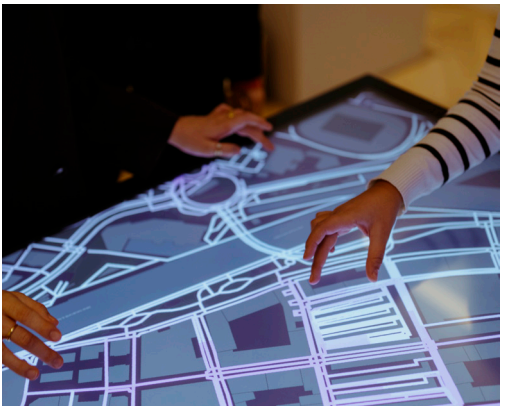


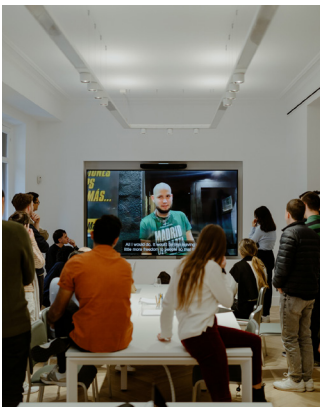


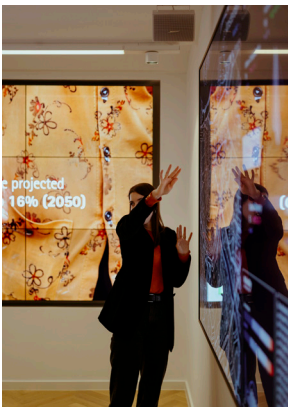


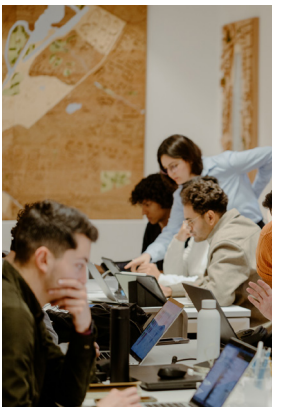
NFI Centre for City Science

Zurbarán 15, 28010, Madrid, Spain









NFI Public Events Spaces

General Martínez Campos 14, 28010, Madrid, Spain | Almagro 42, 28010, Madrid, Spain

The NFI Centre for City Science

The NFI Centre for City Science is a research laboratory that develops evidence-informed strategies to support city administrations in advancing sustainable urban development. The centre seeks to address key environmental and social challenges by creating practical solutions that enhance urban planning, public spaces, and policies, all aimed at improving the quality of life for residents.

The initiative operates through a dedicated team of researchers who develop tailored solutions for cities, guided by co-directors Norman Foster and Kent Larson. The team combines advanced urban analytics, design thinking, and sustainable strategies to address the unique challenges of each city. This approach ensures that this work is both locally responsive and globally informed, delivering measurable, impactful solutions that align with the specific needs and goals of city administrations.

How we do it

NFI Centre for City Science's methods encompass four key facets: diagnosis, solution finding, implementation strategies, and dissemination.

- **Diagnosis**

  Spatial Inventories: Map existing data, projects, and infrastructure to identify gaps, vulnerabilities, and opportunities.
  Thematic Analysis: Conduct analysis to identify key themes and indicators for assessment, exploring topics such as climate and ecology, availability of public and active transportation, and access to amenities and green spaces.

- **Solution Finding**

  Site Discovery and Selection: Develop selection criteria, datasets and analytical workflows based on identified priorities to select optimal locations for high-impact interventions.
  Strategic Interventions: Encourage adaptive spatial strategies that can be applied locally and scaled up incrementally and adaptively as funding and opportunities allow.

- **Implementation**

  Design and Implementation: Translate strategic priorities into tangible interventions in the urban realm through thoughtful design. Emphasis is placed on high quality placemaking to create comfortable pedestrian streets, vibrant public spaces, and enduring community value.
  Policy and Advisory: Align strategies with existing policies, advocate for necessary adjustments, and encourage frameworks that support sustainable development.
  Post-occupation Evaluation and Monitoring: Evaluate interventions and monitor interventions and key sustainability metrics over time, such as climate impacts or changes in pedestrian activity.

- **Dissemination**

  Data Visualisation and Communication: Convert complex urban data into clear, actionable insights, using interactive maps, dashboards, and simulations.
  Public Participation: Develop guidelines and tools to encourage community engagement and build consensus.

03

Summary

Programme Summary

42 weeks

Stage I Foundations
4 weeks

The Foundations stage defines sustainable development goals for the Pilot Cities. This stage draws a retrospective of history and government to better understand the framework for project impacts.

Stage II Diagnosis
14 weeks

The diagnosis stage provides an integrated understanding of different spaces for transformation. Students develop a diagnosis of six thematic layers.

- **Transformation Challenges**

  The students identify key transformation challenges for the pilot cities.

- **Pilot City Engagement**

  The students visit the pilot cities and workshop with the city representatives.

Stage III Interventions
24 weeks

A project-based testing of implementation strategies through three specialisations: City Science, Urban Design and Architecture.

- **Project Development**

  Students develop proposals for interventions and test their implementation through technical workshops with experts.

- **Final Presentations**

  Presentation of the students' proposals to the cities' mayors and representatives.

Objectives

The Master's Programme on Sustainable Cities is mindful of the premise that the planet is becoming a network of cities, and the most successful cities will evolve into more liveable, entrepreneurial and resource-efficient communities. The primary focus is to train students from different disciplines in the sustainable development of cities with effective strategies for the future. Students explore how to:

- Understand methods for gauging the environmental, social and economic performance of a city.
- Study the history of different kinds of cities, including informal settlements and suburbia.
- Know mechanisms for governance and transformation of communities.
- Lay out clear environmental strategies to tackle climate change impact, mindful of the goal of 2.5 tons of CO_2 emissions per person per year in cities.
- Incorporate the Sustainable Development Goals (SDGs) into local sustainability and climate action plans.
- Identify the designs, technologies and public policies that can dramatically improve cities.
- Explore challenges and opportunities addressing density, walkability, mobility, diversity, affordability and social equity issues.
- Experience hands-on fieldwork and community engagement.
- Propose urban strategies focusing on the neighbourhood scale.
- Foster improvements to the quality of life, public health and biodiversity.
- Develop communication, presentation, leadership and advocacy skills.
- Use evidence-based methods to test implementation strategies.
- Combine human-centred and data-driven design in projects and relate them to a global context.

Structure

The 42-week programme consists of three stages—*Foundations*, *Diagnosis* and *Interventions*, with time divided between classrooms, cities and studios.

- *Foundations* consists of an in-depth study of the concepts and processes necessary to understand a city, from history and governance to the ethics and metrics that define sustainable cities. Special emphasis is placed on understanding the 'importance of a place', building upon concepts such as 'townscape/cityscape' as well as different strategies of urban space making.
- *Diagnosis* provides an understanding of the challenges and opportunities for transformation in each city. It studies six of the layers at which a city could be defined: Planning & Public Space, Networks & Mobility, Climate & Natural Enviroments, Resources & Energy, Economy & Social Infrastructure and Culture & the Arts.
- *Interventions* enables ideas that reduce embodied and operational emissions to improve public health and create a new vision for communities. This stage is dedicated to testing a range of strategies for sustainable improvement in each field for the selected areas.

04

Contents

Stage I – Foundations

Pre-courses + Introductory Week + 3 Weeks

The first four weeks of the programme consist of an in-depth study of the concepts and processes necessary to understand a city. Through seminars by experts followed by brainstorming and round-table debate with the academic body on relevant themes and pilot cities, students engage with the foundations of a city.

Skills Courses

Each week there are classes that teach the methods that students need to address the topic of the week. The three skills courses that are given throughout this stage are:

Sustainable Policies Framework

Sustainable Development Goals
Urban Agendas
EU taxonomy

Introduction to Geographic Information Systems (GIS)

Cartography
Basic Spatial Operations

Introduction to Python

Data types
Functions
Automation

Introduction

- Opening and programme breakdown.
- Keynote lectures.
- Pilot cities introduction and assignment.

The opening week is be devoted to an introduction to the programme with keynote lectures from the Co-Directors and Academic Council. Students are introduced to and trained in leadership, advocacy, communication and presentation skills. They are assigned to their cities and groups, and begin documentation of the programme through film and other media.

History & Technology

- Global history of the urban form and planning.
- Post-colonial perspective on urban morphology.
- Ecological impacts and technology in urban history.
- Cities, health and pandemics through history.

Students gain awareness of the history and diversity of urban settlements across different continents. They learn how to read both old and contemporary cartography to be able to assess urban heritage policies and practices.

Sustainability & Frameworks

- Climate change law framework.
- Sustainable Development Goals.
- Urbanisation and sustainable urban development at the local, national and global level.
- Urban metrics, data-driven measurements.

Students are introduced to the criteria of sustainability and develop a critical perspective on sustainable frameworks and acquire a more nuanced approach to them. In this block, they identify the characteristics of diverse kinds of cities and debate global urbanisation in a time of climate change.

Governance & Ethics

- Public policies.
- City management.
- Informal settlements overview.
- Civil rights and discrimination.

This section starts with a comprehensive study of the role of public policies, private interests and city management from an ethical perspective. The role of politics is examined in issues of equality, especially related to the provision and distribution of affordable housing. The issue of informal settlements is covered—their evolution and strategies for their transformation. For broad application, specialist contributors explore the processes of consultation in a bottom-up approach compared with traditional models from the past.

Stage II – Diagnosis

12 Weeks + 2 Weeks of Pilot City Engagement

The second stage of the programme lasts for 12 weeks and is devoted to the layers of Diagnosis of the city, essential skills and project development work. This stage culminates with preparation and visits to the cities with a focus on the scale of the neighbourhood. Students study and debate these issues to create a small number of well-defined project assignments in the form of Challenges and Opportunities for selected areas in each city.

Skills Courses

Throughout Stage II, skills courses teach technical skills that students need to develop their future projects. The three skills courses that are given throughout this stage for twelve consecutive weeks are:

Urban Analytics I

QGIS
Python
Data preparation
Data modelling
Urban metrics

Research Methods & Dissemination

Research methodologies
Archives & sources
Dissemination & publishing
Presenting
Mapping theory & graphics

Leadership & Project Planning

Team management
Risk taking and decision making
Collaborative project planning
Agile project development

Seminars present 6 key layers, each has a duration of two weeks, and the students identify key transformation challenges for the pilot cities.

- **Planning & Public Spaces:** topics address issues of bottom-up development, housing, industry, health, and regenerative architecture in order to focus on master plans, density, mix of uses, affordability, high-performance buildings, townscape and place-making.

- **Networks & Mobility:** topics address issues around the complexity and balance of systems of transportation, mobility, and human behaviour patterns in urban areas to open discussion on matters such as hubs, public/private transport, lightweight mobility and walkability.

- **Climate & Environments:** topics address issues of climatology, ecosystems, water, and environmental politics to set frameworks on climate, topography, vegetation/green spaces, carbon footprint and living systems.

- **Resources & Energy:** topics address issues of energy, water governance, circular economy, and food production in order to introduce subjects such as grids, recycling & upcycling, alternative energy sources, waste management and sanitation.

- **Economy & Social Infrastructure:** topics address issues of urban economics, politics, demographics and catalytic communities and social services in order to tackle questions of equality, diversity, circular economy, innovation, and interest groups.

- **Culture & the Arts:** topics address issues of public art, art in the city, arts and the sciences and art communities in order to challenge matters of tourism, historic neighbourhoods, and digitisation.

Public Health & Resilience: The Diagnosis Stage culminates with a workshop on Public Health & Resilience, an overarching theme that informs and intersects with every layer of the programme's analysis and design approach.

Pilot City Engagement

Field work plays a central role in the project development, overcoming distances between planning and site, proposal and inhabitants, intervention and stakeholders. Field trips include:

- Diagnosis, challenges, presentation and feedback.
- First-hand experience and fieldwork—the neighbourhood—observing, walking, interviewing, recording, collecting and filming.
- Community engagement and development of outreach skills.
- Identification of areas to study and create improvements.

Stage III – Interventions

12 Weeks + 12 Weeks of Project Development

In the third stage of the programme, students transition from analysis to the development and testing of targeted interventions within pilot cities. Building on foundational knowledge and context from earlier stages, this phase introduces three specialisation: City Science, Urban Design and Architecture, allowing students to focus their skills and creativity on distinct yet interconnected dimensions of sustainable urban transformation. Working in interdisciplinary teams, students develop project proposals that respond to critical urban challenges, informed by hands-on technical workshops and skills labs tailored to each specialisation. In this stage, students engage in workshops aligned with their specialisation, each culminating in tangible actions that feed into a cohesive strategy for urban intervention. The focus is on designing actionable, evidence-based and context-sensitive solutions that can be implemented, measured and adapted for broader impact.

Skills Courses

Stage III courses target technical skills and tools that students use to develop and test their project proposals. The three skills courses that are given throughout this stage for twelve consecutive weeks are:

Urban Analytics II

Network analysis
Statistical aggregations
Data mining
Data visualisation
Evidence-based workflows

Innovation & Entrepreneurship

Business models
Fundraising
Feasibility & benchmarks
Scaling up
Incubators & accelerators

Engagement & Outreach

Stakeholder outreach
Public participation
Crowdfunding
Social media management
Marketing and promotion

Specialisations	Workshops	Actions
City Science Led by Norman Foster & Dr. Gareth Simons	**Climate Analysis & Nature-based Solutions**: Urban microclimates, thermal comfort, extreme weather events & nature-based solutions. **Networks, Graphs & Transport**: Street networks, walkability, & land use accessibility. **Computational Planning & Land-use**: Evidence-based urban design workflows. **Energy Models & Life-cycle Analysis**: Urban energy models & emissions, utility grids & district frameworks. **Narrative**: Communication of urban ideas, data visualisation, graphical storytelling, discourse & strategic framing.	Dense Compact Cities Civic Core Live-work Proximity Proximity to Amenities Proximity to Nature Hyper-efficient Housing High-performance Buildings Public Transit Lightweight Community-Scale Mobility High-Density Distributed Energy Clean Industries Zones
Urban Design Led by Norman Foster & Vishaan Chakrabarti	**Core & Skills:** Urban morphology & the design of the civic realm. Culturally rooted place-making strategies. **Digital Tools:** Mapping & visualisation techniques for urban form. Use of 2D & 3D design tools to generate spatial scenarios, site constraints, & community dynamics. **Responsive Design:** Designing for social interaction, ecological performance, & human experience. **Urban Policies and Economics:** Planning regulations, land value, zoning & development. **Narrative**: Communication of urban experiences, materiality, front and background buildings.	Walkable Streets Active Public Spaces Urban Canopies Social Infrastructure Ecological Corridors Local Cultural Identity Green Civic Landmarks Flexible Mixed-use Blocks Civic-oriented Neighbourhoods Shared Urban Commons
Architecture Led by Norman Foster & Frédéric Migayrou	**Core & Skills:** Architectural composition & tectonics. Contextual design approaches for climate and culture. **Digital Tools:** Design-to-production workflows integrating context-based performance. Innovative tyologies. **Responsive Design:** Bioclimatic architecture, passive systems, & adaptive reuse. Designing for climate responsiveness, thermal comfort, material efficiency, & future-proofing. **Fabrication & Materials:** Nature-based materials, digital fabrication, & circular construction systems. **Narrative**: Visual storytelling, spatial diagrams, conceptual framing, prototyping.	Sustainable Housing Civic and Cultural Hubs Bioclimatic Prototypes Adaptive Building Typologies Off-grid Architecture Low-carbon Materials Modular and Prefabricated Systems Urban Timber and Bio-based Structures AI-driven Design Resilient Community Facilities

NFI Norman Foster Institute on Sustainable Cities

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